NYRCR ULSTER COMMUNITIES

NY RISING COMMUNITY RECONSTRUCTION PLAN

March 2014

NY Rising Community
Reconstruction Program

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Foreword

Introduction

In the span of approximately one year, beginning in August 2011, the State of New York experienced three extreme weather events. Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy wreaked havoc on the lives of New Yorkers and their communities. These tragic disasters signaled that New Yorkers are living in a new reality defined by rising sea levels and extreme weather events that will occur with increased frequency and power. They also signaled that we need to rebuild our communities in a way that will mitigate against future risks and build increased resilience.

To meet these pressing needs, Governor Andrew M. Cuomo led the charge to develop an innovative, community-driven planning program on a scale unprecedented and with resources unparalleled. The NY Rising Community Reconstruction (NYRCR) Program empowers the State's most impacted communities with the technical expertise needed to develop thorough and implementable reconstruction plans to build physically, socially, and economically resilient and sustainable communities.

Program Overview

The NYRCR Program, announced by Governor Cuomo in April of 2013, is a more than $650 million planning and implementation process established to provide rebuilding and resiliency assistance to communities severely damaged by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Drawing on lessons learned from past recovery efforts, the NYRCR Program is a unique combination of bottom-up community participation and State-provided technical expertise. This powerful combination recognizes not only that community members are best positioned to assess the needs and opportunities of the places where they live and work, but also that decisions are best made when they are grounded in rigorous analysis and informed by the latest innovative solutions.

One hundred and two storm-affected localities across the State were originally designated to participate in the NYRCR Program. The State has allocated each locality between $3 million and $25 million to implement eligible projects identified in the NYRCR Plan. The funding for these projects is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program[1].

Forty-five NYRCR Communities, each comprising one or more of the 102 localities, were created and led by a NYRCR Planning Committee composed of local residents, business owners, and civic leaders. Members of the Planning Committees were identified in consultation with established local leaders, community organizations, and in some cases municipalities. The NYRCR Program sets a new standard for community participation in recovery and resiliency planning, with community members leading the planning process. Across the State, more than 500 New Yorkers represent their communities by serving on Planning Committees. More than 400 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's NYRCR Program team to develop community reconstruction plans and identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 125-plus Public Engagement Events attracted thousands of community members, who provided feedback on the NYRCR planning process and proposals. The NYRCR Program's outreach has included communities that are

1. Five of the 102 localities in the program—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.

traditionally underrepresented, such as immigrant populations and students. All planning materials are posted on the NYRCR Program's website (www.stormrecovery.ny.gov/nyrcr), providing several ways for community members and the public to submit feedback on materials in progress.

Throughout the planning process, Planning Committees were supported by staff from the Governor's Office of Storm Recovery (GOSR), planners from New York State (NYS) Department of State (DOS) and NYS Department of Transportation (DOT), and consultants from world-class planning firms that specialize in engineering, flood mitigation solutions, green infrastructure, and more.

With the January 2014 announcement of the NYRCR Program's expansion to include 22 new localities, the program comprises over 2.7 million New Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allocated over $650 million of funding to the program for implementing projects identified in the NYRCR Plans. NYRCR Communities are also eligible for additional funds through the program's NY Rising to the Top Competition, which evaluates NYRCR Communities across eight categories, including best use of technology in the planning process, best approach to resilient economic growth, and best use of green infrastructure to bolster resilience. The winning NYRCR Community in each category will be allocated an additional $3 million of implementation funding. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and create new funding opportunities where none existed before.

The NYRCR Program has successfully coordinated with State and Federal agencies to help guide the development of feasible projects. The program has leveraged the Regional Economic Development Council's State Agency Review Teams (SARTs), comprised of representatives from dozens of State agencies and authorities, for feedback on projects proposed by NYRCR Communities. The SARTs review projects with an eye toward regulatory and permitting needs, policy objectives, and preexisting agency funding sources. The NYRCR Program is continuing to work with the SARTs to streamline the permitting process and ensure shovels are in the ground as quickly as possible.

On the pages that follow, you will see the results of months of thoughtful, diligent work by NYRCR Planning Committees, passionately committed to realizing brighter, more resilient futures for their communities.

The NYRCR Plan

This NYRCR Plan is an important step toward rebuilding a more resilient community. Each NYRCR Planning Committee began the planning process by defining the scope of its planning area, assessing storm damage, and identifying critical issues. Next, the Planning Committee inventoried critical assets in the community and assessed the assets' exposure to risk. On the basis of this work, the Planning Committee described recovery and resiliency needs and identified opportunities. The Planning Committee then developed a series of comprehensive reconstruction and resiliency strategies, and identified projects and implementation actions to help fulfill those strategies.

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the NYRCR Community's prioritization of these projects and actions. Proposed Projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding. Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. Additional Resiliency Recommendations are projects and actions that the

Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects found in this NYRCR Plan were voted for inclusion by official voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

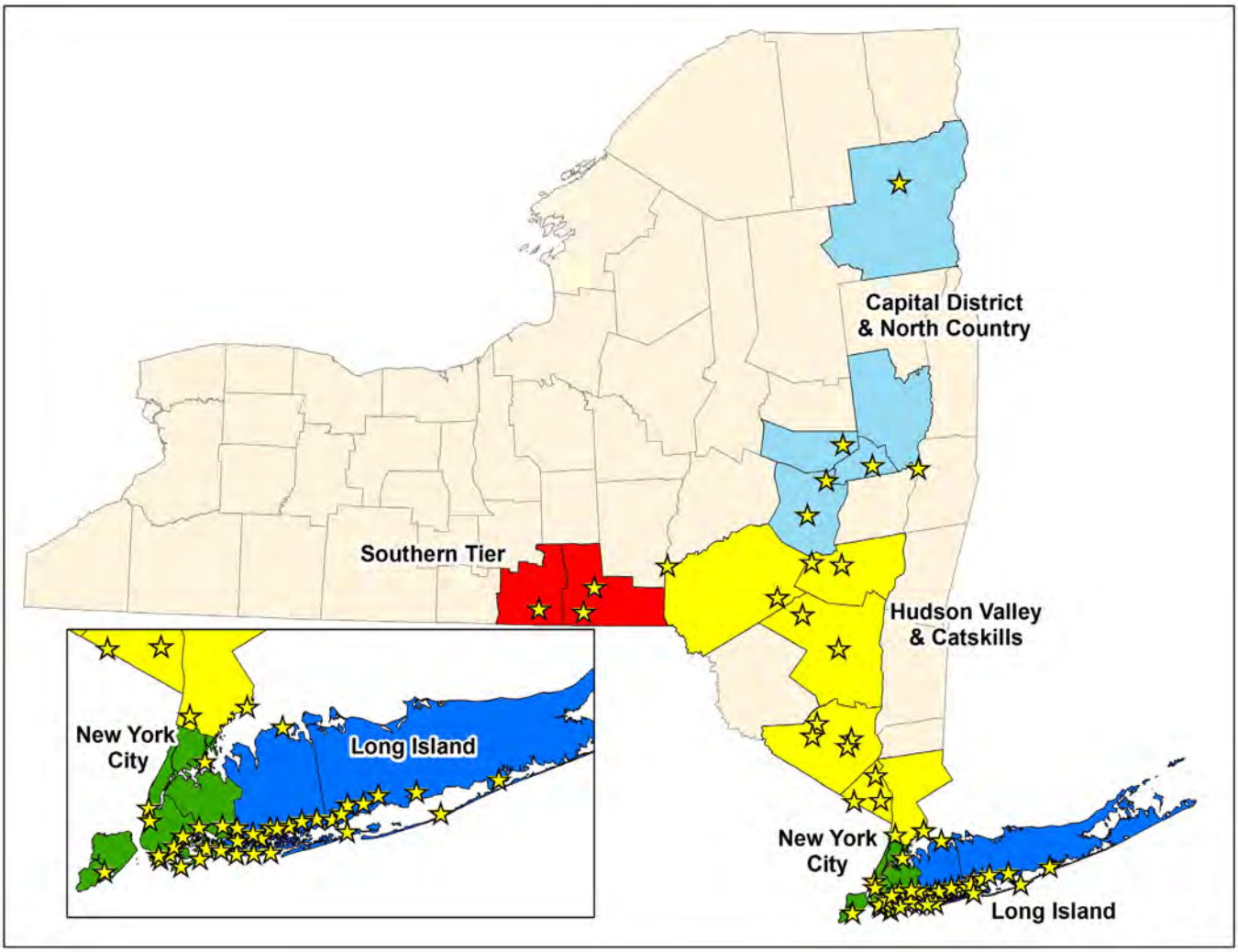
NYRCR Ulster Communities are eligible for up to $30 million in CDBG-DR implementation funds[2].

While developing projects for inclusion in this NYRCR Plan, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. Planning Committees also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding. Projects and actions implemented with this source of Federal funding must fall into a Federally-designated eligible activity category, fulfill a national objective (meeting an urgent need, removing slums and blight, or benefiting low to moderate income individuals), and have a tie to the natural disaster to which the funding is linked. These are among the factors that the Governor's Office of Storm Recovery will consider, in consultation with local municipalities and nonprofit organizations, when determining which projects and actions are best positioned for implementation.

The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in this NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in this NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented. The Governor's Office of Storm Recovery will actively seek to match projects with funding sources.

In the months and years to follow, many of the projects and actions outlined in this NYRCR Plan will become a reality helping New York not only to rebuild, but also to build back better.

2. The following localities' allocations comprise the NYRCR Community's total allocation: Village of Ellenville - $3 million; Town of New Paltz - $3 million; Village of New Paltz - $3 million, Town of Olive - $3 million, Town of Rochester - $3 million, Town of Rosendale - $3 million, Town of Saugerties - $3 million, Village of Saugerties - $3 million, Town of Wawarsing - $3 million, Town of Woodstock $3 million.



Note: map includes those NYRCR Communities funded through the CDBG-DR program, including the NYRCR Communities announced in January 2014.

Table of Contents

Section I. Community Overview I-1

A. Geographic Scope I-4

B. Description of Storm Damage I-6

C. Critical Issues..... I-8

D. Community Vision I-23

E. Relationship to Regional Plans I-23

Section II: Assessment of Risk and Needs..... II-1

A. Description of Community Assets and Assessment of Risk..... II-1

i. Description of Community Assets II-1

ii. Assessment of Risk to Assets and Systems II-20

B. Assessment of Needs and Opportunities II-43

Section III: Reconstruction and Resiliency Strategies..... III-1

Section IV: Implementation - Project Profiles..... IV-1

Intermunicipal Proposed Projects

Rondout Watershed Study and Improvements IV-4

Stream Bank Restoration IV-6

Emergency Shelter IV-9

Intermunicipal Featured Projects

Temporary Regional Shelter Located in a New Wing to be Constructed at Ellenville Regional Hospital IV-10

Proposed Projects

Village of Ellenville

Generators for Ellenville School and Village Water Supply IV-11

Town & Village of New Paltz

Carmine Liberta Bridge IV-12

Consolidated Municipal and Emergency Operations Center IV-13

Flood Prevention Strategies and Stormwater Management for Wallkill River & Waterways IV-14

Inflow and Infiltration Investigation and Permanent Wastewater Collection System Repairs IV-15

Route 299 West and Springtown Road IV-16

Sewer Treatment Plant Hardening IV-17

Springtown Road Rail Trail Approach Reconstruction IV-18

Town of Olive

Bushkill Creek Stream Restoration IV-19

Relocate Boiceville Firehouse Co #5 .....IV-20

Relocate West Shokan Firehouse Co #3 .....IV-21

The Esopus Creek in Boiceville and the Bushkill and Maltby Hollow Creeks in West Shokan Flood Mitigation Project IV-22

Town of Rochester

Alligerville Emergency Station IV-24

Rehabilitate Existing Community Center to Serve as Disaster Relief Shelter IV-25

Rochester/Rondout Creek and Tributaries Immediate Repair IV-26

Town of Rosendale

Fann's Plaza Redevelopment IV-27

Flood Mitigation and Protection for Key Intersections in Town IV-28

Flood Mitigation and Protection to Homeowners
Prone to Flooding IV-29

Generators for Town Facilities IV-30

Rosendale Flood Control Project Improvement IV-31

Rosendale Sewer Treatment Plant Stormwater Management Study IV-32

Stormwater Mitigation, Route 32/Washington Park IV-33

Town of Saugerties

Bridge Abutment Replacement IV-34

Harden Malden Sewer Plant Against Flooding IV-35

Replace Culvert-Platte Clove IV-36

Replace Culvert-Wilhelm Road IV-37

Sewer Extension to Creekside Neighborhoods IV-38

Storm Sewer Replacement IV-39

Stream and Stream Bank Rehabilitation IV-40

Village of Saugerties

Dredging Assistance IV-41

Housing Flood-Proofing Assistance IV-42

Parks Restoration IV-43

Repair Supporting Structures Adjacent to Lighthouse IV-44

Shoreline Stabilization at and Adjacent to Tina Chorvas Park IV-45

Water Supply Protection: Pre-Filter IV-46

Water Supply Protection: Silt & Debris Removal IV-47

Water Supply Protection: Supplemental Source Exploration IV-48

Town of Wawarsing

Oak Ridge Road Flood Mitigation IV-49

Route 209 Alternative Analysis IV-50

Town of Woodstock

John Joy Road Improvements IV-51

Mink Hollow Bridge Protection IV-52

Replace Culverts-Reynolds Lane and Church Road IV-53

Replace Culverts-Lane Road IV-54

Upgrade Route 212 .....IV-55

Featured Projects

Village of Ellenville

Mobile Water Pumps IV-56

Town of Olive

Relocate Town Offices & Highway Complex out of Flood Plain IV-57

Town of Rochester

Rochester Creek Bridge Project IV-58

Town of Wawarsing

Mobile Water Pumps on Trailer IV-59

Portable Generators & Transfer Switches IV-60

Stream Bank Restoration IV-61

Section V: Additional Materials V-1

A. Additional Resiliency Recommendations V-1

B. Master Table of Projects V-8

C. Public Engagement Process V-30

D. Community Asset Inventory V-38

E. End Notes V-73

F. Glossary V-74

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Executive Summary

I. Overview

Community Location and Allocation Amount

Ulster County, located in the mid-Hudson region of New York State, measures 1,161 square miles and is located approximately 100 miles north of New York City. Ulster County borders the western shore of the Hudson River. A considerable portion of the County is located within the Catskill Mountains and the Shawangunk Ridge. The County is comprised of 20 towns, three villages and the City of Kingston. According to the 2010 US Census, Ulster County is home to 182,493 residents.

This Ulster NY Rising Community Reconstruction Plan presents proposed programs, policies and construction initiatives developed by the NYRCR Ulster Communities, which includes the Villages of Ellenville, New Paltz and Saugerties; and the Towns of New Paltz, Rochester, Rosendale, Saugerties, Wawarsing and Woodstock.

Each of the NYRCR Ulster Communities is eligible for up to $3 million in CDBG-DR funding.

Scope of Planning Area

The Planning area includes the ten municipalities within NYRCR Ulster Communities. Although some of the areas within the geographic scope were not directly damaged by the storms, the Ulster NYRCR Planning Committee agreed that important community assets, areas where access to critical facilities was interrupted or cut off entirely due to storm-related flooding, and areas with high potential for more resilient reconstruction should be included in the planning area.

Summary of Storm Impacts

Hurricane Irene (August 28, 2011), Tropical Storm Lee (September 7, 2011), and Superstorm Sandy (October 29, 2012) hit the Ulster County NY Rising Communities with full force. The torrential downpour caused water levels in the Rondout Creek, Wallkill River, and Lower and Upper Esopus Creek to reach record heights causing widespread flash flooding. Homes, businesses and infrastructure were destroyed in all ten municipalities particularly in low-lying areas. Countless roads were closed due to flood waters overtopping culverts; bridges were closed isolating residents; and the force of the stormwater caused substantial infrastructure damage to water mains, sewage treatment facilities, and water delivery systems throughout the region.

Stream banks were overtopped and severely eroded, flooding dozens of homes and depositing natural and man-made debris throughout the stream corridors. Businesses were severely flooded, leaving residents without access to basic necessities for weeks. Residents were forced to evacuate their homes, moving to shelters established in local emergency service buildings, schools, and community centers. County-wide shelters were set up at the Belleayre Mountain Ski Center and the SUNY New Paltz Health and Wellness Center, which, given their remote locations were difficult to access.

The physical damage to roads, bridges, homes, and other essential infrastructure resulted in short and long term economic impacts that rippled throughout the County and the region. Irreparable losses to commodity farms, power failures, and, in some cases, isolation from economic centers complicated and delayed recovery efforts. Tourism, a major industry in this region, suffered greatly through both an overall loss of revenue and lost wages due to postponed

business activity. Today, Ulster County municipalities are still recovering from the damage caused by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee.

Summary of Critical Issues

During and after Hurricane Irene, Tropical Storm Lee and Superstorm Sandy, the Rondout, Wallkill and Esopus as well as various streams and tributaries overflowed their banks forcing water throughout the Towns and Villages. Previous development within the floodplain increased impervious surface coverage, inhibiting water storage absorption and funneling flood water further and further away from the source. When the water did recede back into the waterway, it took with it bacteria, roadway oils and spills, potentially contaminating valuable riverine ecosystems. Damage to streams and watersheds were severe and included stream bank erosion and deposits of man-made and natural debris. Passive and active recreation areas, trails for hiking, biking, climbing, swimming, skating, fishing, throughout the County were closed or damaged and some are still waiting for funding for repair.

The key critical issues facing the Ulster NYRCR Communities include:

- Widespread flooding of the Rondout, Wallkill and Esopus;
- Natural and man-made debris blocking culverts, lodging against bridge abutments, and inhibiting the flow of water, and compromising infrastructure;
- Direct economic impact to agricultural operations from commodity loss and secondary economic impacts to the region from loss of tourism revenue;
- Massive stream bank erosion throughout the watershed areas, and on the Hudson River shoreline;
- Lack of emergency preparedness, regional command centers and effective inter-municipal communication among emergency service providers;
- Damage to residential neighborhoods built in flood prone areas, exacerbated by the lack of resilient design and construction;
- Lack of regional sheltering, with protected access routes;
- Vulnerability of and damage to critical assets including key municipal and emergency service buildings, commercial and healthcare facilities;
- Vulnerability of and damage to bridges, culverts, roadways, water supply, wastewater treatment plans and system infrastructure;
- Widespread and prolonged roadway closures isolating neighborhoods, healthcare facilities and senior centers, regional shelters, businesses, regional economic generators, and preventing access by emergency service providers;
- Lack of designated route detours and signage;
- Prolonged and widespread electrical power interruption including to communication towers.

II. Community-Driven Process

Committee Vision/Goals

NYRCR Ulster Communities Vision for the Future

The Ulster NY Rising Community Group Reconstruction Plan will identify projects to advance a regionally-coordinated plan for resiliency that addresses the specific needs of our 10 municipalities to respond to and recover from future disasters. Our vision is to protect our residents and our man-made and natural resources by implementing ecologically-sound policies and programs that will sustain our local and regional environments and promote further growth in our economies.

Goals to realize that vision:

- Advance educational outreach to ensure our residents understand natural hazards and how they can protect themselves, their homes, neighborhoods, and communities against future disasters.
- Contribute to community recovery and regional preparedness with a defined approach to crisis planning, attracting and retaining volunteers, and enhanced communication between and among our municipalities and emergency services.
- Identify a plan for business continuity designed to ensure the availability of goods and services and to advance economic opportunity in the region.
- Develop policy, design, and construction standards to make our community more resilient in the future.
- Cultivate partnerships among private organizations, public agencies, and municipalities to address hazard mitigation, and ensure coordinated preparedness, and response.
- Identify and evaluate natural resources, waterways, and watersheds to restore, preserve, protect, and conserve our natural assets and reduce the vulnerability of our watersheds to storm-related hazards.

Summary of Public Outreach

The NYRCR Program is fundamentally a grass-roots initiative. Initial project recommendations were generated by the Ulster NYRCR Planning Committee, which was comprised of residents, business owners and municipal representatives from the ten NYRCR Ulster Communities. The Committee met approximately every other week from September 2013 through March 2014. Materials were circulated to the Planning Committee before and after each meeting and also posted to the NYRCR website. The Planning Committee members also created Facebook pages, posted relevant materials to their municipal websites, held additional meetings within their communities, and attended municipal meetings to report on their NYRCR Plan progress.

Four public engagement meetings were held throughout the eight month planning process. These meetings provided the opportunity for Ulster County residents to learn about the NYRCR planning process and provide input to help develop community-driven plans for a more resilient future. The format and venue of the Public Engagement Meetings varied, but generally included power point presentations, display boards and mapping, workgroups with maps and markers, survey sheets and comment boxes.

III. Final Plan as a Blueprint for Implementation

The risks to, and vulnerability of, the NYRCR Ulster Communities exposed by Superstorm Sandy, Hurricane Irene and Tropical Storm Lee forced everyone – from local residents to their elected representatives at every level of government – to change their focus from repair to resiliency and to prioritize improvements to pre-storm conditions. This change of purpose revealed significant opportunities to help the Communities build back better.

The NYRCR Ulster Communities understand where they are vulnerable, where their critical assets are located and the risks to those assets. To address their specific vulnerabilities, a comprehensive needs and opportunities analysis was prepared through a combination of research, analysis, NYRCR Planning Committee and community feedback. A sample of the needs and opportunities identified to address those needs are:

NEEDS:

- Multi-jurisdictional planning activities to mitigate future storm damage
- Systemic, coordinated regional watershed modeling data for the Rondout, Wallkill and Esopus Watersheds
- Regional inventory of sensitive environmental systems (wetlands and tidal areas) for use in flood control
- Fortified/hardened wastewater and stormwater management infrastructure
- Improved storm preparedness training, inter-municipal emergency communication systems, regional shelters, back-up power generators and water pumps
- Improved detour signage for post-disaster travel
- Additional financial, education and construction assistance to area businesses on flood mitigation and flood proofing measures
- Rehabilitation, repair and relocation assistance and homeowner buyout programs
- Revisions to local zoning regulations to restrict development from floodplains and flood prone areas
- Coordinated list of vulnerable and home-bound populations maintained by emergency service providers to ensure particular attention during and after events.

OPPORTUNITIES:

- Watershed-wide studies to manage and implement recovery initiatives.
- Regional hydraulic and hydrologic watershed modeling to identify system-wide infrastructure improvements including resizing culverts, bridge and roadway design
- Alternative broadcast channels for emergency dispatch
- Public education campaigns for storm preparedness
- Public-private partnerships for mutual assistance post storm assistance
- Assistance for flood proofing and elevating vulnerable structures
- Regional coordination for infrastructure improvements and flood control systems
- Alternative flood management initiatives including green infrastructure, best management practices for stream management
- Implementation of alternative renewal energy sources including wind, solar, geo-thermal.
- Regional network of shelters and food pantries and public private partnerships to ensure uninterrupted sources for provisions.

Sections I and II of the NY Rising Community Reconstruction Plan (NYRCR Plan) provide an overview of NYRCR Ulster Communities and present risks, vulnerabilities and needs. Strategies for reconstruction and resilience were developed to put action to the opportunities, presenting short-term action items (Proposed and Featured Projects) that most effectively implement identified opportunities.

Proposed Projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding.

Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.

Additional Resiliency Recommendations are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

Proposed and Featured Projects

Each strategy and the Proposed or Featured project presented in the table below specifically addresses a stated need and transforms an opportunity into an action item. The strategies were developed to concentrate the resiliency efforts toward resolving critical issues identified throughout the planning process. The Proposed and Featured Projects are presented in conjunction with the relevant strategy, though are not presented in any particular order of priority.

Community	Project Name
Strategy 1: Optimize regional coordination and communication to better mitigate flooding, plan for future disasters, and protect communities.	
Village of Ellenville, Town of Rochester, Town of Rosendale, Town of Wawarsing	Rondout Watershed Study and Improvements
Village of Ellenville, Town of Wawarsing	Stream Bank Restoration
Town & Village of New Paltz	Flood Prevention Strategies and Stormwater Management for Wallkill River & Waterways (streams, tributaries, etc.)
Town of Olive	The Esopus Creek in Boiceville and the Bushkill and Maltby Hollow Creeks in West Shokan Flood Mitigation Project
Village of Saugerties	Water Supply Protection: Supplemental Source Exploration
Town of Wawarsing	Stream Bank Restoration
Strategy 2. Implement measures to fortify and increase the resiliency of existing and future commercial development and critical infrastructure.	
Town of Rosendale	Fann's Plaza Redevelopment
	Stormwater Mitigation, Route 32/Washington Park
Town of Woodstock	Upgrade Route 212

Community	Project Name
Strategy 3. Improve emergency preparedness and increase the resiliency of critical health and social service facilities	
Village of Ellenville	Generators for Ellenville School and Village Water Supply
Town & Village of New Paltz	Consolidated Municipal and Emergency Operations Center
Town of Olive	Relocate West Shokan Firehouse Co #5
	Relocate Boiceville Firehouse Co #5
Town of Rosendale	Generators for Town Facilities
Village of Saugerties	Water Supply Protection: Pre-Filter
Village of Ellenville	Mobile Water Pumps
Town of Olive	Relocate Town Offices & Highway Complex out of Flood Plain
Town of Wawarsing	Mobile Water Pumps on Trailers
	Portable Generators & Transfer Switches
Strategy 4. Strengthen current emergency shelters at both a local and regional level and develop new sheltering opportunities where needed, particularly for vulnerable populations.	
Village of Ellenville, Town of Wawarsing	Emergency Shelter
Village of Ellenville, Town of Rochester, Town of Wawarsing	Temporary Regional Shelter Located in a New Wing to be Constructed at Ellenville Regional Hospital
Town of Rochester	Alligerville Emergency Station
	Rehabilitate Existing Community Center to Serve as Disaster Relief Shelter
Strategy 5. Provide assistance to homeowners to protect themselves from future flooding through mitigation measures, elevation, acquisition, relocation and general flood proofing	
Town of Rosendale	Flood Mitigation and Protection to Homeowners Prone to Flooding
Village of Saugerties	Dredging Assistance
	Housing Flood-Proofing Assistance
Strategy 6. Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability.	
Town & Village of New Paltz	Carmine Liberta Bridge Replacement
	Inflow and Infiltration Investigation and Permanent Wastewater Collection System Repairs
	Route 299 West and Springtown Road
	Sewer Treatment Plant Hardening
Town of Rosendale	Rosendale Flood Control Project Improvement
	Rosendale Sewer Treatment Plant Stormwater Management Study

Community	Project Name
Town of Saugerties	Bridge Abutment Replacement
	Harden Malden Sewer Plant against Flooding
	Replace Culvert-Platte Clove
	Replace Culvert-Wilhelm Road
	Sewer Extension to Creekside Neighborhoods
	Storm Sewer Replacement
Village of Saugerties	Repair Supporting Structures Adjacent to Lighthouse
	Water Supply Protection: Silt & Debris Removal
Town of Woodstock	John Joy Road Improvements
	Mink Hollow Bridge Protection
	Replace Culverts- Reynolds Lane and Church Road
	Replace Culverts-Lane Road
Town of Rochester	Rochester Creek Bridge Project
Strategy 7. Strengthen the transportation network by developing alternative transit and emergency routes.	
Town & Village of New Paltz	Springtown Road Rail Trail Approach Reconstruction
Town of Wawarsing	Oak Ridge Road Flood Mitigation
	Route 209 Alternative Analysis
Strategy 8. Preserve and restore natural areas including floodplains, streams and wetlands to help mitigate flooding.	
Town of Olive	Bushkill Creek Stream Restoration
Town of Rochester	Rochester/Rondout Creek and Tributaries Immediate Repair
Town of Rosendale	Flood Mitigation and Protection for Key Intersections in Town
Town of Saugerties	Stream and Stream Bank Rehabilitation
Village of Saugerties	Parks Restoration
	Shoreline Stabilization At and Adjacent to Tina Chorvas Park

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2014
NY RISING COMMUNITY RECONSTRUCTION PLAN

NYRCR ULSTER COMMUNITIES

Section I
Community Overview

I Community Overview

Geography

Ulster County, located in the mid-Hudson region of New York State, measures 1,161 square miles and is located approximately 100 miles (a two hour drive) north of New York City.

"Approximately three percent (34.83 square miles) of Ulster County is water" (Multi-Jurisdictional Natural Hazard Mitigation Plan, Ulster County, New York, February 2009)

Ulster County borders the western shore of the Hudson River. A considerable portion of the County is located within the Catskill Mountains and the Shawangunk Ridge. The County is comprised of 20 towns, three villages and the City of Kingston. According to the 2010 US Census, Ulster County is home to 182,493 residents.

The NYRCR Ulster Communities: the Villages of Ellenville, New Paltz, and Saugerties; and the Towns of New Paltz, Olive, Rochester, Rosendale, Saugerties, Wawarsing, and Woodstock.

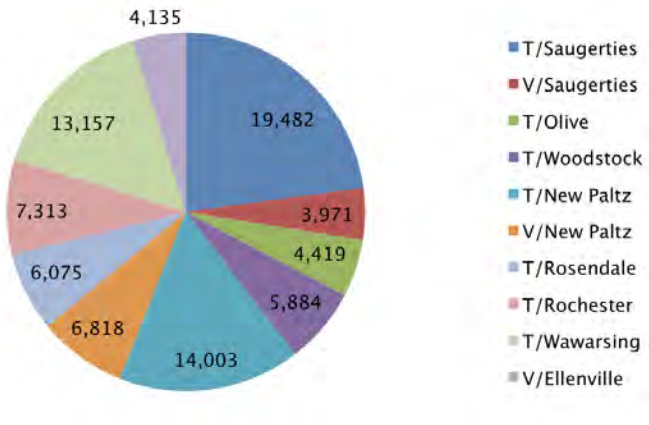
The NYRCR Ulster Communities cover approximately 475 square miles, and encompass three watershed areas. The Esopus Watershed covers 190.4 square miles, and generally includes the Towns of Olive, Woodstock, and Saugerties, and the Village of Saugerties in the northeastern portion of the County. The

Ulster NYRCR Planning Committee Meeting #1, 9.24.13 (Arch Street Communications)

Upper Esopus Creek flows from Slide Mountain to the West into the Ashokan Reservoir in the Town of Olive. The Lower Esopus Creek flows East from the Ashokan Reservoir and North towards Saugerties, where it is met by the Sawkill and Plattekill before flowing into the Hudson through the Village of Saugerties.

Demographics

The demographics for the NYRCR Ulster Communities varies significantly, with small villages (3,971 in the Village of Saugerties, 4,135 in Ellenville, and 6,818 in the Village of New Paltz), and small and large Towns (4,419 in the Town of Olive to 19,482 in the Town of Saugerties). Ulster County's largest population centers are the City of Kingston and the Town of Saugerties.



2010 Population - NYRCR Ulster Communities
Source: 2010 Census: Public Law 94-171 Data, ulstercountyny.gov

Uprooted Apple Tree, Town of New Paltz (Roger Dodge)

Natural Resources

The Wallkill River Watershed covers 35.6 square miles and includes the Town and Village of New Paltz. The Wallkill River flows through New Paltz, portions of Rosendale, and the City of Kingston to its outlet at the Hudson River. The largest economic activity center and employment generator in New Paltz is the State University of New York at New Paltz (SUNY), followed by tourism, recreational resources and activities, and small- and large-scale agricultural operations.

The Rondout Creek Watershed encompasses 248.4 square miles and includes the Towns of Rochester, Rosendale, and Wawarsing, and the Village of Ellenville. The Rondout Creek flows from the north into the Rondout Reservoir in the Town of Wawarsing and then flows East along Route 213, a major population and transportation corridor, through Rochester and Rosendale, where it joins the Wallkill River to its outlet at the Hudson River. The communities in the Rondout Creek subgroup are generally more rural than their neighbors in Ulster County, with an abundance of recreation and natural amenities and an economy supported by small scale industry, tourism and agriculture.

The Esopus Creek Watershed area is 425 square miles, divided into two parts by the Ashokan Dam. The area above the Dam commonly referred to as the Ashokan Basin measures 256 square miles. Flows from this upper drainage area are regulated by the Ashokan Reservoir. Flows from the area below the Dam, known as the Lower Esopus Watershed represents the drainage from 169 square miles of watershed combined with spillage or releases from the upstream reservoirs. The Lower Esopus includes two tributaries or sub-basins: the Plattekill and Sawkill. The lower creek has three distinct stream segments plus a tidal estuary at its mouth. Diversions for the New York City water supply are made from Ashokan Reservoir via the Catskill Aqueduct. Diversions from Plattekill Creek at the Blue Mountain Reservoir provide drinking water for the Village of Saugerties. Also, a slight diversion occurs at headwaters of the Saw Kill into Cooper Lake to supply water to the City of Kingston. Water is diverted from the lower Esopus Creek for agricultural irrigation.

The municipalities in Ulster County are as varied as is the landscape and topography – from the Hudson River, which forms the eastern border, to the hills and valleys throughout the County and the Catskill and Shawangunk Mountains. Ulster County offers a rich variety of natural resources, including wetlands, lakes, streams, and rivers, all contributing to the natural beauty of the region, but also to its vulnerability during storm events.

Awosting Falls (Sandra Nancetti)

Economy

The economy of the County is diverse relying on farms, and agri-tourism initiatives including farm-markets, food-based fairs and agricultural festivals, a growing economy of local breweries, vineyards, and distilleries. Small and large scale commodity and crop farming operations have historically been located in or near floodplains, because the lands are generally flat and adjacent to lakes, streams and rivers, essential for natural irrigation. During the natural course of the annual freeze and thaw, rivers, lakes and streams overflow their banks and flood into the established floodplain. This moderate flooding is generally good for farms, because minerals, water and moisture helps plants thrive and grow and provides nutrients to grazing animals. Farming in the floodplain is particularly good for plants that thrive in very moist environments. However, because farming operations are located in the floodplain, they are also particularly vulnerable to storm events and an entire season of crops can be destroyed by one major storm. Just such devastation occurred on farms throughout the NYRCR Ulster Communities.

In addition to the vibrant second-home and weekender community, Ulster County is also a year-round vacation and tourism destination, owed to the beautiful natural landscape and abundance of recreational activities including hiking and biking, rock-climbing, rafting, canoeing and camping in the Catskill and Shawangunk Mountains, and other more local destinations including Joppenbergh Mountain in Rosendale. Other seasonal activities include sailing on the Hudson River; fishing in the Counties' multitude of trout streams including but certainly not limited to: the Ashokan Reservoir, Esopus Creek, the Rondout Creek and Beer Kill in Wawarsing, Mill Brook and Rochester Creek in Rochester, the Plattekill in Saugerties, and the Sawkill in Woodstock. During the winter, residents and visitors snow-board, ice climb, ski and ice skate and enjoy holiday open houses in various villages around the country. Leaf-peepers

Flood Ravaged Farm, New Paltz (Julia Robbins)

Ulster NYRCR Planning Committee Meeting #2, 10.7.13 (Arch Street Communications)

flock to Ulster County in the late summer and fall, attracted by the natural beauty and also by the world renowned Woodstock Film Festival, the New Paltz-Woodstock Crafts Fair, the Saugerties Garlic Festival and the popular Jennie Bell Pie Festival in Rochester. Popular music festivals include the Maverick Concerts, America's oldest continuous summer chamber music festival held in a historic music hall in Woodstock and other music venues, such as Arm-of-the-Sea, located right on the Hudson River in Saugerties. Ulster County has preserved much of its rich cultural history, including the settlements by the Huguenots and Walloons in New Paltz; the Hudson River Lighthouse in Saugerties, and the Senate House State Historic Site in Kingston. The popular and rapidly expanding art, music and cultural industries rely heavily on road, bridge, communication and energy infrastructure in order to deliver the experiences and maintain market share within the tourism industry.

The County is well-served by a network of interstate, state, and local highways (including Interstate 87), as well as State Routes 9W, 28, 32, 52, 55, 209, and 212. This interconnected network of State, County and local roads provide transportation infrastructure connecting Ulster County communities to each other and to the region. When access to the Counties' major economic centers of activity and education, including the State University of New York at New Paltz, Ulster County Community College, Stone Ridge and Kingston campuses, is compromised during and after storm events, the resulting dent in the economic recovery is palpable both in the short and long term.

It is critical to point out that the rich and diverse economy offered in Ulster County is a delicate balance of the natural and man-made environments. It's all connected. When the natural environment is threatened or damaged, as was the case with Hurricane Irene, Tropical Storm Lee and Superstorm Sandy, the balance is compromised.

A. Geographic Scope

Defining the geographic scope for the NYRCR Ulster Communities was the key first step in the planning process and was particularly critical due to the complexity of including ten municipalities within one Planning Area.

Ulster County Ulster NYRCR Planning Committee Meeting #1, 9.24.13 (Arch Street Communications)

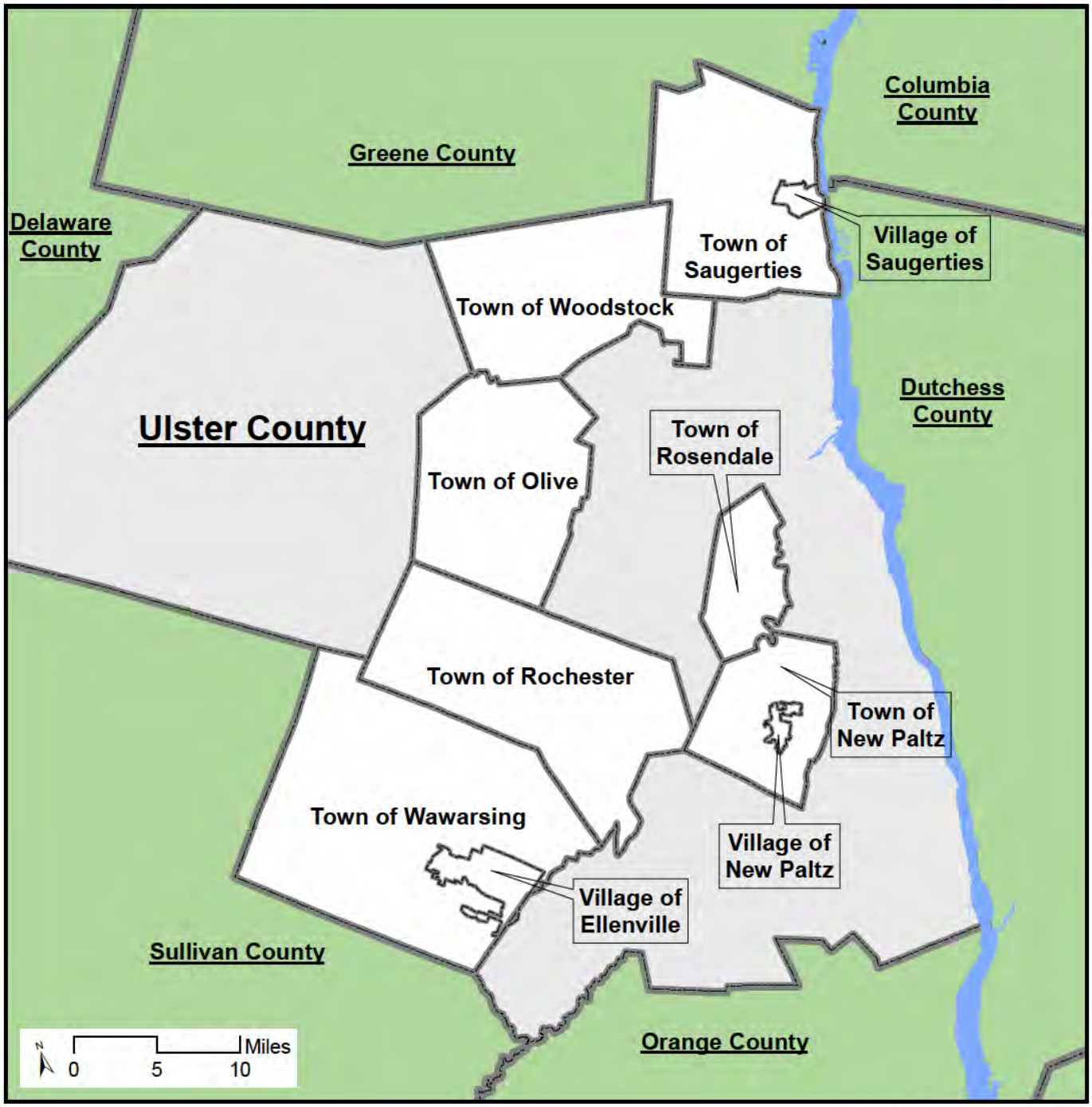
Communities were encouraged to define the geographic scope of their NYRCR Plan to include locations that are most vulnerable and where assets are most at risk; areas where future development or redevelopment will be discouraged and encouraged; and areas where additional economic investment will help the communities' financial resiliency.

"Assets are likely to be most at risk due to future storms in the extreme, high and moderate risk areas of the community. But reviewing current and previous storm damage may indicate that other areas should be included [in the geographic scope]."

Guidance for New York Rising Community Reconstruction Plans, A Planning Toolkit for CR Planning Committees

While some of the municipalities within the NYRCR Ulster Communities share some services and jurisdictions related to their municipal government (i.e., town/village), school districts, and emergency services,

Figure I-1
Geographic Scope



Ulster County
NYRCR Ulster County Communities
Other NYS Counties

Data Sources
Municipal Boundaries: NYS

March 19, 2014

their distance from one another and varied topography and geography informed the definition of the geographic scope.

All ten of the NYRCR Ulster Communities are considered "riverine" communities as they are located along the Esopus and Rondout Creeks, the Wallkill River and their tributaries. The Town and Village of Saugerties are also considered coastal communities as portions of these municipalities are located on the western shore of the Hudson River. The riverine communities were primarily affected by Hurricane Irene and Tropical Storm Lee. The coastal communities suffered damage from all three storms.

Discussion on how to determine the Geographic Scope began at the first Committee meeting. The Committee reviewed maps and discussed the most efficient way to group themselves. Originally, there was discussion about forming sub-groups focusing the municipalities around the three watersheds. The Towns of Rochester, Rosendale and Wawarsing, and the Village of Ellenville are generally located within the Rondout Watershed, while the Town and Village of New Paltz are within the Wallkill Watershed and the Towns of Olive, Woodstock and Village and Town of Saugerties are located in the Esopus Watershed. However, it became clear that while the Rondout and Wallkill Watershed informal subgroups may be a consideration, the Village of Saugerties and Towns of Olive, Woodstock, and Saugerties were more effectively scoped based on individual municipal boundaries. Additionally, because the Town and Village of Saugerties suffered damage from all three storms, special considerations for the coastal resources would be required.

The final geographic scope was agreed to shortly thereafter, and confirmed to contain the entire boundaries of the ten municipalities within the NYRCR Ulster Communities, as shown in Figure I-1, Geographic Scope. Some of the areas within the geographic scope were not directly damaged by the storms, but include important community assets and opportunities for reconstruction that Committee members agreed were important to include within the scope of the Ulster NY Rising Community Reconstruction Plan. In addition, it was critical to the Committee members that the geographic scope include areas where access to critical facilities was interrupted or cut off entirely due to storm-related flooding.

B. Description of Storm Damage

Hurricane Irene (August 28, 2011), Tropical Storm Lee (September 7, 2011), and Superstorm Sandy (October 29, 2012) hit the Ulster County NY Rising Communities with full force. The torrential downpour caused water levels in the Rondout Creek, Wallkill River, and Lower and Upper Esopus Creek to reach record heights. Because the Town and Village of Saugerties are both riverine and coastal, the two communities suffered flooding damage not only from Hurricane Irene and Tropical Storm Lee, but also Superstorm Sandy. On August 26th, 2011, a county-wide state of emergency was declared. It was not only the severity of the individual storms that left destruction in its path, but the systemic and sequential nature of the storm events, that inhibited the communities from allocating resources effectively. Just when a plan was put in place to help the community rebuild and recover, another acute event tore through the community.

Town of Olive Fire Truck Rescue During Tropical Storm Lee (Ed Kahill)

The rising waters of the Rondout Creek, Wallkill River, and Lower and Upper Esopus Creek—and of the many smaller streams and tributaries surrounding the region—caused flash flooding. Homes, businesses and infrastructure were destroyed in all ten municipalities particularly in low-lying areas. Woodstock and Rosendale both experienced record floodwaters. Based upon claims filed with the Federal Emergency Management Agency (FEMA), Ulster County suffered $7.4 million worth of damage. The Times Herald-Record estimated crop losses at $5 million in an article published in September 2011.

Countless roads were closed due to flood waters overtopping culverts and bridges. Sections of Route 209, the main transportation corridor through many of

Town of Olive - Watson Hollow Rd. Bushkill Creek (Ed Kahill)

Emergency Service Providers, Rosendale (Jeanne Walsh)

Roadway Collapse in Ellenville (Mary Sheeley)

these towns, remained closed for an unprecedented five days. Residential areas in the Towns of Saugerties and Rosendale became isolated from essential emergency and community services for multiple days. In Saugerties, following, Hurricane Irene and Tropical Storm Lee, 27 roads and bridges failed and were subsequently closed. It took a year (and over 3 million in FEMA funding) to reconstruct and eventually reopen them. One of the failed bridges left residents in 30 homes completely isolated. The force of Hurricane Irene resulted in massive infrastructure damage to water mains, sewage treatment facilities in Saugerties and New Paltz, and water delivery systems in several communities, including the Village of Ellenville. Stream bank erosion severely impacted eight out of the ten NYRCR Ulster Communities, flooding dozens of homes and depositing natural and man-made debris throughout streams and on dry land. The primary businesses including the grocery store, post office, pharmacy, and liquor store within the hamlet of Boiceville in the Town of Olive were severely flooded, leaving residents without access to basic necessities for weeks. In Woodstock, a building and pharmacy were flooded due to the Tannery Brook rising too high to pass under the Library Bridge on Tinker Street which diverted the flooding water onto properties going East along the South side of Tinker Street.

Residents throughout the NYRCR Ulster Communities were forced to evacuate, moving to shelters established in local emergency service buildings, schools,

Cragswood & Springtown Roads in Hurricane Irene (Julia Robbins)

and community centers. County-wide shelters were set up at the Belleayre Mountain Ski Center and the SUNY New Paltz Health and Wellness Center, which, given their remote locations, were difficult to access.

Emergency services were supported by numerous volunteers within the community. The Ulster County Emergency Response Center also provided strong support. However, emergency response was complicated by the lack of cellular reception in the more rural areas of the county, and radio frequency incompatibility among EMS providers.

The storms resulted in significant damage to agricultural farm fields and livestock pastures, with water 12 feet deep over croplands in some locations. The Wallkill River flooded its banks, inundating hundreds of acres of farmland, in New Paltz, while flooding of the Rondout Creek impacted farms in Rochester.

The physical damage to roads, bridges, homes, and other essential infrastructure compounded short and long term economic impacts that rippled throughout the County and the region. Irreparable losses to commodity farms, power failures, and, in some cases, isolation from economic centers complicated and delayed recovery efforts. Tourism, a major industry in this region, suffered greatly through both an overall loss of revenue and lost wages due to postponed business activity. Today, Ulster County municipalities are still recovering from the damage caused by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee.

C. Critical Issues

There was a level of understanding that what one community does within their municipal boundaries inherently impacts not only their community, but also neighboring communities upstream and downstream.

Throughout the planning process, the NYRCR Ulster Communities identified issues impacting their individual municipalities, the County, and the region. Critical issues were shared during public engagement events, where attendees were asked to confirm existing issues and supplement the list with additional critical concerns. The key issues facing these municipalities affect both their ability to withstand the impact of various storms and also their ability to recover from the storms. The following is a list of critical issues identified by the NYRCR Ulster Communities.

The key component of discussion and development of critical issues is that all the municipalities are fundamentally interconnected. The level to which they rely on each other for basic services and needs is not fully realized until access is cut off – an issue that was so widespread during the Hurricane Irene and Tropical Storm Lee that it crippled some municipalities for days and even weeks.

Regional Issues

Flooding issues do not adhere to municipal jurisdictional boundaries. For mitigation measures to be effective, regional approaches are required. The Towns of Rosendale, Rochester, and Wawarsing and the Village of Ellenville all identified flooding along the Rondout as a critical issue. Natural and man-made

Flooded Residence, Lawrenceville (Dr. David Rosenbaum)

debris was deposited throughout the Rondout Creek during the various storm events and to date, most of it remains, blocking culverts, lodging against bridge abutments, and inhibiting the flow of water. The resulting damage and compromised infrastructure remains not only in these municipalities, but also the municipalities on the Wallkill and Esopus. The regional implications of not addressing these flow issues are substantial.

The furious rate of water flow during Hurricane Irene and Tropical Storm Lee caused massive stream bank erosion throughout the watershed areas, and on the Hudson River shoreline. Throughout the riverine municipalities, erosion was further exacerbated by the clogged waterways, pushing water up beyond the floodplain areas, and causing massive flooding. Much of the resulting damage throughout the municipalities remains today, creating precarious situations during all storm events, and the springtime thaw.

As the NYRCR Ulster Communities prepare for future disasters, it is critical that communication across municipal boundaries takes place. The municipalities identified the lack of inter-municipal communication among emergency service providers as a critical issue during the storm events. Improvements to regional communication infrastructure are critical to ensure seamless assistance to people in need and communication between the emergency service providers for efficient emergency response.

Natural and Cultural Resources

The natural resources in the NYRCR Ulster Communities form the foundation for all other resource evaluation and are fundamentally the source of the region's beauty and its vulnerability. The region's lakes, rivers, streams, mountains, and valleys, define its character, support the economy through agriculture, tourism, and recreation. Natural systems such as wetlands help control floodwaters, and they cleanse pollutants from stormwater runoff improving overall water quality. Floodplains provide additional storage space for stormwater overflow, and allow for gradual absorption of flood waters. When natural systems are unnaturally altered or compromised, the systemic impact can be irreversible and irreparable, underscoring the need for considerable long term support and protection.

Ulster County's rich natural and cultural resources were severely impacted during Hurricane Irene, Tropical Storm Lee and Superstorm Sandy, causing long term damage, much of which remains today. Perhaps the key critical issue identified by the NYRCR Ulster Communities was the devastation caused by water overflowing banks of rivers, streams, and lakes and the resulting damage that ensued.

During and after Hurricane Irene, Tropical Storm Lee and Superstorm Sandy, the Rondout, Wallkill and Esopus as well as various streams and tributaries overflowed their banks forcing water throughout the Towns and Villages. Existing development within the floodplain increased impervious surfaces, inhibiting water storage absorption and funneling flood water further and further away from the source. When the water did recede back into the waterway, it took with it bacteria, roadway oils and spills, potentially contaminating valuable riverine ecosystems. Damage to streams and watersheds was severe, including stream bank erosion, deposits of man-made and natural debris creating the need for debris and selective gravel removal. Creekside septic fields also eroded, carrying fecal material into the creek. Residents expressed considerable concern regarding the impact of water releases from the Ashokan Reservoir on

sedimentation and water quality in the Lower Esopus Watershed. Although the NYS DEC and the NYC DEP are working cooperatively with the community and the greater Ulster county government to address these concerns, the need to protect and enhance this vital asset is still noted as being of great importance to the community.

Passive and active recreation areas, trails for hiking, biking, climbing, swimming, skating, fishing, throughout the County were closed or damaged and some are still waiting for funding for repair. Cultural resources, such as Opus 40, the monumental sculpture in Saugerties that sustained erosion problems, were impacted following the Superstorm event.

In addition to the damage to the communities from Hurricane Irene and Tropical Storm Lee, the Town and Village of Saugerties absorbed the impact of Hudson River storm surges during Superstorm Sandy further comprising natural areas, including parks and recreation areas, the Arm-of-the Sea Theater and the historic Lighthouse. The Committee identified the need to restore existing damaged or vulnerable recreation assets and fishing areas and the opportunity to develop new recreational assets, and use portions of the riparian buffer for a regional trail system and river walk.

Figures I-2 through I-8 present FEMA flood areas for the ten Ulster County NYRCR Communities (Town and Village of New Paltz are shown on one map, Figure I-2; the Town and Village of Saugerties are presented together in Figure I-6; and Figure I-7 presents the Town of Wawarsing and the Village of Ellenville.

As shown in Figure I-2, the Town of New Paltz is literally bisected by the Wallkill River, separating the eastern portion of the Town, which includes the Village of New Paltz from the western portion of the Town. Bridges over the Wallkill River were damaged by flood waters, isolating the two halves of town and preventing any through travel. The area east of Interstate 87 and west of the Swarte Kill is identified as the 500-year floodplain, much of which flooded during Hurricane Irene and Tropical Storm Lee.

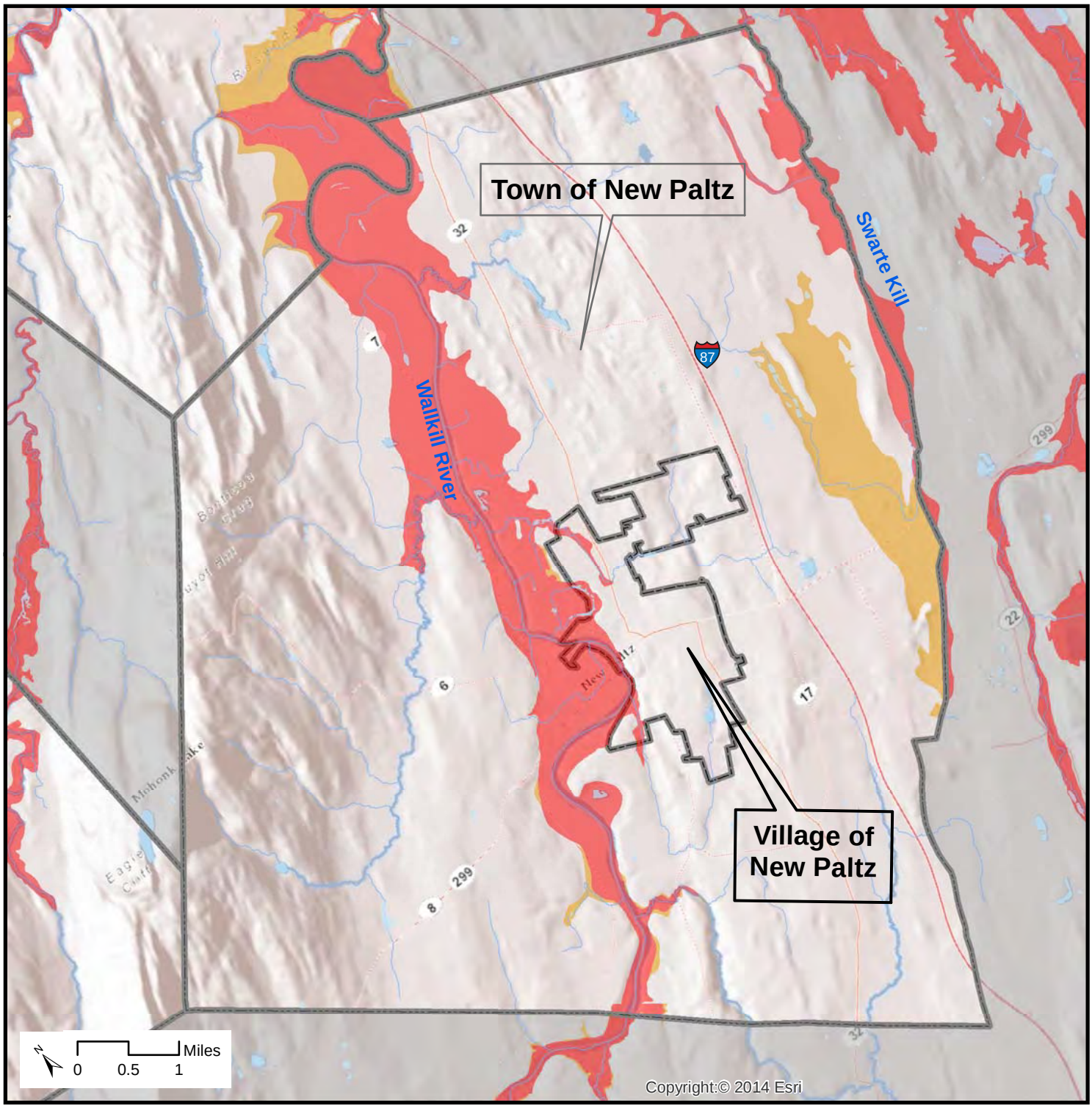
Figure I-3 presents FEMA flood areas for the Town of Olive. As shown, almost all of Boiceville is located within the 100-year floodplain. Much of Olive's municipal infrastructure including two fire stations and government buildings are located within this area. In addition, the Ashokan Reservoir, the primary source of the NYC drinking water system, is the primary feature in the center of Town with various streams and tributaries flowing throughout Olive and to the neighboring towns and villages.

The Town of Rochester (as shown in Figure I-4) is bisected by the Rondout Creek with various streams and tributaries located throughout the Town. When acute storm events occur, the various creeks, kills, brooks, and streams scattered throughout the landscape of the Town overflow their banks, resulting in widespread flooding. One of the most vulnerable sections of Route 209, located in the Hamlet of Accord in the Town of Rochester, was closed for five days due to the flooding.

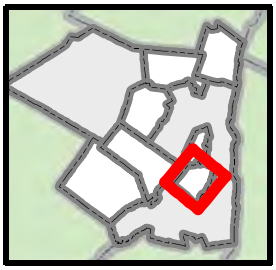
Figure I-5 presents FEMA Flood Areas for the Town of Rosendale. The Town is bisected by the Rondout Creek, which divides the northern and southern portions of Town. In addition, the Wallkill River flows through the southeastern section of Town and forms much of its eastern border. As a result, much of that area is located in the 100-year and the 500-year floodplain. Flooding from the various storms resulted in the closure of Route 32 for extended periods, and required significant repair to the roadway.

As mentioned earlier, the Town and Village of Saugerties have the distinction of being both riverine and coastal municipalities. As shown in Figure I-6, the lower Esopus and its tributaries including the Plattekill, Sawyer Kill, and various streams flow through the Town and Village of Saugerties into the Hudson River, which forms the municipalities' eastern boundary. Several key cultural and historic institutions located on the Hudson River waterfront, including the

Figure I-2
FEMA Flood Areas - New Paltz



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

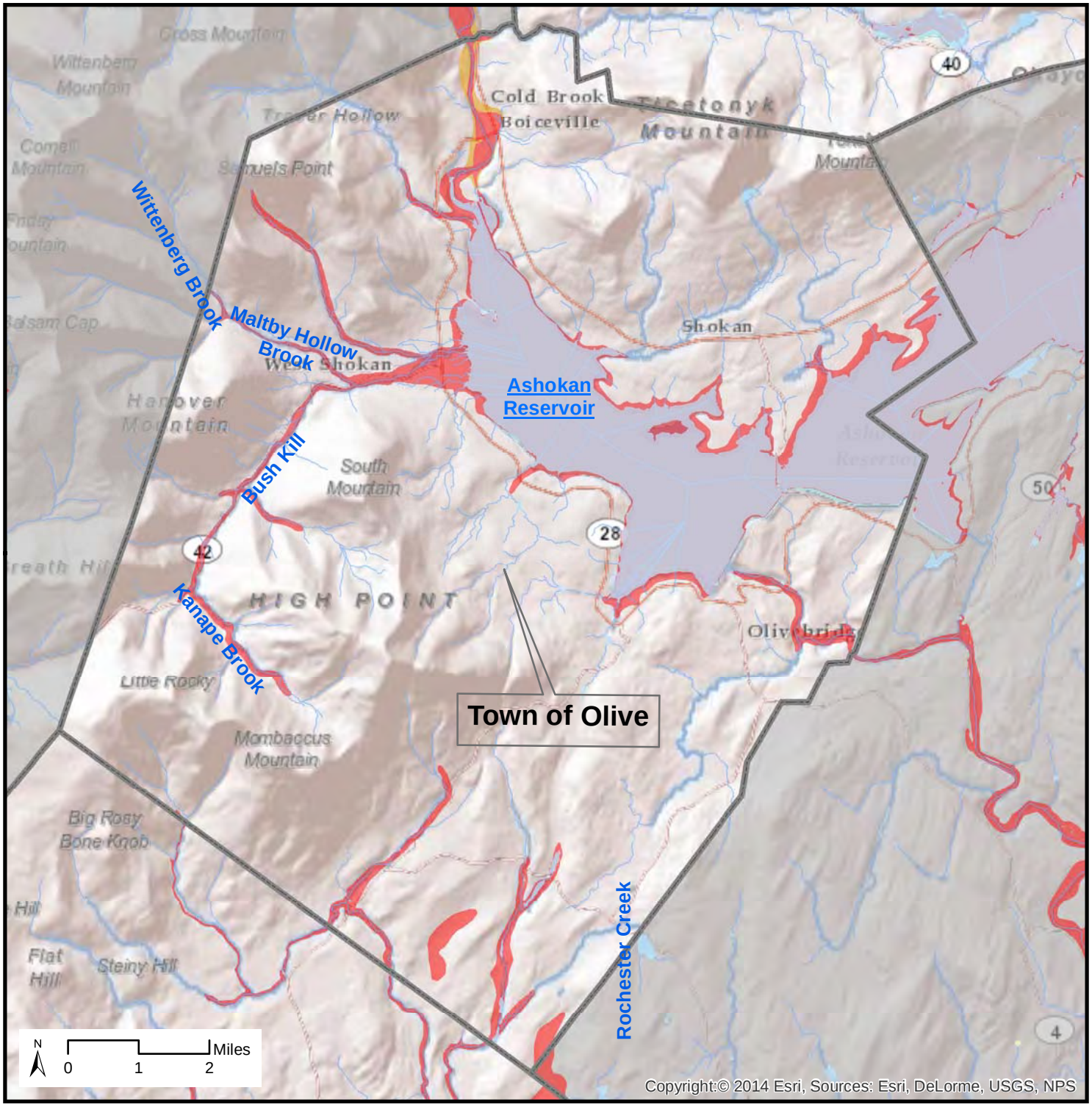


Flood Zones

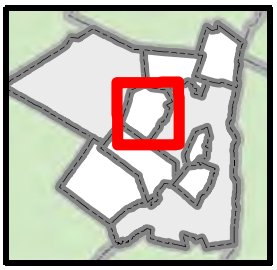
- 100-yr Floodplain
- 500-yr Floodplain

March 19, 2014

Figure I-3
FEMA Flood Areas - Olive



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

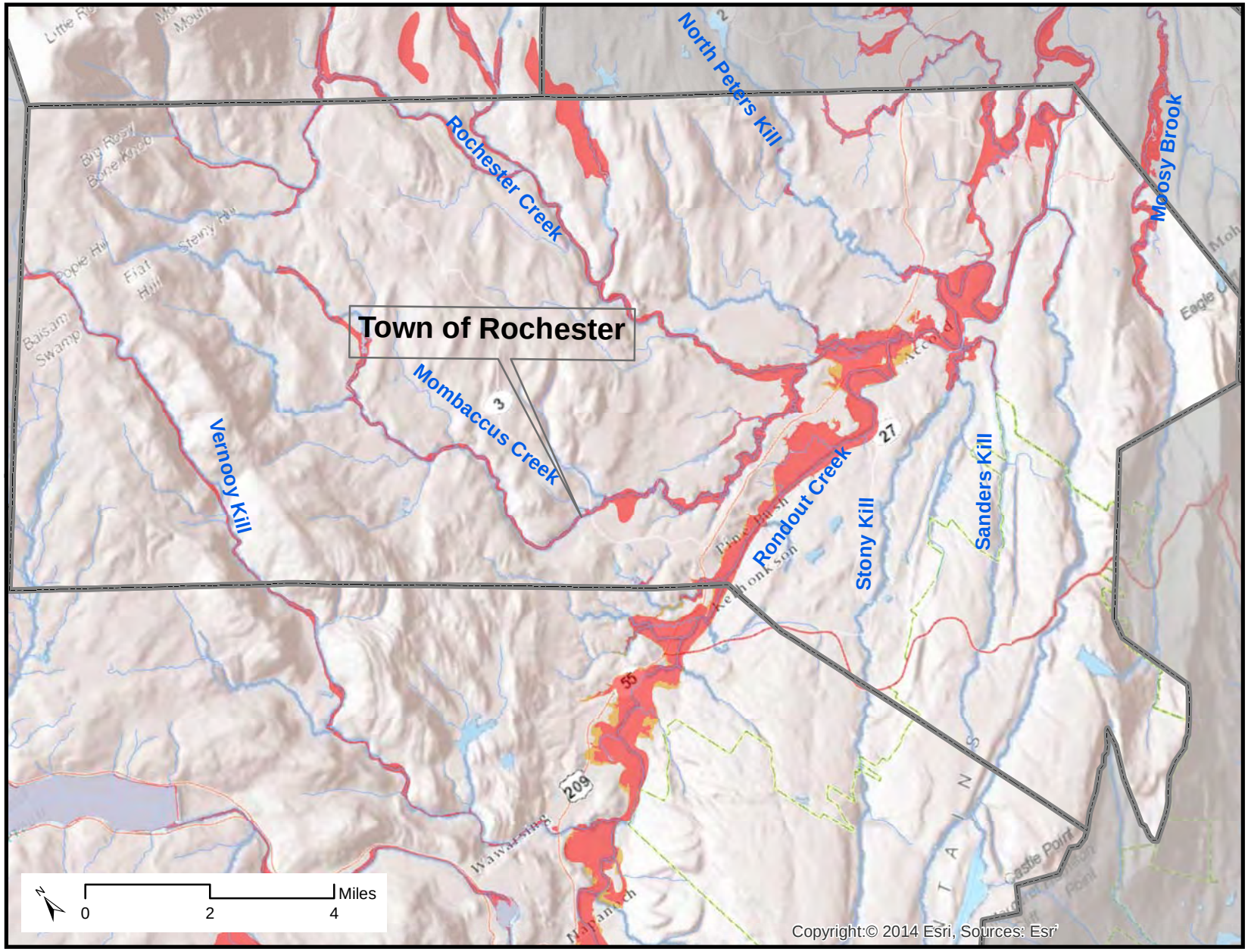


Flood Zones

- 100-yr Floodplain
- 500-yr Floodplain

March 19, 2014

Figure I-4
FEMA Flood Areas - Rochester



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 19, 2014

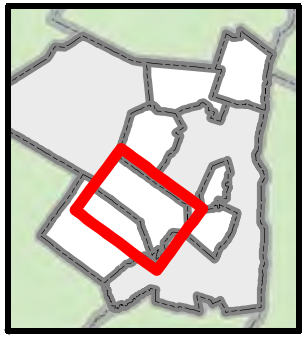
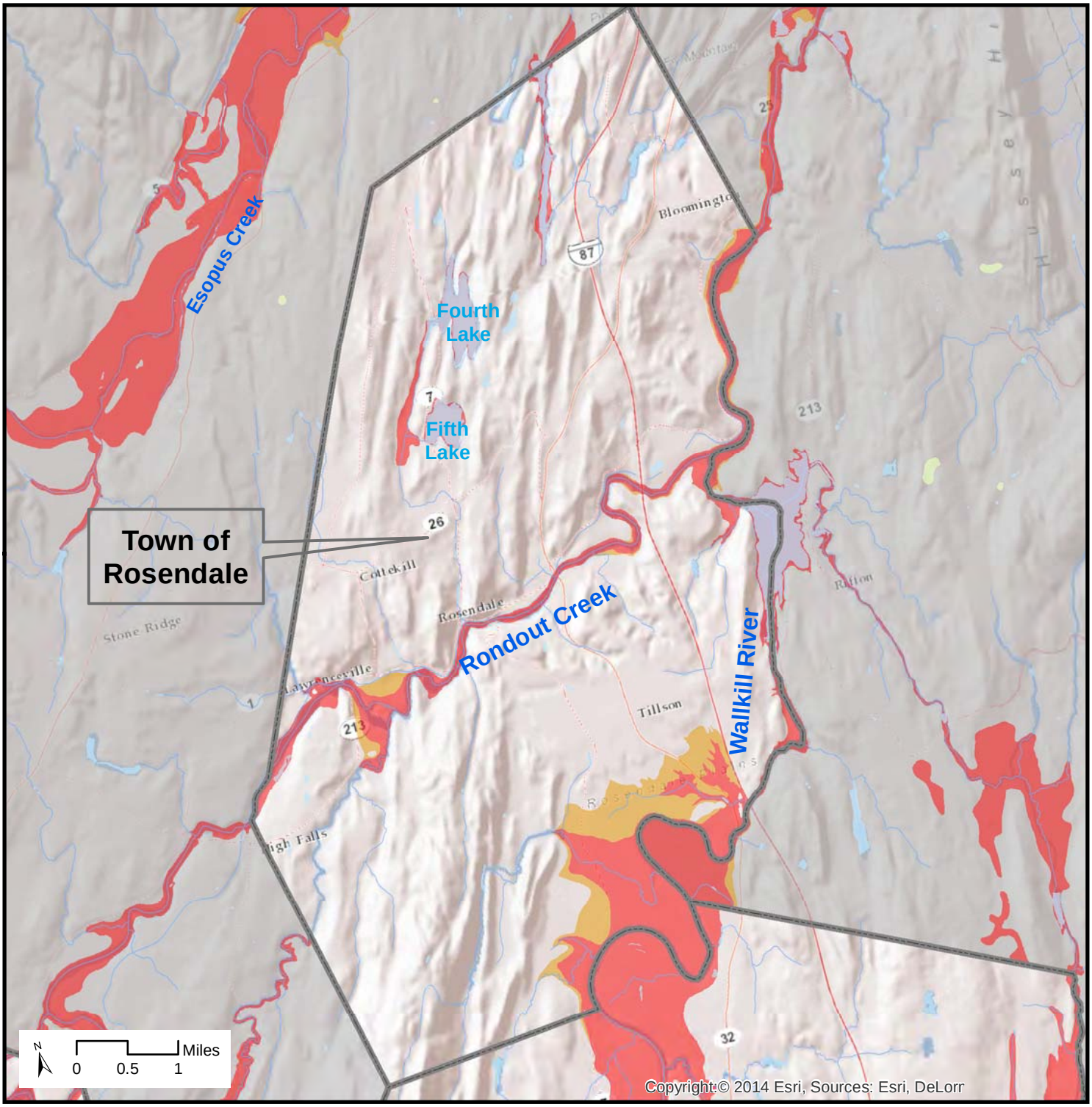
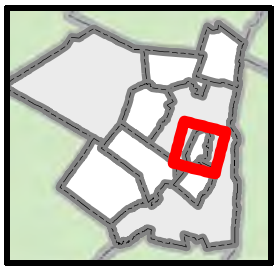


Figure I-5
FEMA Flood Areas - Rosendale



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

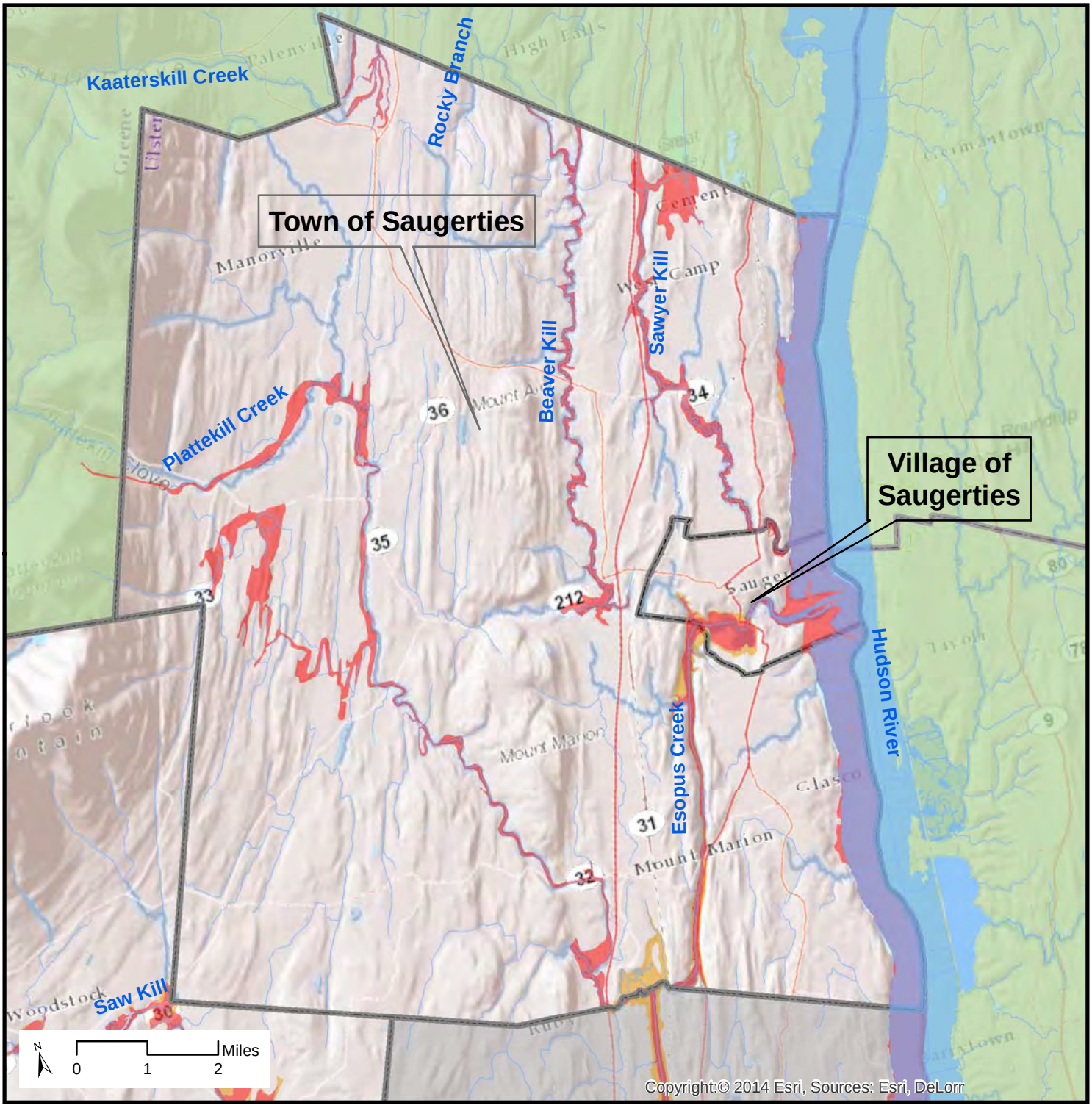


Flood Zones

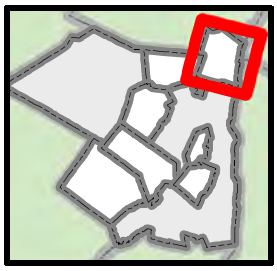
- 100-yr Floodplain
- 500-yr Floodplain

March 19, 2014

Figure I-6
FEMA Flood Areas - Saugerties



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

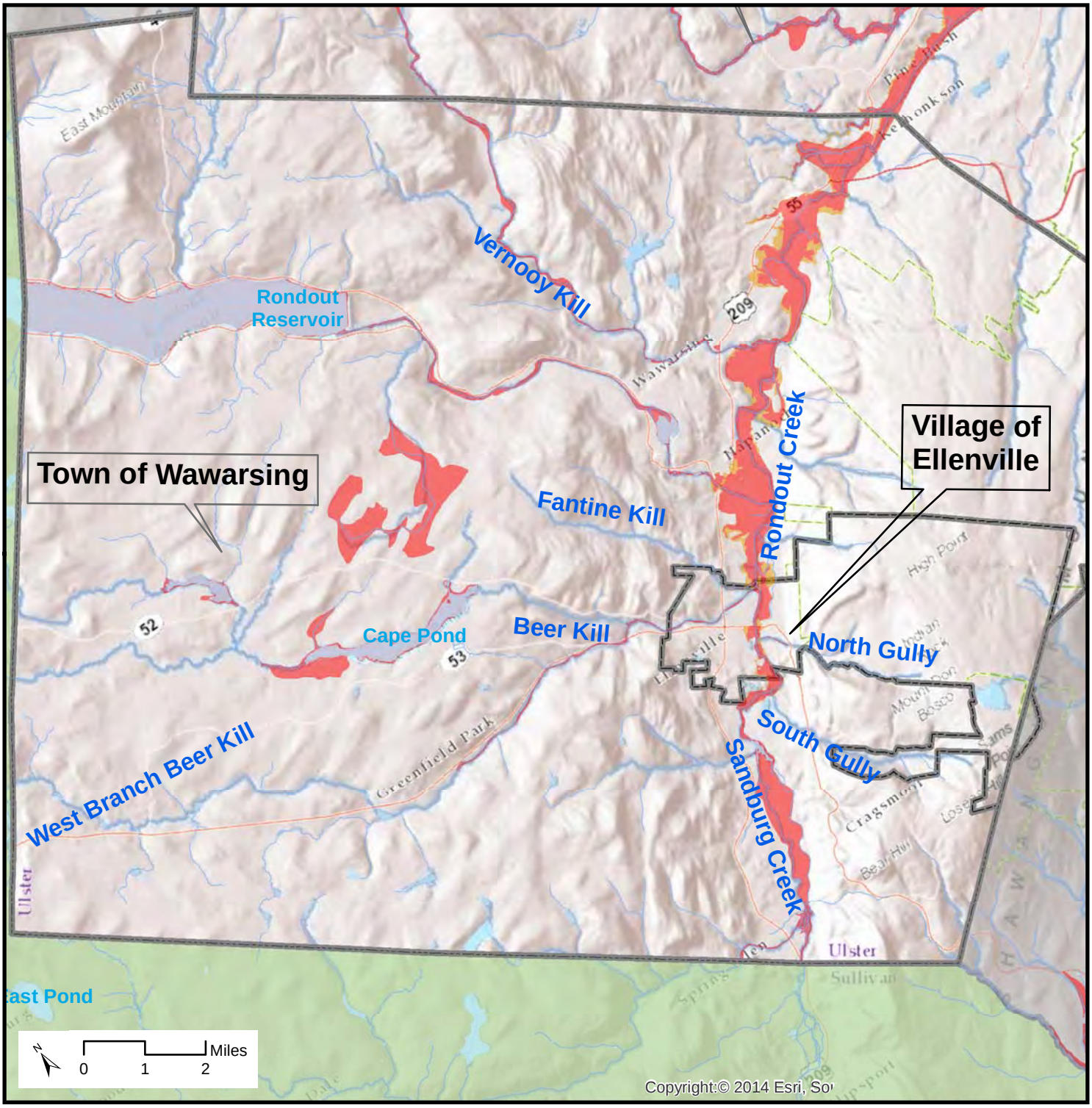


Flood Zones

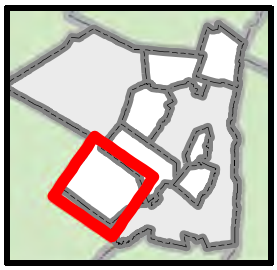
- 100-yr Floodplain
- 500-yr Floodplain

March 19, 2014

Figure I-7
FEMA Flood Areas - Ellenville & Wawarsing



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

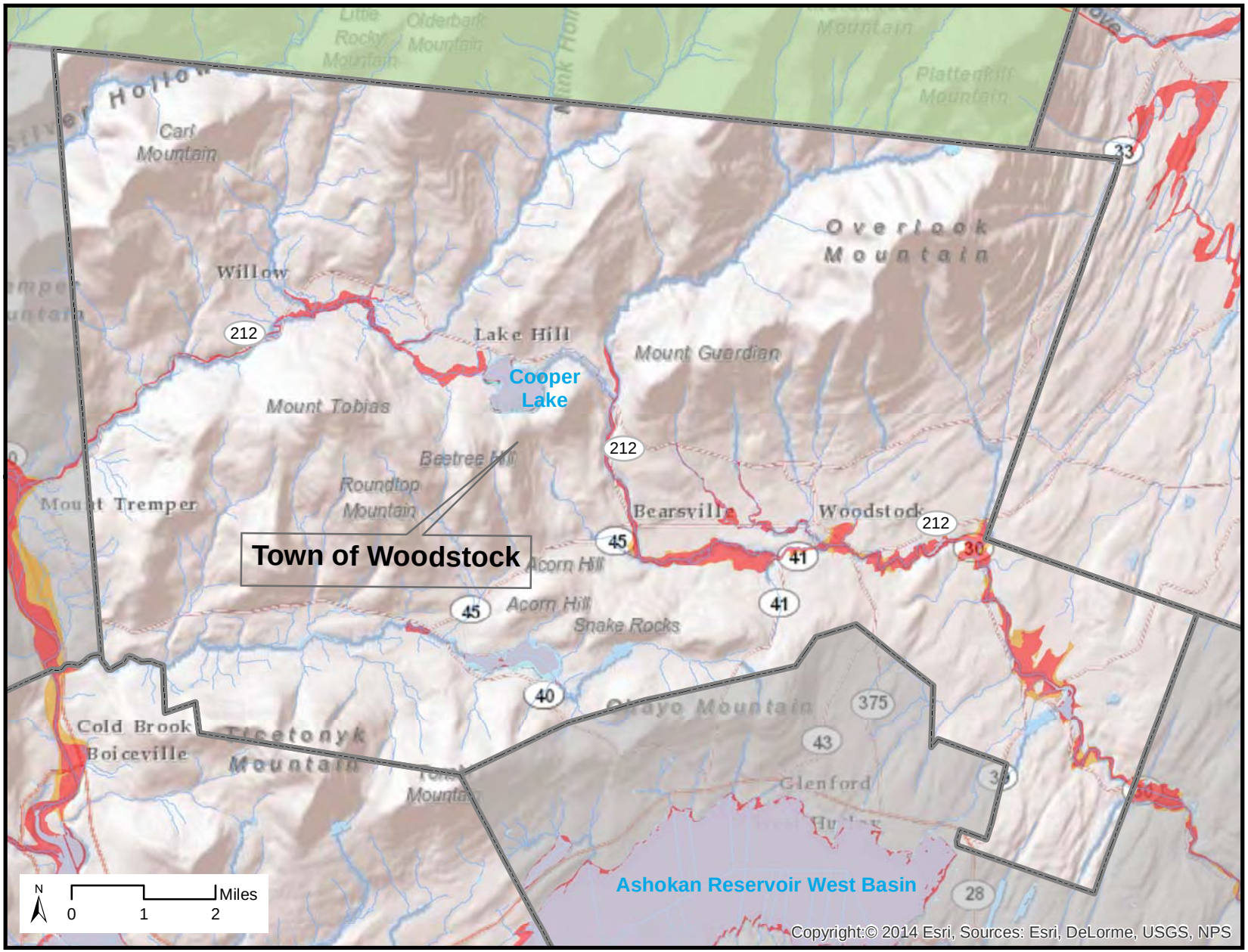


Flood Zones

- 100-yr Floodplain
- 500-yr Floodplain

March 19, 2014

Figure I-8
FEMA Flood Areas - Woodstock



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

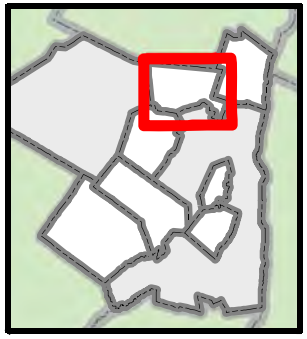
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 19, 2014



Saugerties Lighthouse and the Arm-of-the-Sea Theater, were inundated by floodwater causing permanent damage, which has not yet been addressed.

Figure I-7 presents FEMA Flood Areas for the Town of Wawarsing and the Village of Ellenville. Much like Rosendale and Rochester, the Town of Wawarsing and Village of Ellenville are built on the banks of the Rondout Creek and all its streams and tributaries. When flooding occurs, the impacts are felt throughout the Town and Village through the inherent interconnection of the various waterways.

The Town of Woodstock is located along the northwest basin of the Ashokan Reservoir (see Figure I-8). Much of the geographic center of the Town is located within the 100-year floodplain and some areas are within the 500-year floodplain. Route 212, the Town's central transportation artery, runs parallel to the 100-year floodplain for much of its length through Woodstock. Because of this development pattern, when floodwaters jump the banks, much of Route 212 is closed, isolating residents on the north side of Town from the south and also requiring significant detours for east–west travel.

Housing

The primary housing issue identified by the Committee was protection of neighborhoods and homes from future flooding, and restricting future development of homes to areas outside the flood plain and flood prone areas. In New Paltz, several homes along Springtown Road suffered damages as did the Town & County Condominium complex located near the Historic Huguenot Street District. Housing along Lighthouse Drive and Ferry Street in Saugerties was severely impacted by flooding and muddy waters from the Lower Esopus during Hurricane Irene. These same houses saw several feet of water from the Hudson River flood their homes during Hurricane Sandy revealing a need for housing rehabilitation programs for any home that was damaged during the storm, regardless of whether they are located within the floodplain. For the homes that were damaged during

Crumbling Pier at the Saugerties Lighthouse (Patrick Landewe)

the storm, the Committee identified opportunities for homeowner assistance to rehabilitate structures through participation in the NY Rising Housing Recovery Program, and protect their residences from future flooding through door to door education about and financing for elevating their homes, acquisition and relocation, and flood proofing. Implementing and adopting stricter regulations for housing development may present the opportunity to apply for reduced flood insurance rates through the Community Rating System.

In the Town of Rosendale and the Village of Saugerties, neighborhood flooding was a critical issue facing several isolated residential neighborhoods. Generally, the homes are located within the floodplain, and are therefore subject to flooding not only during the 100-year storm events, but also (in some cases) more frequently.

Planning and Capacity Building

Of critical concern to the municipalities is the ability to plan together for flood mitigation. All of the NYRCR Ulster Communities that share major watersheds identified disparate improvements and lack of coordinated planning or design of critical watershed infrastructure as a key issue inhibiting long-term resiliency planning.

To assess this issue, the Committee discussed their preparedness during the storm events, including communication between local and regional emergency service providers, vulnerability of structures located in or near floodplains and the ability for emergency service providers to access these structures. Perhaps more significantly, the Committee discussed the gaps; what they were not able to achieve and what the difficulties were and how they can better prepare themselves in the future.

One of the issues that repeatedly came up was a lack of a centralized regional command center and communication infrastructure. Emergency service providers were forced to communicate by their own cell phones, where service was available. Inter-municipal and mutual aid emergency service coordination is critical during and after storm events to identify road closures and detour routes and was hampered by the lack of a regional system. The Committee reinforced the need for a cross-jurisdictional map of alternative evacuation routes and real-time display, for use by emergency service providers and residents, and training and communication measures for emergency service workers and volunteers.

Similarly, the Communities identified the lack of regional sheltering as a critical issue, highlighting the need for existing shelters that can be used by several communities, and for protected routes (those that don't flood during acute storm events) for residents of the various communities to get to those shelters. A widespread public outreach and education initiative for disaster preparedness, evacuation routes and shelters was identified as a key need.

The Communities identified the need to relocate key municipal and emergency service infrastructure out of the floodplain. In the Boiceville Hamlet of the Town of Olive, two firehouses, and the municipal building are located in the floodplain, as are the communities' only supermarket and gas station, which were without power and closed for extended periods of time. In New Paltz, due to flooding in surrounding areas, the Town Hall and Community Center were inaccessible for use as an emergency shelter or emergency planning center. The Committee agreed that addressing these issues would require a tri-fold initiative:

- First, better enforcement of existing regulations for floodplain development;
- Second, a re-examination of zoning and building codes to eliminate development in the floodplain, or within key identified areas; and
- Third, require additional protective measures for structures currently located in the floodplain or flood prone areas and require green infrastructure for treatment of stormwater during and after construction.

The Committee also recognized that revisions to and enforcement of more restrictive flood plain development requirements would reduce risk in the future and support eligibility in programs to help reduce flood insurance rates including the Community Rating System.

Infrastructure

Infrastructure repairs and enhancements are often one of the largest investments a community will make after a disaster. Rebuilding infrastructure in a way that is more resilient is a key to ensuring community-wide resiliency to future storms. Bridges, culverts, roadways, wastewater treatment plants and system infrastructure throughout the NYRCR Ulster Communities were entirely overwhelmed by flood water, resulting in failure, and severe damage

The NY Rising Community Reconstruction Program looks at measures to rebuild community infrastructure with increased resiliency. That is, specifically, to build back better. This is critical for improving the ability for the community to better withstand impact from future storms.

Downed Trees and Power Lines in Ellenville (Mary Sheeley)

Committee members and the public indicated that the vulnerability of infrastructure is a critical issue in all ten municipalities.

Roadway damage and the inability for residents or emergency service providers to travel unimpeded throughout their Towns, Villages and the region for weeks following the storms was a huge obstacle to the recovery effort in the NYRCR Ulster Communities. In New Paltz, the Wallkill flooded along Route 299 and Springtown Road impeding access to western parts of the Town as well as to places like the historic Mohonk Mountain House and the Rondout Valley. In Rosendale, the flood waters rose to the top of the Army Corps flood control project and prompted voluntary evacuations. Route 32, the main North/South corridor from Kingston to New Paltz was closed due to flooding. In Saugerties the major East/West roadway, Route 212 was impassable because of the extent of the downed trees and power lines. The Saugerties Village Beach along the shore of the Lower Esopus was almost completely wiped out. Widespread road closure underlined the need for additional route detour signs and roadway upgrades.

Downed power lines not only cut off electricity, but also cut off roadway access throughout the region. In addition, power to communication towers was interrupted, further isolating residents revealing a pressing need to better protect communication towers from interruptions of service. The Committee identified immediate needs including roadway, bridge and culvert repair and resizing throughout the ten NYRCR Ulster Communities. Longer term, there is an opportunity to consider burial of power lines.

The Malden Wastewater Treatment Plant located adjacent to the Hudson River in the Town of Saugerties was overwhelmed with stormwater during Hurricane Sandy, and additional generators were brought in to keep the plant operational. This is the only time this plant has been overwhelmed since its construction approximately 20 years ago. Similarly, the wastewater treatment plant and conveyance system in New Paltz was overwhelmed during Hurricane Irene, forcing the system to operate well beyond capacity. The Committee identified the need to harden treatment plants and systems to help them better withstand damage due to storm surges.

There is a pressing need to better evaluate the region's existing water supply and, stormwater management and flood control systems to determine the need for spare capacity or redundancy. The Town and Village of Saugerties identified the need to identify secondary water sources to supplement the reservoir, during prolonged turbid events. The Committee identified the need for additional coordination with state and federal agencies in relation to permitting needs and evaluating and repairing flood control systems.

Emergency Response

Floodwaters in the various storm events forced the closure of a number of roads, not only in the ten NYRCR Ulster Communities, but also throughout the County. These road closures temporarily isolated parts of the community and in many cases vulnerable populations, including senior citizens, and left them unable to access emergency services, food, or medical care.

Emergency services were supported by many volunteers within the community and the Ulster County

Boat Rescue in Rosendale (Jeanne Walsh)

Emergency Response Center. However, emergency response was complicated by the inability of the Ulster County Emergency Services Department and local emergency service providers to communicate with each other over a common radio frequency. Local fire fighters and emergency service providers who did not have a charged cell phone or resided or travelled through one of the many rural areas without cell phone service, were unable to communicate with each other, potentially leaving a large number of residents stranded until the roads were clear and/or rebuilt which, in some cases, was days or weeks.

Economic Development

In rural Ulster County much of the economy is supported by commodity and livestock farming. Farms in both the Rondout Valley area and New Paltz were severely impacted by not only the flooding but by the resulting loss of crops during what should have been peak harvesting season. In the Town of Rochester, Schoonmaker Farms lost more than half of its crops of sweet corn, pumpkins and soy beans and its farm stand was flooded. Kelder Farms, in Kerhonksen, had upwards of ten feet of water in their flooded fields, enough for the owner to ride a jet ski to assess the extent of flooding.

In New Paltz, the Wallkill flooded hundreds of acres of farmland, including the Wallkill View Farm, causing substantial losses of the sweet corn and pumpkin crops. In fact, on both the Wallkill and Rondout, droves of pumpkins could be seen floating downstream. Residents gathered at High Falls to watch as hundreds of pumpkins tumbled over the waterfall.

Crops not lost to the flood waters outright, were, in many cases, un-marketable due to the extent of inundation and exposure to harmful bacteria since flood waters were contaminated with sewage from nearby overwhelmed wastewater treatment plants. In addition, to direct losses to the farmers, the region lost significant revenue typically generated by fall leaf-peepers and visitors to the pumpkin and apple farms throughout the County.

As previously discussed, crop and livestock farms are frequently located in the floodplain and these uses are generally suitable for that environment. However, it makes them particularly vulnerable to loss. The Committee identified an opportunity to provide additional insurance, and supportive funding to farms and agricultural operations to reduce the economic impact and resulting loss.

The Ulster NYRCR Planning Committee identified additional support of regional tourism and agri-tourism that are key economic and job engines as critical to their recovery and resiliency. The Committee identified opportunities for a regionally coordinated tourism and agri-tourism strategy that could be implemented through chambers of commerce or County economic development groups. Promoting local agricultural resources and identifying grant sources for food pantry replenishment, accomplishes the goal of supporting agricultural operations and ensuring sufficient supply for vulnerable populations.

Better protection of historic and natural resources that attract visitors and tourists from outside the region coupled with the formation of public/private partnerships will allow for mutually supportive initiatives.

Flooded Road in Rosendale (Jeanne Walsh)

The Committee also identified the lack of adequate protection, insurance and local, state and federal financial support for agricultural lands and livestock farms that are frequently located in the floodplain as critical issues.

The local and regional economy is supported by large employment centers in New Paltz and Kingston. When access to these centers is restricted, businesses cannot recover as quickly, and people cannot get back to work. Many of the rural NYRCR Ulster Communities rely on one or two supermarkets and gas stations for their food and fuel needs. When those stores close, and road closures or lack of gasoline prevents travel to adjacent communities, residents are left without alternatives to serve their basic needs. Additional recovery infrastructure for flood protection during and immediately following storm events including water pumps and backup power generators (alternative energy sources), business assistance in the form of loans, grants for working capital, equipment needs, retrofitting, relocating, electrical and crop loss insurance are all pressing needs.

Committee members identified the need to better protect their business centers (hamlets, central business districts, and village centers) from future flood events. Many of the ten NYRCR Ulster Communities are smaller rural areas, often served by one gas station, one pharmacy, one bank, and one grocery store. In some cases, the municipalities' only businesses were inundated by floodwaters resulting in a loss of basic goods and services including food, pharmaceuticals, gas for generators, and banking. Because major through-roads were inoperable for extended periods due to bridge flooding, roadway collapse, and downed trees and power lines, residents were not only unable to access basic needs within their own municipalities, but also could not travel to neighboring municipalities.

Health and Social Services

Identifying health and social service needs are among the most pressing concerns following catastrophic events. Ensuring that public health, health care facilities and essential social services needs are restored straightaway is critical to community recovery. To assess preparedness and recovery, the Committee inventoried the damage to health and social service facilities, ascertained whether full recovery was impeded and addressed the reasons for obstacles to recovery, and proposed measures to increase long term resiliency. Health and social service facilities include healthcare facilities and emergency services as well as schools, eldercare and childcare facilities.

Regional hospitals that served the NYCR Ulster Communities were not severely damaged during the storm events. However, access to these healthcare facilities was critically affected. At one point, flooding of Route

Shawangunk Mountains (Nina Peek)

209 made it necessary to transfer cots via boat to one of the fire house/shelters. This very real situation revealed a need for protection not only for housing and emergency shelters, but also multiple points of primary access.

Two firehouses located in the floodplain in the Hamlet of Boiceville, Town of Olive, were damaged, revealing the need for their relocation. Providing adequate and accessible emergency shelters for safe havens during storm events is key to quick recovery from a storm. In addition, shelters need to be equipped to accommodate pets, the elderly and the medically vulnerable population, with wheelchair access, ADA-accessible restrooms, and other facilities.

County-wide shelters were set up at the Belleayre Mountain Ski Center and the SUNY New Paltz Health and Wellness Center. Unfortunately many of these shelters lacked back-up power generators, and sufficient equipment and facilities to accommodate the overwhelming and unanticipated demand. In Ellenville residents of the Mountainview Senior Apartments were evacuated to nearby shelters and, after two days, some medically vulnerable residents had to be transferred to Benedictine Hospital.

D. Community Vision

Developing the Vision Statement was one of the first activities of the Ulster NYRCR Planning Committee. It was essential that this large group come together early to develop a shared vision for the future. The Vision Statement was developed by the Committee after conducting visioning exercises in which residents, municipal officials, and business owners participated.

Despite all the differences, what the NYRCR Ulster Communities shares is a vision for the future.

The NYRCR Ulster Communities Vision Statement:

The Ulster NY Rising Community Reconstruction Program will identify projects to advance a regionally-coordinated plan for resiliency that addresses the specific needs of our 10 municipalities to respond to and recover from future disasters. Our vision is to protect our residents and our man-made and natural resources by implementing ecologically-sound policies and programs that will sustain our local and regional environments and promote further growth in our economies.

E. Relationship to Regional Plans

The storms and resulting damage from Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy impacted communities throughout the eastern United States. It would be virtually impossible to identify projects that would increase community resiliency without recognizing the regional implications of storm damage and recovery. Because the NYRCR Ulster Communities comprise ten municipalities, they are in a unique position to provide coordinated regional planning initiatives.

Joppenbergh Mountain Trail, Rosendale (Nina Peek)

Many regional planning efforts have been undertaken in Ulster County, both before and after the storms. The County has an Open Space Plan, a Hazard Mitigation Plan, an Economic Development Plan, and a Long Range Transportation Plan in place. These pre-existing regional planning efforts served as the genesis for many projects that were identified though the NYRCR Community Reconstruction Program.

Although Committee members represented their own municipalities' interests, they became increasingly cognizant of the importance of planning in a regional context and collaboratively created strategies with the greater region in mind. Many of the regional planning documents, including the Ulster Open Space Plan, identified the need for focused coordination and cooperation among municipalities to achieve the goals of the plan. This sentiment is echoed by the NYRCR Ulster Communities and their willingness to work together toward the common goal of mitigating future flood damage.

Review of Regional Project Ideas, Public Engagement Meeting #1, 10.18.13 (Arch Street Communications)

The key for the Ulster NYRCR Planning Committee was to identify initiatives that would not duplicate previously completed plans, and to extract the initiatives, policies, projects, and programs that had not yet been implemented, addressed critical needs, and were critical to long-term resiliency.

The goal of the comprehensive review of these documents was not only to highlight previously identified initiatives that would contribute to long-term resiliency but also to identify gaps. Had these planning efforts missed anything? Were there any policies and programs that would significantly reduce the region's vulnerability that had not been identified? Did the impact and damage of the three storms teach the community that there were areas they had not thought about that currently need their attention?

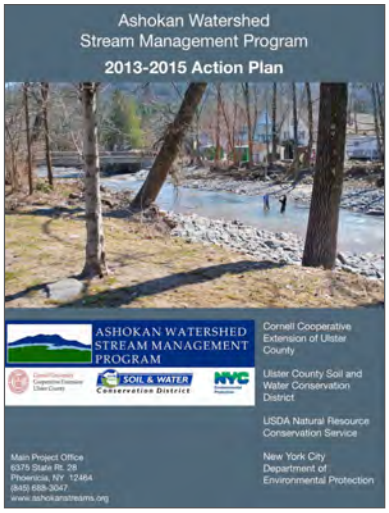
The Consultant Team collected relevant local and regional planning documents, which were reviewed and supplemented by the Committee at the kick-off meeting. Additional documents were collected and reviewed with an eye towards identifying gaps and previously identified but currently unmet needs. This document review provided the basis for assessing local and regional issues to be incorporated into the NYRCR Ulster Plan.

The key intelligence gathered from the existing plan review included:

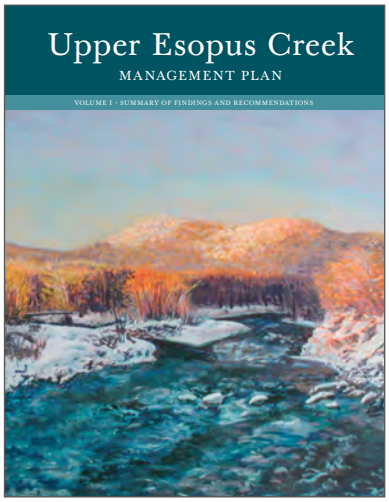
- Regional watershed planning is critical to the long term resiliency;
- County, State, and Federal agencies responsible for infrastructure maintenance, repair, and reconstruction have well considered long-term plans, but are restricted by the lack of available funding;
- Additional coordination and cooperation between municipalities and various local, state, and federal agencies is required to decrease vulnerability and increase resiliency;

- Waterfront access and additional funding for recreational trails along waterways throughout the County, not only provides economic benefits in increased tourism spending, but also removes impervious development from the floodplains; and
- Much of the County is not adequately served by cellular phone service, thereby isolating residents and creating additional communication obstacles for emergency service providers.

Table I-1 presents an abridged list of local and regional planning documents and resources that were reviewed by the NYRCR Consultant Team.



Ashokan Watershed Stream Management Program, 2013-2015 Action Plan



Upper Esopus Creek Management Plan, January 2007

Table I-1 Regional Plans

Plan Name	Description	Key Lessons
Ulster County Plans		
Ulster County Open Space Plan (2007)	County-level assessment of resources and maps (open space, water resources, ecological communities), historic, and cultural resources	Recommended strategies for preservation applicable to all towns, though not Town-specific
Catskill Park State Land Master Plan (Aug. 2008)	Description of management of the Catskill Park	Not directly relevant to disaster resiliency but useful when overlapping with more local open space plans
Ulster County Comprehensive Emergency Management Plan (Apr. 2007)	Various hazards evaluated for Ulster County, flood and severe storms were considered "moderately high hazard" and highest on the list	Delegation of emergency management responsibilities to different entities
Ulster County Final Hazard Mitigation Plan (Feb. 2009)	Extensive analysis of County wise hazards including risk assessment, capabilities and resources	Specific mitigation actions identified for Rosendale and Saugerties
Ulster County Transportation Council Final Year 2035 Long Range Transportation Plan (Aug. 2010)	Inventory of large-scale existing transportation conditions and needs, public involvement initiatives	Minimal discussion of issues related to flooding and natural hazards. Discussion of some environmental mitigation activities related to actions listed in plan
UC Tomorrow - Sustainable Economic Development Plan	Economic development trends, best practices and strategies for Ulster County as a whole	Minimal discussion of issues with flooding/natural hazards
A Three-County Regional Housing Needs Assessment: Orange, Dutchess and Ulster Counties from 2006-2020	Regional study identifying housing stock, economic and demographic forecasts, condition and affordability issues, housing needs and gap analysis, municipal allocations, targets and strategies	Comprehensive needs and gap analysis for Ulster County
Watershed Plans		
DRAFT Rondout Creek Interim Watershed Management Plan (Dec. 2010)	Watershed management plan for the lower, non-tidal portion of the Rondout Creek, to educate residents about the watershed, identify actions and measures that can be implemented to protect it	Key resource for regional watershed planning
Ashokan Watershed Stream Management Program 2011-2013 Action Plan (May 2011)	Summary of general recommendations for Ashokan watershed	Includes specific stream projects in Woodstock and Olive
Ashokan Watershed Stream Management Program 2013-2015 Action Plan (May 2013)	Summary of general recommendations for Ashokan watershed	Includes specific stream projects in Woodstock and Olive
Upper Esopus Creek Management Plan (Jan. 2007)	Primary goals of the plan include managing flooding/erosion and improving water quality	Detailed inventory of assets, opportunities, threats to flooding, erosion and water quality, ecosystems and recreation. Detailed stream management recommendations
Wallkill River Watershed Conservation and Management Plan (Jan. 2007)	Summary of general recommendations for Wallkill watershed	Includes recent riparian and water quality projects in New Paltz
Hudson River		
DRAFT Hudson River Estuary Habitat Restoration Plan (July 2013)	General strategies for restoring habitat in the lower Hudson River with description of habitat types along the river	Specific projects or locations are not identified

2014
NY RISING COMMUNITY RECONSTRUCTION PLAN

NYRCR ULSTER COMMUNITIES

Section II
Assessment of Risk and Needs

II Assessment of Risk and Needs

A. Description of Community Assets and Assessment of Risk

i. Community Assets

An essential component of increasing community resiliency is identifying the various components of the community that need to be better protected. Assets are features valued by the community, which were impacted by the recent storm events, are vulnerable to storm events, or are vital to the continued operation of the community before, during, and after storm events—and therefore require additional attention in the future.

Asset Mapping (Arch Street Communications)

The purpose of the Asset Inventory is to identify and map these critical community facilities and services so that better protective measures may be developed and implemented. Assets are classified into six categories: economic, health and social services, housing, infrastructure systems, natural and cultural resources, and socially vulnerable populations.

Infrastructure Systems: roads, bridges, culverts, wastewater treatment facilities, gas stations, water, stormwater, and wastewater conveyance systems.

Natural and Cultural Resources: the Rondout, Wallkill, and Esopus Watersheds and their tributaries, habitats, wetlands and marshes, parks, recreation areas and open spaces, historic landmarks, and arts and entertainment venues.

Economic Assets: central business districts where assets in the downtown core are grouped as a single-asset, supermarkets, commercial and industrial buildings, and seasonal or tourist destinations;

Heath and Social Services: hospitals, health and assisted living facilities; government and administrative services, and critical emergency and utility services such as police, fire, ambulance (EMS), and public works facilities and providers.

Housing: residential neighborhoods (including single-family and multi-family dwellings, where buildings in the same neighborhood may be grouped as a single asset), group homes, and senior housing developments.

Socially Vulnerable Populations: assets that serve people with disabilities, low-income populations, the elderly and young children, and people at risk of becoming or are currently homeless.

LEFT: Asset Categories (Arch Street Communications)

RIGHT: Asset Mapping, Woodstock and Saugerties, 9.24.13 (Arch Street Communications)

Asset Mapping, 10.7.13 (Arch Street Communications)

Asset Mapping, 10.21.13 (Arch Street Communications)

The key components of the asset inventory included identifying, mapping, and categorizing assets and evaluating the risk to those assets posed by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy.

The asset inventory began with informal group discussions at the first Ulster NYRCR Planning Committee meeting focusing on identifying key assets that were damaged by the storms. Following these preliminary asset inventories, existing GIS data, augmented by other State, County, and local databases were used to create maps to provide a better visual representation of the assets in each community. Mapping and inventory lists were reviewed and revised based on further discussions with the Committee and public input to create a list that would represent a comprehensive inventory of assets that are most critical to protect.

Following the initial asset inventory, the Committee worked toward characterizing the various assets based on risk and community value. Assets in areas subject to repeat flooding and located within the 100-year floodplain were identified by the Committee to be subject to extreme risk. In addition, the Committee assigned a community value to the asset expressed as high, medium, or low. These choices were community specific; some communities chose to place high value on emergency service assets, while others placed high value on large employment centers.

Understanding the level of risk to high-value assets is critical to identifying measures of protection to mitigate impacts and increase asset and community resiliency in the event of future storms. The final asset inventory mapping is provided in Figures II-1 to Figure II-8.

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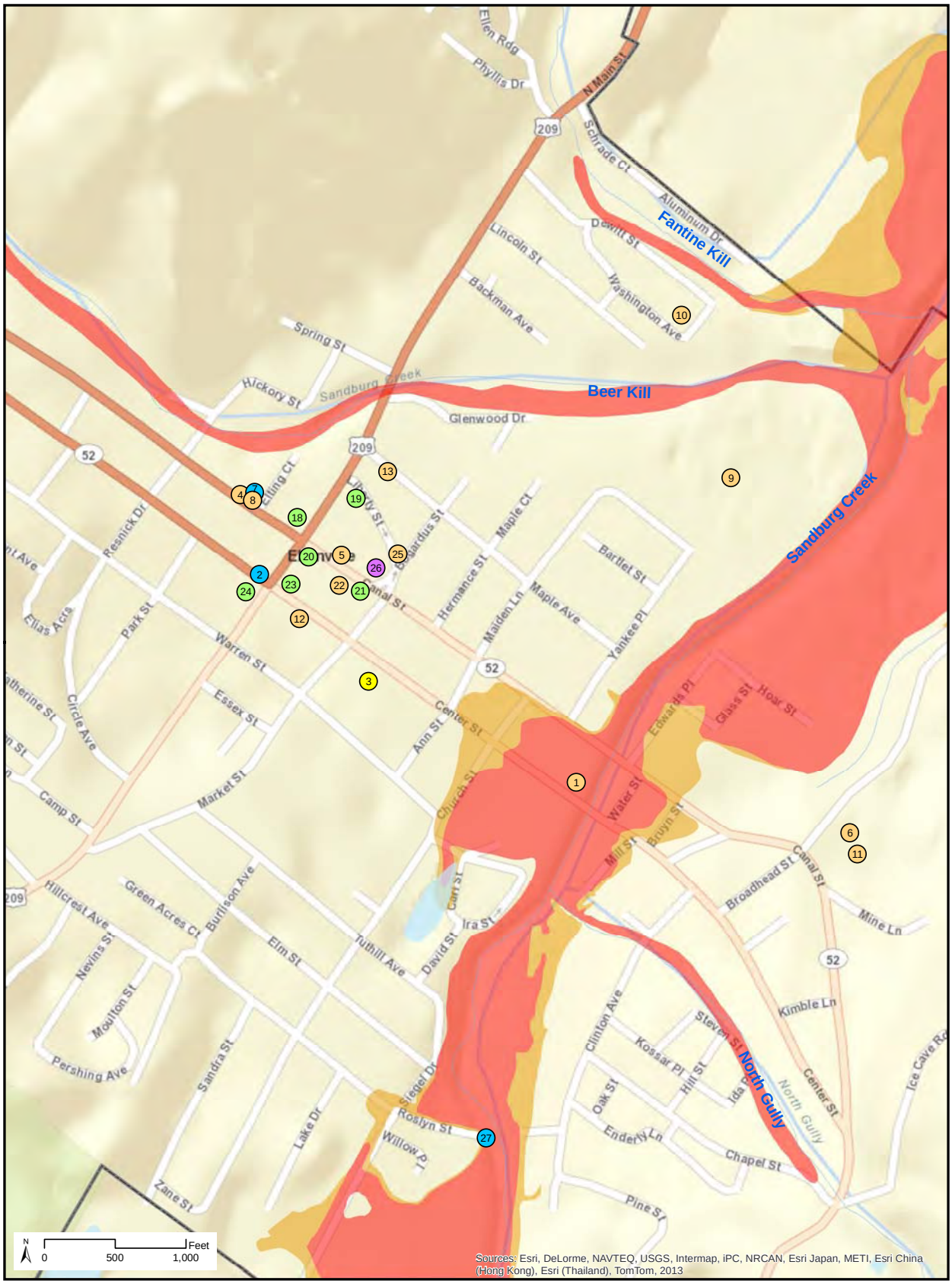
Village of Ellenville Community Assets

1 Ellenville Senior Housing
2 Wastewater Treatment facility
3 Ellenville Senior Apartments
4 Ellenville Village Hall
5 Wawarsing Town Hall
6 Ellenville Street Department
7 Ellenville Water Department
8 Ellenville Police Department
9 Ellenville Central School
10 Ellenville First Aid & Rescue Squad
11 Ellenville Joint Fire District Kimble Hose Company (26)
12 Ellenville Joint Fire District Pioneer Engine Company (26)
13 Ellenville Joint Fire District Scoresby Hose Company (26)
18 Provident Bank
19 M&T Bank
20 Bank of America
21 Catskill Hudson Bank
22 Matthews' Pharmacy
23 Getty Gas Station
24 Citgo Gas Station
25 US Post Office
26 Hunt, George and John R. Memorial
27 Roslyn Street Pump Station

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-1
Community Assets - Ellenville



Flood Zones

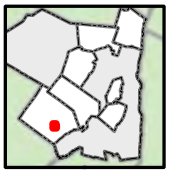
- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

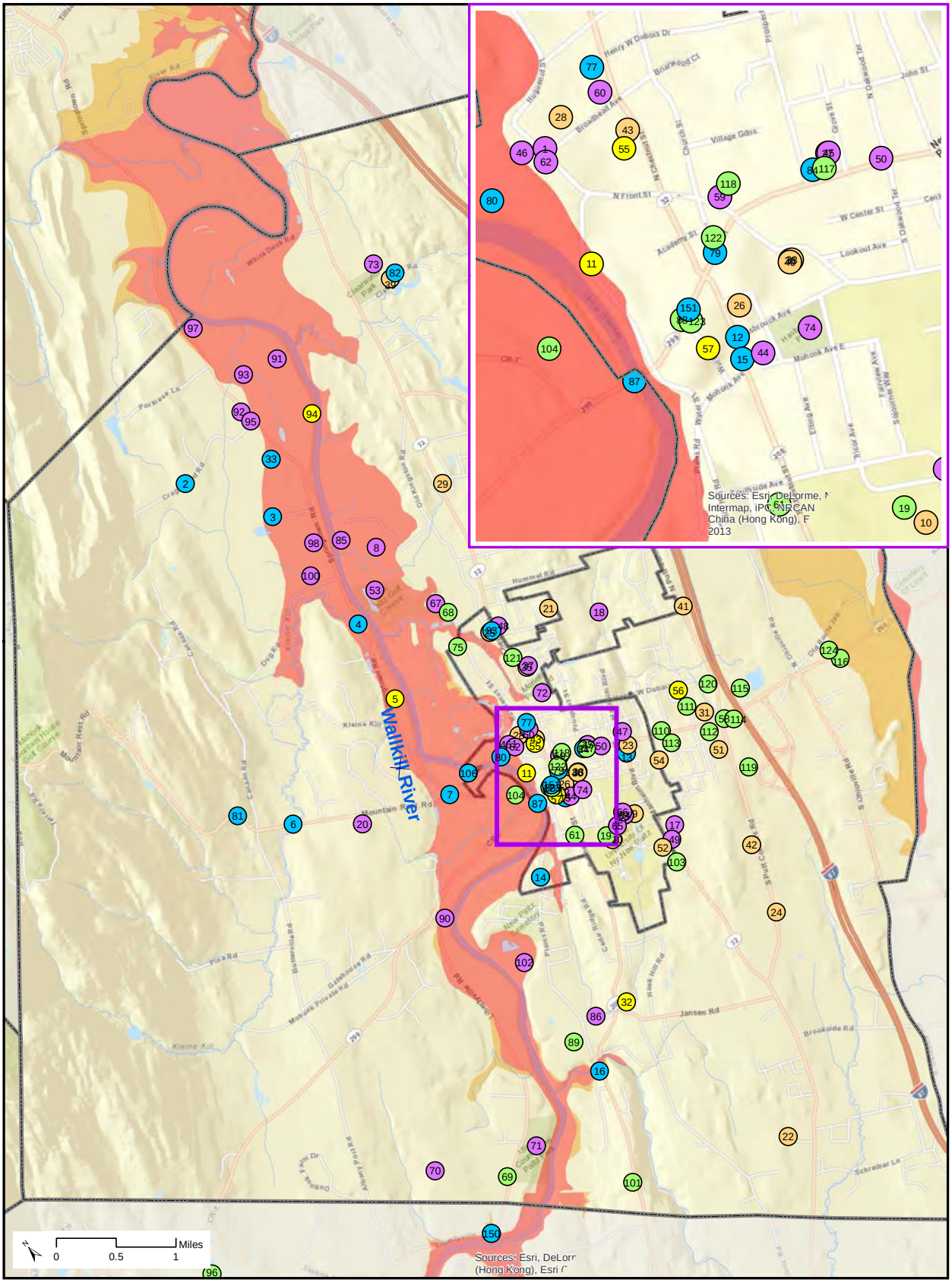


Town and Village of New Paltz Community Assets

1 Historic Huguenot Street
2 Cragswood Road
3 Coffey Road
4 Springtown Road
5 Residential Flooding Springtown Road
6 Dip in Road
7 Water accumulation Springtown Road/Mountain Rest Road
8 Wallkill Valley Rail Trail
9 SUNY Student Union Building/ Haggerty Administration Building
10 SUNY Athletics Center
11 Towne and Country Apartments
12 Hasbrouck Ave/South Chestnut Street Flooding
13 Rte 32 Flooding
14 Flooding along Plains Road
15 Rte 208 Flooding
16 Flooding at intersection
17 Wetland
18 Millbrook Preserve
19 SUNY New Paltz
20 Unison Arts Center
21 Duzine Elementary School
22 Lenape Elementary School
23 New Paltz Middle School
24 New Paltz High School
25 Ulster Board of Cooperative Educational Services
26 Mountain Laurel Waldorf School
27 New Paltz United Methodist Church Pre-school
28 Huguenot Street Cooperative Nursery School
29 Little Explorers Nursery & Daycare Center
30 First Care Walk-in Medical Center
31 New Paltz Family Health Center
32 Mountain View Nursing & Rehabilitation Center
33 Johnson Fuel
34 Kimlin Propane Co Inc.
35 Town of New Paltz Town Hall
36 Village of New Paltz Village Hall
37 Town of New Paltz Community Center
38 Village of New Paltz Dept. Public Works
39 Town of New Paltz Highway & Building Department
40 New Paltz Fire Department Station #1
41 New Paltz Rescue Squad
42 New Paltz Police Department
43 Family of New Paltz
44 St. Joseph's Church and Food Pantry
45 New Paltz United Methodist Church
46 Reformed Church of New Paltz
47 New Paltz Religious Society of Friends/Quakers
48 New Paltz Church of the Nazarene
49 Redeemer Evangelical Lutheran Church
50 St. Andrew's Episcopal Church
51 NY State Department of Environmental Conservation Region 3 Office
52 SUNY New Paltz Campus Police
53 New Paltz Golf Course
54 ARC Housing
55 Huguenot Park Apartments
56 Meadowbrooks Housing
57 Boys Home
58 Downtown Historic District
59 Elting Memorial Library
60 Salvation Army
61 Lefervre House Bed & Breakfast
62 Daniel Dubois House
63 McKenna Theater
64 Julien Studley Theater
65 Parker Theater
66 Samuel Dorsky Museum
67 Locust Lawn
68 Locust Tree Building
69 Ulster County New Paltz Park
70 Recreational Fields
71 Ulster County Pool
72 Moriello Pool
73 Clearwater Park
74 Hasbrouck Park
75 Huguenot Street CSA & Community Gardens
77 Verizon Wireless
79 Time Warner Cable
80 Sewage Treatment Plant
81 Aqueduct
82 New Paltz Recycling Center - Town Dump
83 Ulster County Area Transit Departure Stop
84 Adirondack Trailways Bus Terminal
85 Wallkill Valley Rail Trail
86 Rail Trail Bridges
87 Carmine Liberta Bridge
88 Core Business District - Village
89 Taliafiero Farm CSA
90 Wallkill View Farm
91 Million Dollar Farm
92 Ray Bradley Farm
93 Symanski Farm
94 Light-Joseph Farm
95 Kara Kenney Farm
96 Jenkins Leukens Orchards
97 Bruderhof Farm
98 Fackler Farm
100 Springtown Sweet View Farm
101 Dressels Orchards
102 Dodd Farm
103 Moriello Orchards/Apple Hill Farm
104 Open Space Institute
105 Robibero Winery
106 Boat Launch
107 Mohonk Preserve
108 Minnewaska State Park
109 Mohonk Mountain House
110 243 Main Street Office Building
111 Stop & Shop Plaza
112 Shoprite Plaza
113 Rite Aid Plaza
114 Super 8 Motel
115 87 Motel
116 Econolodge
117 New Paltz Hostel
118 Orchard Heights B&B
119 Frito Lay Inc.
120 Freihofer Charles Baking Company
123 New Paltz Farmers Market
124 The Living Seed Yoga & Holistic Health Center
150 Libertyville Road
151 Rte 299--Main Street Flooding

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-2
Community Assets - New Paltz



Flood Zones

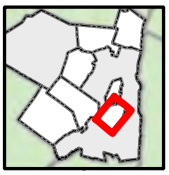
- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

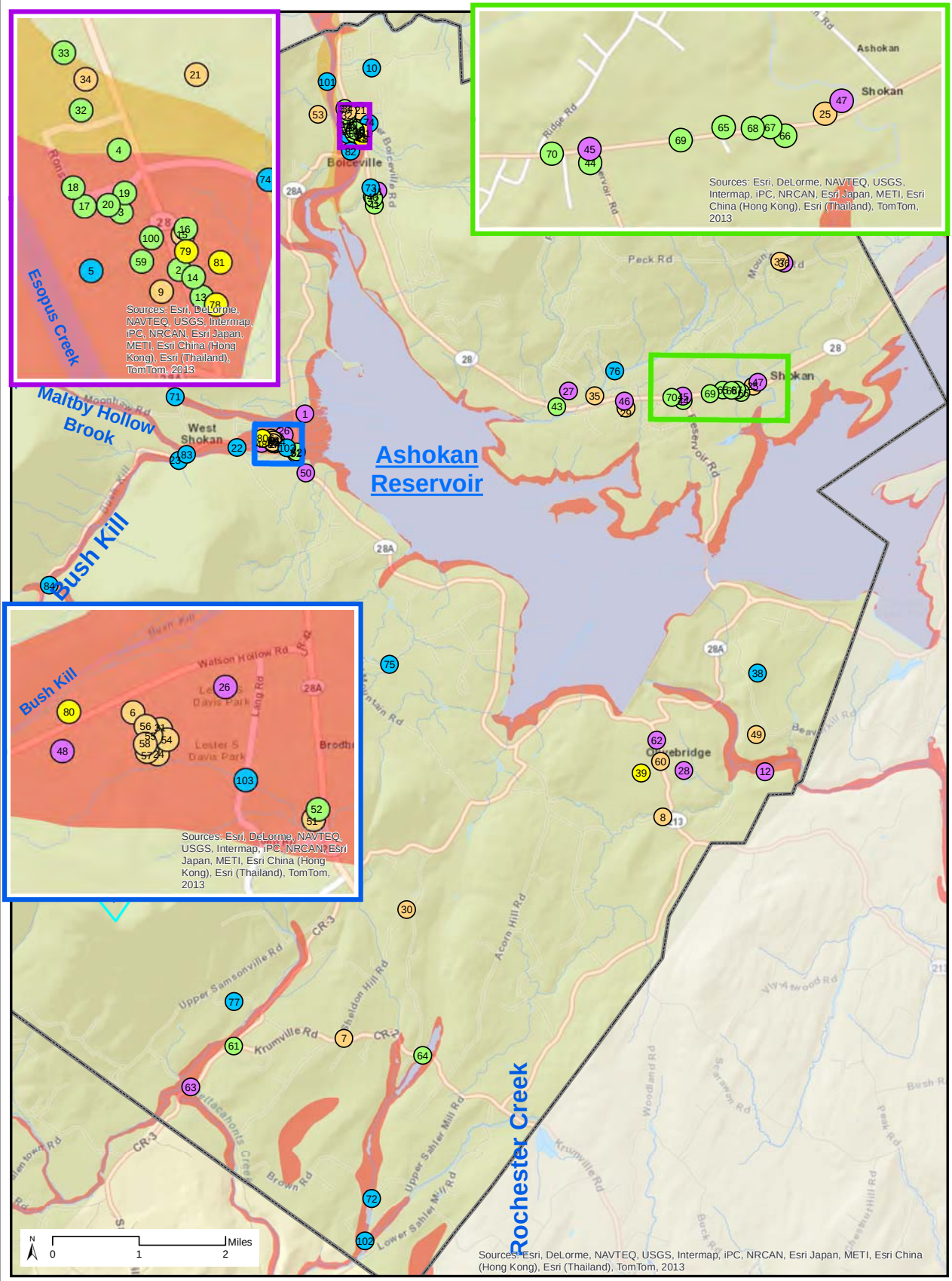


Town of Olive Community Assets

1 Ashokan Bush Kill Creek Flooding
2 Boiceville Flooding
3 Boiceville Market
4 Chester Properties Inc.
5 Boiceville Wastewater Treatment Facility
6 Olive Fire Company #3
7 Olive Fire Company #4
8 Olive Fire Company #1
9 Olive Fire Company #5
10 Hudson Valley Water Company #5 Water Treatment Facility
11 Bruneul, Emile, Studio and Sculpture Garden
12 Ashokan-Turnwood Covered Bridge
13 Boiceville Florist
14 The Landmark Grille
15 Maverick West Medical Facility
16 Johanansen Office Complex
17 Stucki Embroidery
18 Ronsen Piano Hammer Co., Inc.
19 Nekos Boiceville Pharmacy
20 Boiceville Wine & Spirits, Inc.
21 Onteora School Complex
22 Bushkill Bridge--Co. Rte. 42
23 Watson Hollow Rd., Co. Rt. 42
24 Town of Olive Offices & Highway Complex
25 Olive Fire Company #2
26 Lester S. Davis Park
27 Grant Avery Park
28 Olivebridge Park
29 Olive First Aid Unit, Inc.
30 Olive First Aid Unit, Inc.
31 Olive First Aid Unit, Inc.
32 Luky Petroleum, Inc.
33 Community Bank
34 Beginnings Day Care
35 Town of Olive Court & Police
36 American Legion Hall & Sr. Center
37 NY State Police Substation
38 Olive Transfer Station
39 Tongore Pines Sr. Housing
40 Boiceville Inn
41 Bread Alone
42 Coldwell Banker Real Estate
43 Pine View Bakery
44 Olive Animal Hospital
45 Old School Baptist Meeting House
46 Shokan Reformed Church
47 Ashokan UM Church
48 St. Augustines Chapel
49 Ashokan Center
50 Olive Free Library
51 West Shokan Post Office
52 Joma Café
53 Ulster Highway Dept. Substation
54 Town of Olive Office Building
55 Town of Olive Highway Garage
56 Town of Olive Equipment Bldg.
57 Town of Olive Salt Shed
58 Town of Olive Dog Kennel
59 Roberts Auction
60 Olivebridge Post Office
61 Tettas Food Port
62 Olivebridge United Methodist Church
63 Samsonville United Methodist Church
64 The Country Inn
65 Shokan Square
66 Olive Plaza
67 Sheldon Hill Forestry
68 Carma Automotive
69 RJ Wilkins Plaza
70 Verizon, NY Substation
71 Hillside Drive Bridge--Olive owned
72 Brown Road Culvert--Olive owned
73 DeSilva Road Bridge--Olive owned
74 Upper B'ville Rd. Bridge--Olive owned
75 Brodhead Rd. Bridges --Olive owned
76 Red Maple Rd. Streambed Sediment Deposit
77 Jomar Lane Culverts (3)
78 Girard Residence
79 Daniels Residence
80 Seven Residences
81 Klippel Apartments
82 NYC Bridge--Five Arch
83 Ulster Maltby Hollow Bridge
84 South Hollow Bridge Flooding
100 Trails Motel
101 Cold Brook Road and Esopus Creek
102 Upper Sahler Mill Road at Beaverdam Creek
103 Lang Road

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-3
Community Assets - Olive



Flood Zones

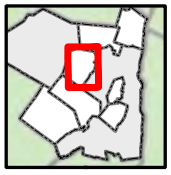
- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

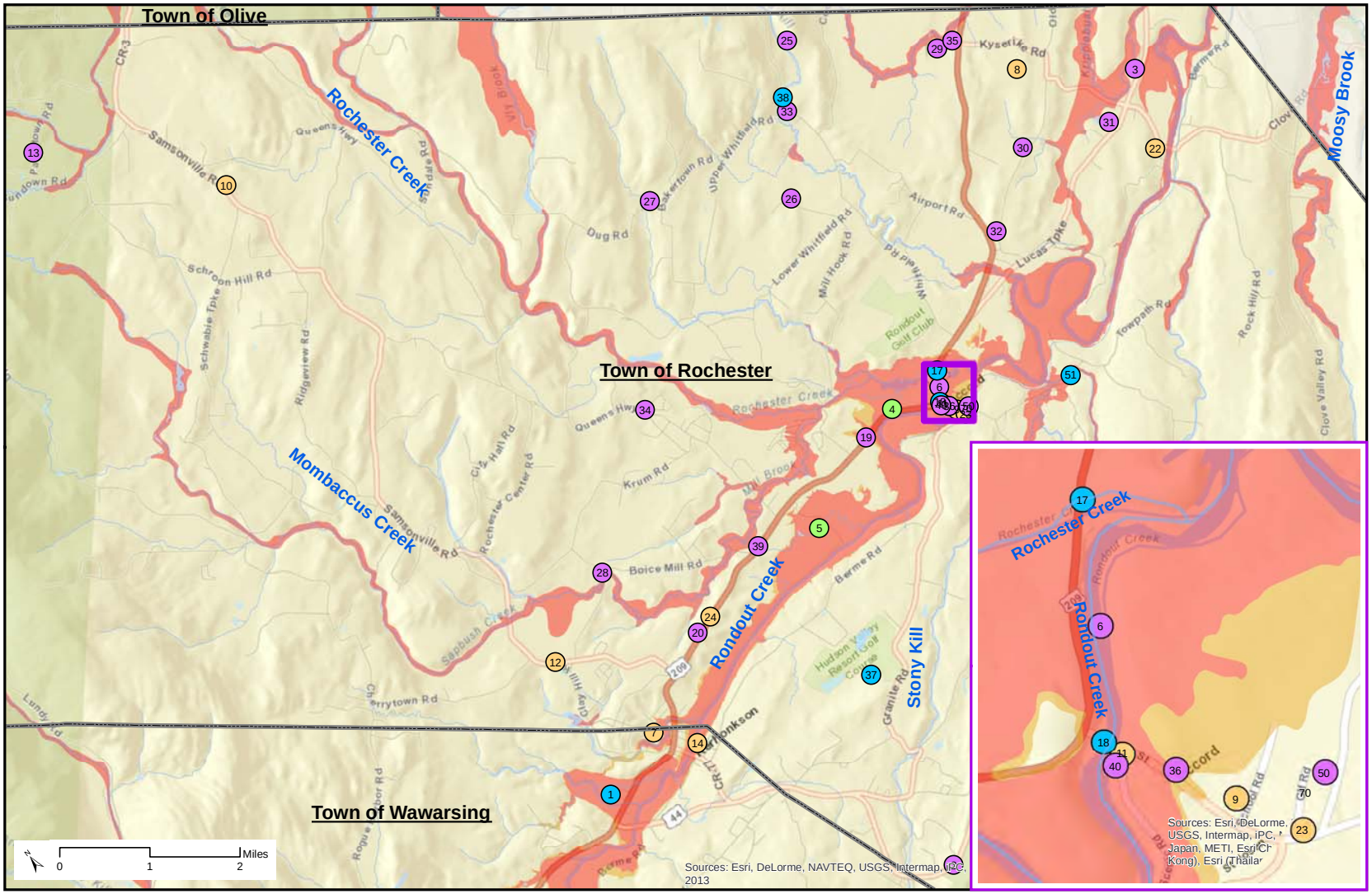


Town of Rochester Community Assets

1 Carlo Drive
2 Minnewaska State Park
3 Pompeys Cave
4 Saunderskill Farms
5 Kelder farms
6 Rondout Creek
7 Kerhonkson Elementary school
8 Rondout Central School
9 Accord Fire District Accord Station
10 Accord Fire District Rochester Station (15)
11 Town Hall
12 Town Court
13 Palentown School
14 Kerhonkson Fire Company
15 Ellenville Regional Hospital
16 Benedictine Hospital
17 Rochester Creek Bridge
18 Accord Bridge
19 Rochester Reformed Church
20 Chapel of Our Lady of Lourdes Church
21 Ulster County Sheriff Sub Station
22 Accord Fire District Alligerville Station (15)
23 Municipal Garage
24 Kerhonkson Accord First Aid Squad
25 Markle, Jacob F., Stone House
26 Middaugh Stone House and Dutch Barn
27 Baker, Sebastian, Stone House
28 Hoornbeck, Jacob, Stone House
29 Sahler Stone House and Dutch Barn
30 Stilwill-Westbrook Stone House
31 Van Wagenen Stone House and Farm Complex
32 Westbrook, Dirck, Stone House
33 Krom, Lucas Stone House
34 Schoonmaker, C. K., Stone House
35 Winfield Corners Stone House
36 Friends of Historic Rochester Museum
37 Hudson Valley Resort Water Treatment Facility
38 Whitefield Road Bridge-Flooding
39 Red Brick House-Historic
40 D and H Rail Trail Entrance
50 Youth and Community Department
51 Towpath Road
70 Rochester Community Center
-- Lucas Estates Water Company Water Treatment Facility
-- The Rondout Aquifer
-- Zolota Osin Inc. Water Treatment Facility

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-4
Community Assets - Rochester



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

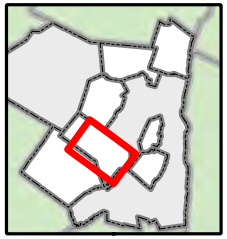
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014

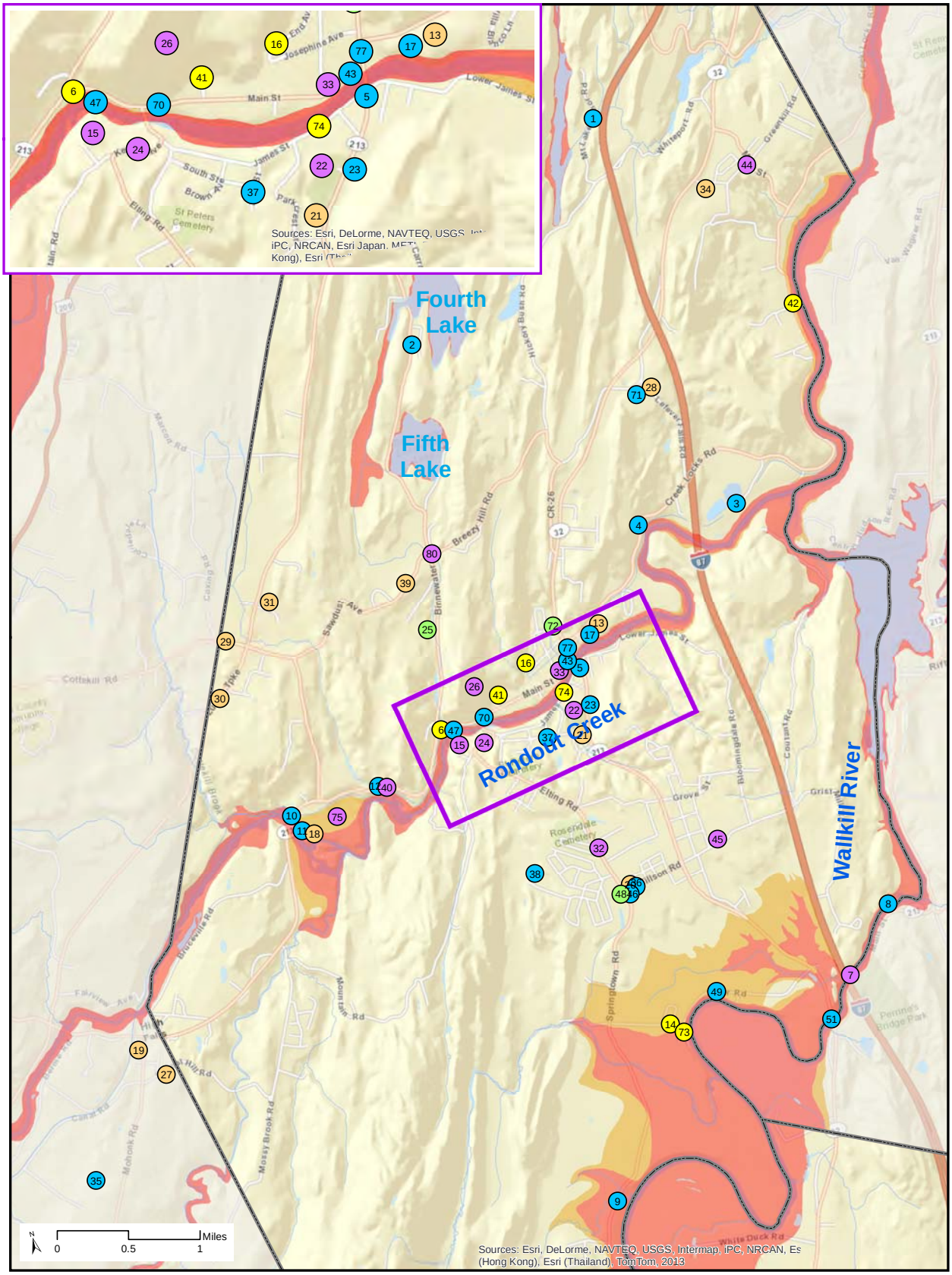


Town of Rosendale Community Assets

1 Hickory Bush Road
2 Spring Hill Road
3 Webster Lock Road
4 Creek Locks Road
5 Flood Canal System
6 Residences West of Railroad Trestle
7 Perrine's Bridge
8 Dashville Dam
9 Springtown Road
10 Route 213
11 Creekside Lane
12 Route 213 Flooding
13 Rosendale Salt Shed
14 Mobile Home Park
15 Wallkill Valley Rail Trail
16 Washington Park
17 Sewer Plant
18 Island View Adult Family Care
19 High Falls Firehouse (serves Rosendale)
20 Tillson Volunteer Fire Department
21 Park Heights Senior Housing
22 Rosendale Recreation Center and Pool House
23 Park & Ride Bus Station
24 Saint Peter's Catholic Church (used as shelter)
25 Iron Mountain
26 Joppenbergh Mountain
27 Marbletown First Aid Unit
28 Rosendale Police Department
29 Cottekill Fire Department
30 Future Town Hall
31 Brookside School (Special Education)
32 American Legion
33 Rosendale Library
34 Bloomington Fire Department
35 High Falls Water District Water Treatment Facility
36 Clarks Estates Homeowners Water Treatment Facility
37 Rosendale Water Plant
38 Tillson Estate Comm. Assoc. Water Treatment Facility
39 Binnewater Fire Station
40 Snyder Estate Natural Cement Historic District
41 Hardenburgh Group Home (disabled adults)
42 Family House
43 US Army Corps Flood Control System pump station
44 Bloomington Church
45 Tillson Community Church
46 JMG Bus Station
47 Railroad Trestle (can provide access for emergency vehicles across Rondout)
48 IGA Market
49 River Road
51 Route 32/Rifton Bridge
70 Main Street Flooding
71 Communications Tower
72 Fann's Plaza
73 Riverview Drive
74 James Street
75 AJ Snyder Little League Field
77 Route 32
80 Wallkill Valley Rail Trail
-- Cottekill Brook
-- Coxingkill Creek
-- Dewitt Mill Stream
-- Rondout Creek
-- Wallkill River

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-5
Community Assets - Rosendale



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

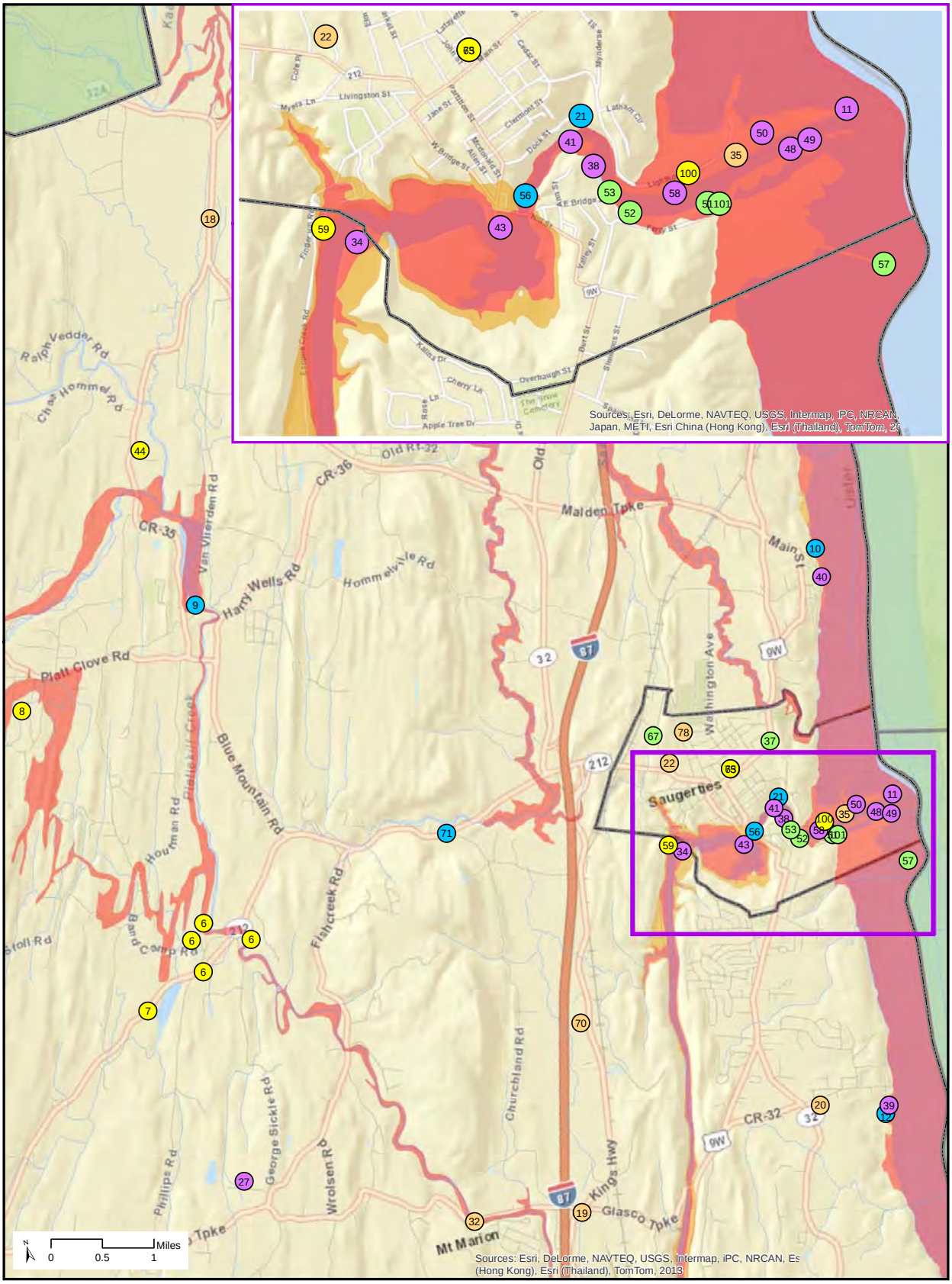
Flood Zones	Asset Class	
100-yr Floodplain	Economic	Housing
500-yr Floodplain	Health & Social Services	Infrastructure
		Natural & Cultural Resources

Town and Village of Saugerties Community Assets

6 Herrick's Bridge
7 Flooded Homes
8 Isolated neighborhood
9 Blue Mountain Reservoir
10 Malden-on-Hudson Wastewater Treatment Plant
11 Lighthouse
12 Glasco Wastewater Treatment Plant
18 Saxton-Katsbaan Fire District Saxton Station (55)
19 Mt Marion Fire Department (41)
20 Fire/First Aid Station
21 Village Sewage Treatment Plant
22 Town Hall/Police Station
27 Opus 40
32 Mount Marion School
34 Esopus Bend Nature Preserve
35 Coast Guard Station
37 Diaz Ambulance
38 Tina Chorvas Park
39 Riverfront Park - Glasco
40 Riverfront Park - Malden
41 Arm of the Sea Theater's studios and storage
43 Village Beach
44 Blue Mountain Manor
48 Tidal marshes on both sides of Creek channel
49 Bulkheads of creek channel
50 Ruth Glunt Nature Trail
51 Saugerties Powerboat Association
52 Lynch's Marina
53 Lighthouse Cove Marina
56 Barclay's Dam
57 Ferry Dock
58 Harbor and Dykes
59 Oakledge Park Residential Neighborhood
63 Saugerties Senior Housing
67 Industrial Park
70 Army Reserve Center
71 Lezette School Bus Garage
75 Better Community Housing
78 Senior Center
100 Lighthouse Drive Residences
101 Saugerties Marina
-- Saugerties (Village) Water District

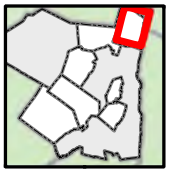
Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-6
Community Assets - Saugerties



Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014



Flood Zones

- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

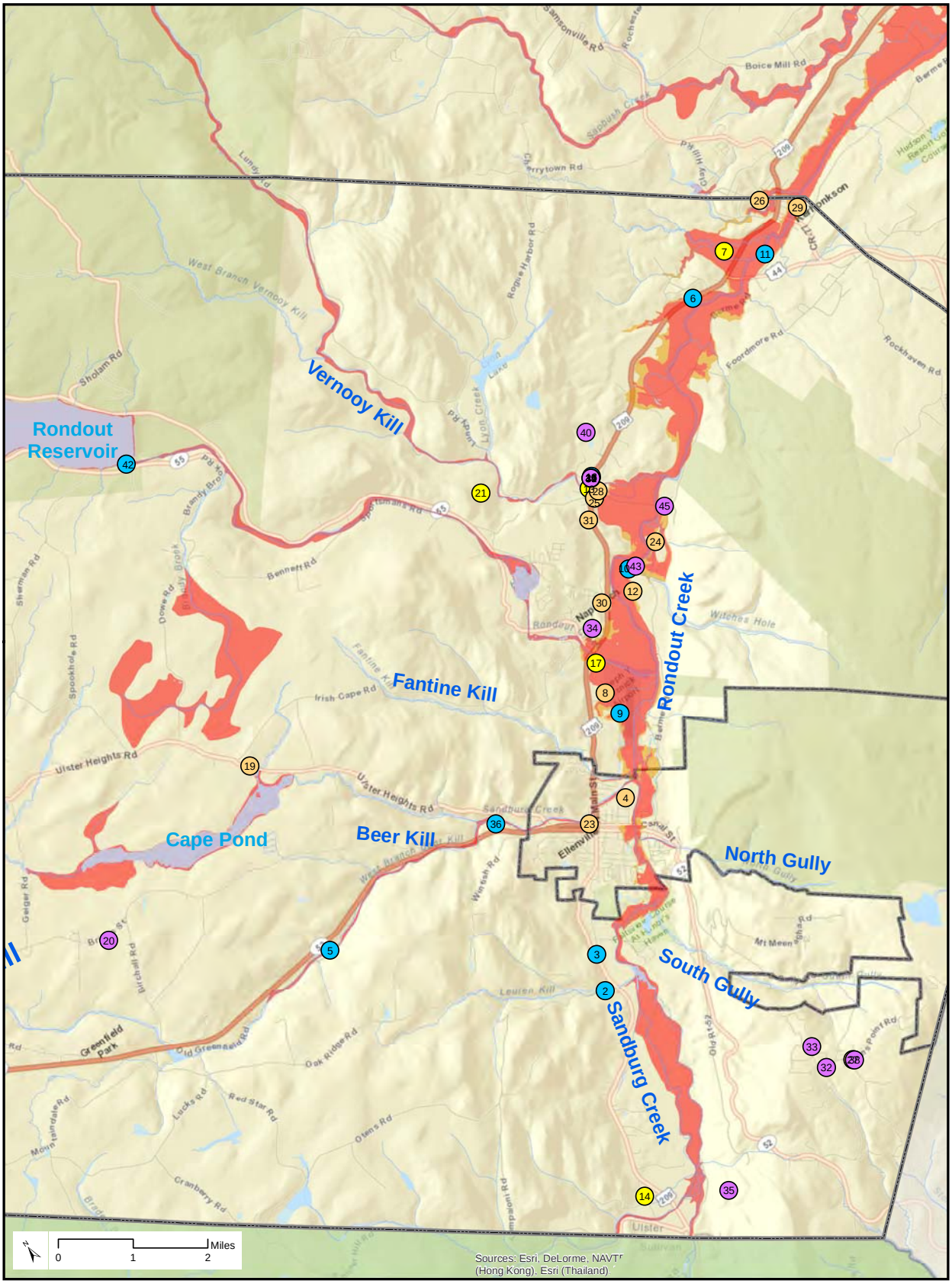
- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

Town of Wawarsing Community Assets

2 Oak Ridge Road
3 Nevele Road
4 Ellenville Central School
5 Old Greenfield Rd
6 Rte 209
7 Carlo Drive Area Housing
8 Ellenville Regional Hospital
9 Joseph Y Resnick Airport
10 Napanoch Sewer Imp Area wastewater treatment facility
11 Kerhonkson Sewer Improv. Area Wastewater treatment facility
12 Eastern Correctional Facility
13 Fantinekill Mobile Home Park
14 Glen Mobile Home Park
15 Hudson Meadows
16 Kerhonkson Water District
17 Ogden Lane Mobile Home Park
19 Renaissance Project Inc.
20 Samaritan Village
21 Shady Acres Mobile Home Park
23 Police Station Wawarsing
24 Ulster Correctional Facility
25 Wawarsing Christian Academy
26 Kerhonkson Elementary School
27 Fire/First Aid Station
28 Fire/First Aid Station
29 Kerhonkson Fire Company
30 Fire/First Aid Station
31 Municipal Garage
32 Cragsmoor Historic District
33 Chetolah
34 Hoornbeek Store Complex
35 Spring Glen Synagogue
36 Central Hudson - Sub Station
37 Napanoch Water Well Field
38 Sam's Point Preserve Visitor Center
39 Tower farm, Lake Maratanza
40 Lippman Park
41 Vernooy Kill State Forest
42 Merriman Dam
43 Rail Trail Route
44 Large Red Cedar Wetland
45 Ontario & Western Port Ben Passenger Train Station
-- East Branch Beer Kill
-- Fantine Kill
-- North Cully
-- Rondout Creek
-- Sandburg Creek
-- South Gully
-- Vernooy Kill
-- West Branch Beer Kill

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-7
Community Assets - Wawarsing



Flood Zones

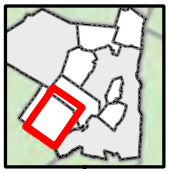
- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

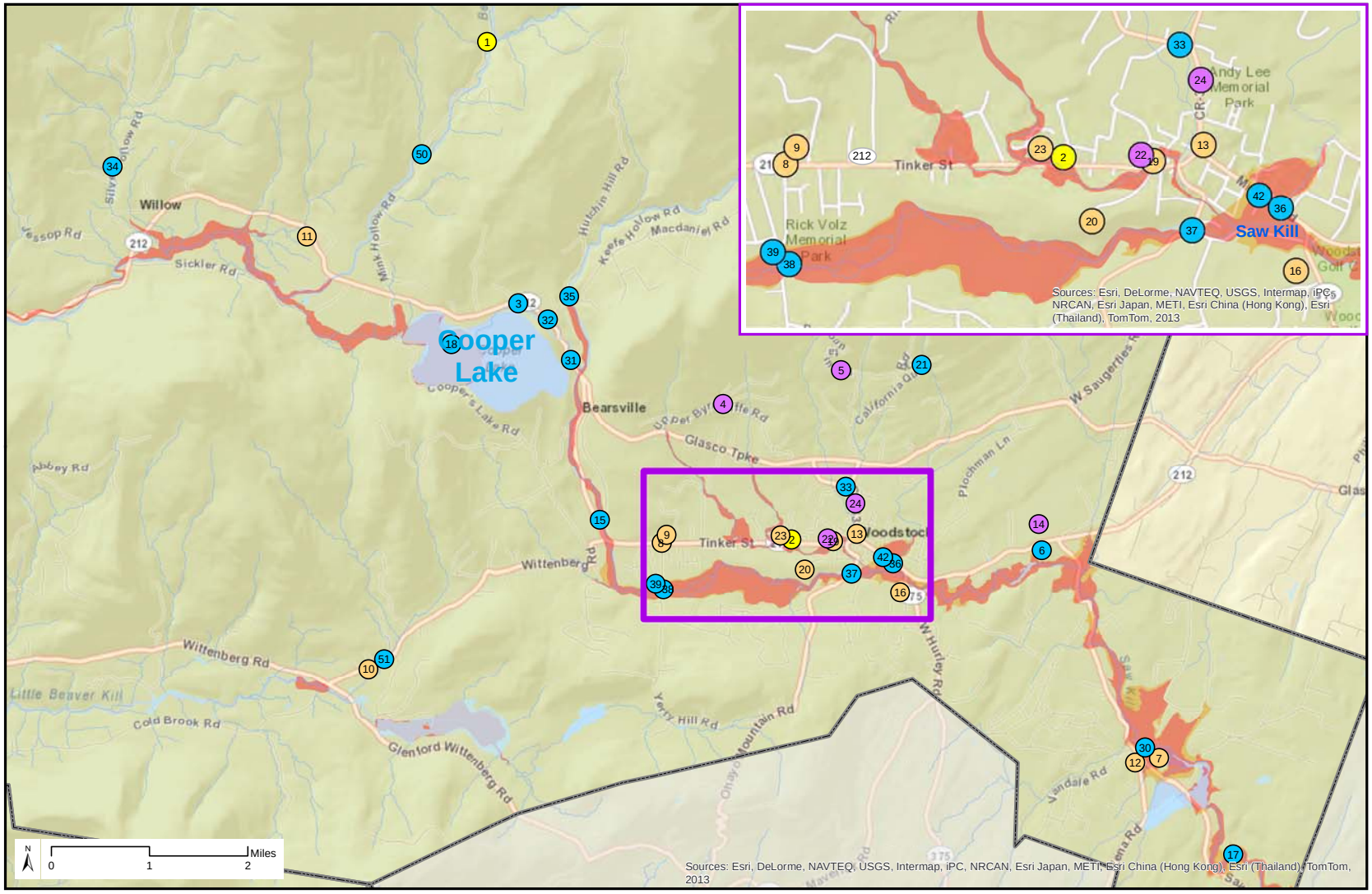


Town of Woodstock Community Assets

1 Isolated Neighborhoods
2 Residential Neighborhood
3 Water Divide
4 Byrdcliffe Theatre
5 Church of the Holy Transfiguration of Christ-on-the-Mount
6 Woodstock Wastewater Treatment Plant
7 Zena Elementary School
8 Fire/First Aid Station
9 Fire/First Aid Station
10 Fire/First Aid Station
11 Fire/First Aid Station
12 Fire/First Aid Station
13 Family of Woodstock
14 Woodstock School of Art
15 Woodstock Highway Facility
16 Woodstock Elementary School
17 City of Kingston Water Treatment Plant
18 City of Kingston Cooper Lake reservoir
19 Woodstock Police & Emergency Dispatch
20 Woodstock Town Offices
21 Woodstock Municipal Communications Tower
22 Woodstock Library
23 Woodstock Post Office
24 Community Center and Youth Center
30 John Joy Road Bridge
31 Reynolds Lane Bridge
32 Church Road Bridge
33 Lower Byrdcliff Rd Culvert
34 Silver Hollow Road Bridge
35 Macdaniel Road Bridge
36 Mill Hill Rd Bridge
37 Ohaya Mountain Road Embankment
38 Pump House 1
39 Pump House 2
42 Rt 212
50 Mink Hollow Bridge
51 Wittenberg Road Bridge
-- Central Business District
-- Mink Hollow Road Rock Wall
-- Sawkill Stream

Notes: Where a map number is not indicated, the asset was not found to correspond to a singular geographic location. Asset numbers may not be consecutive.

Figure II-8
Community Assets - Woodstock



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Asset Class

- Economic
- Health & Social Services
- Housing
- Infrastructure
- Natural & Cultural Resources

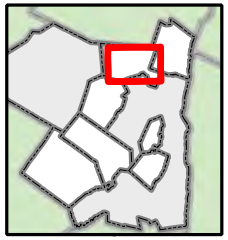
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



ii. Assessment of Risk to Assets and Systems

To be resilient, communities need a strong understanding of the risk to and vulnerability of their assets from the impact of the storms. Often, communities don't even realize that certain areas, roads, buildings, farms, or other treasured locations are at risk until it is too late and the damage is already done.

It is only when we all better understand the risk to our key community features that we are better able to protect them in the future. This assessment of risk attempts to accomplish that goal.

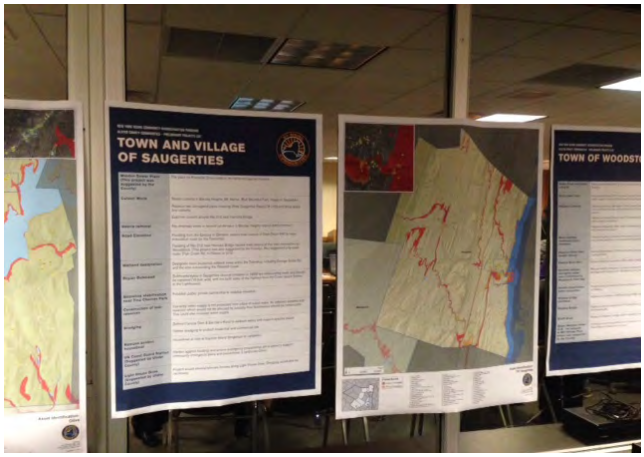
Preliminary Risk Assessment Mapping, 11.18.13 (Arch Street Communications)

As individuals, we take precautions to protect ourselves, our homes, and our businesses from routine storm events: cleaning out gutters, trimming tree branches, and making sure catch-basins are cleared of debris. We are accustomed to performing regular maintenance because we understand that nature is powerful, but generally predictable. Sometimes, during regular wind, rain, or snow storms, trees fall on roadways, taking with them power lines and parts of structures. People often view this as a by-product of creating a built environment within a natural environment. However, the damage caused by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee far surpassed the levels of impact and damage that could be expected from one storm. The results were catastrophic, reminding us all how vulnerable we are.

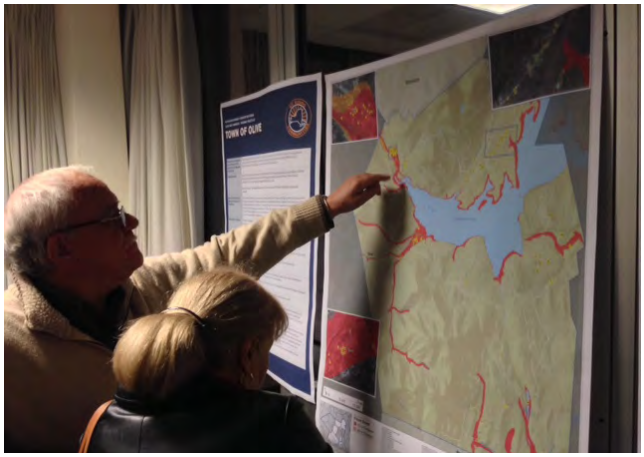
As described earlier, the NYRCR Ulster Communities went through a lengthy process of identifying not only the assets that were damaged in the storm events, but also the assets that were in danger of damage by future storms. This process fundamentally assessed their risk.

The Committee reviewed base maps for each of the ten localities marking specific asset locations for risk assessment. Over the course of eight meetings, the Committee also reviewed example risk assessments and provided input on the overall risk evaluation methodology, described in further detail below, including hazard, exposure, and vulnerability scoring for each community asset. Further discussions dealt with the range of results the model produced, grouping community assets located in close proximity to one another, and how potential asset grouping would affect overall risk to the asset. Each locality subsequently reviewed their asset list, the risk score, and a map of the assets with color coding for that risk score.

Unmitigated Risk Mapping, Public Engagement Meeting #2, November 20, 2013 (Arch Street Communications)



Unmitigated Risk Mapping, Public Engagement Meeting #2, November 20, 2013 (Arch Street Communications)



Unmitigated Risk Mapping, January 6, 2014 (Arch Street Communications)

Overview of Risk Assessment Methodology

The Risk Assessment process was performed using the Risk Assessment Tool provided by the NY Rising Community Reconstruction (NYRCR) Program and the New York State Department of State (NYS DOS). The risk assessment process involved using this tool to first identify "unmitigated" risk scores for assets or asset groups in each community without proposed projects in place.

Developing unmitigated risk scores required determining the exposure and vulnerability of assets through a process of mapping, gathering informational inputs from the Ulster NYRCR Planning Committee and following consistent methodologies to determine landscape attributes and vulnerability scores for each asset.

Figure II-9 provides an overview of the general risk assessment process, which is further described in the sections that follow.

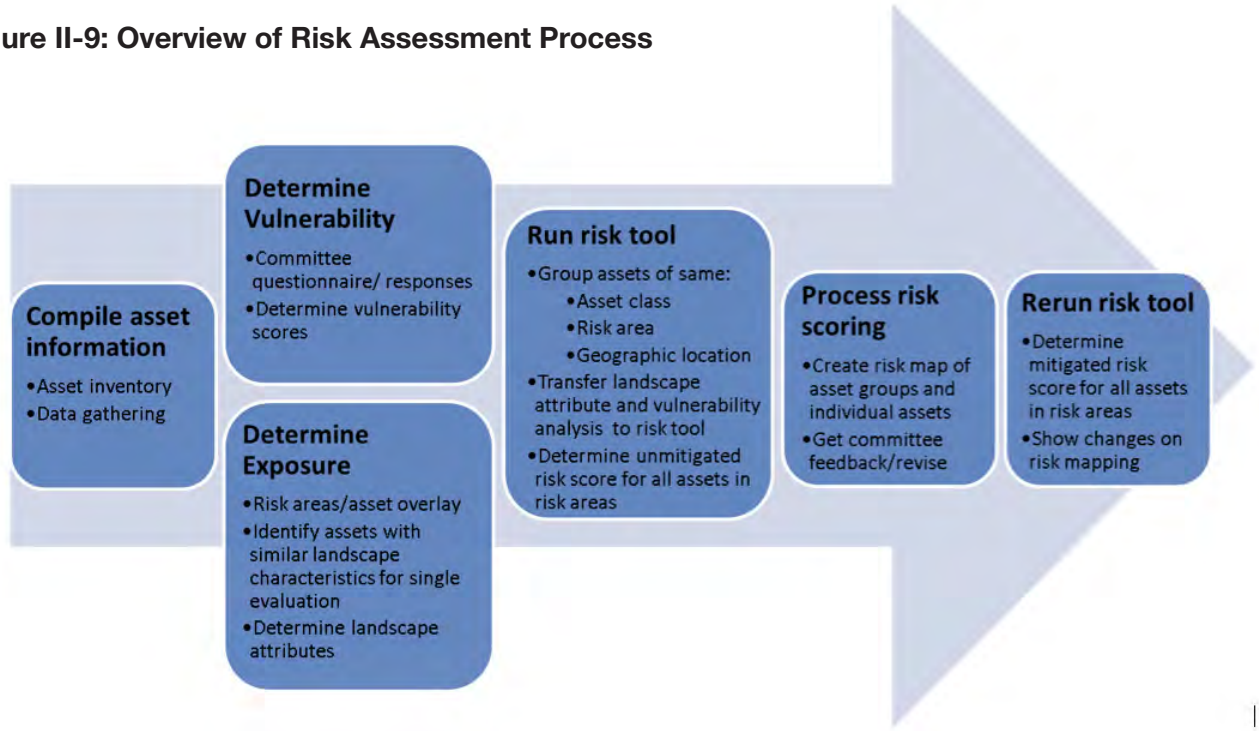
Risk Assessment Tool

Using the asset inventories developed by the Ulster NYRCR Planning Committee and supplemented by public input, the risk assessment process was performed using the Risk Assessment Tool. The tool developed by NYS DOS, combines information from the asset inventory, hazard maps, and qualitative exposure assessments into hazard, exposure, and vulnerability scores. These are further combined into one quantitative risk score. Other information, including the asset class, whether the asset serves socially vulnerable populations, whether the asset is a critical facility (e.g., per FEMA definition or locally significant), or the asset's community value, can help inform a community about the benefits or priority of potential projects, but does not contribute to the quantitative risk score of an asset. An unpopulated version of the Risk Assessment Tool for riverine assets is presented in Figure II-10.

Determining Hazard Score

The hazard score in the Risk Assessment Tool is based on the likelihood a flooding event will occur and the destructive capacity of that event. Likelihood is derived from the storm recurrence interval within the selected time frame, or how many times in a given time period such a storm is likely to occur. For the purposes of this evaluation, the hazard score corresponding to a 100-year storm event, or the storm with a 1% annual chance of occurrence, was used for all assets.

Figure II-9: Overview of Risk Assessment Process



Determining Exposure Score

Exposure in the Risk Assessment Tool is based on both the risk area within which an asset or asset group is located and the local topographic and geographic conditions of its surroundings, or its landscape attributes. Once both the risk area and landscape attributes are determined, an exposure score is calculated. Both risk area and landscape attribute determination are further described below.

Risk Area

Maps of the 100- and 500-year Ulster County Flood Zones, obtained as part of the U.S. Federal Emergency Management Agency Q3 Flood Zone Data, were used to identify areas of high and moderate risk, respectively. An asset's risk area was then determined by overlaying asset maps with the flood risk areas.

Assets, both in and out of the 100-year floodplain, that were repeatedly subject to flooding during historic storms were considered to be within an extreme risk area.

Assets not located in a risk area or reported as repeat flood hazards were not considered for exposure evaluation, as assets located outside of risk areas automatically have risk scores of zero in the Risk Assessment Tool.

Figure II-10: Risk Assessment Tool – Riverine Assets

Risk Assessment Tool																
Asset Information						Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Socially Vulnerable Populations	Critical Facility	Community Value	Defensive Flood Protection Measures	Elevation	Freeboard	Point of Confluence	Storm Water Discharge	Vegetated Stream Bank Buffers	*Landscape Attribute Score ("Yes" = +0.5)*	Hazard Score	Exposure Score	Vulnerability Score	Risk Score

Landscape Attribute Determination

Assets in the NYRCR Ulster Communities are subject to riverine flood risks meaning that they are at risk of flooding from the overflow of non-tidally influenced streams and rivers, rather than from tidal water bodies like bays and estuaries (It should be noted that assets in the Town and Village of Saugerties are also subject to coastal flooding risk and were modeled accordingly). As shown in Figure II-X, there are six landscape attributes considered for riverine assets when evaluating an asset's exposure. Cumulatively, the nature, condition, and presence or absence of these attributes defines the degree of exposure of a geographic location.

Assets within risk areas of similar landscape characteristics were grouped to evaluate multiple assets at once. Assets whose landscape characteristics did not conform to those of others nearby were considered individually. Data sources used for landscape attribute determinations include national and state mapping resources, aerial imagery, site visits, and input from local residents and authorities.

A completed example of these landscape attribute determination worksheets is provided in Section V.D, Exhibit V-1.

The landscape attribute determination worksheets were completed for each asset or asset area to create a landscape attribute score in the Risk Assessment Tool. Using a combination of the landscape attribute score and the particular risk area of the asset, the exposure score for the asset or asset area was calculated in the Risk Assessment Tool.

Determining Vulnerability Score

The vulnerability of an asset is defined as "an expression of the capacity of an asset to return to service after a storm, taking into account its material strength relative to the flood hazard as well its regenerative capacity". To effectively evaluate this metric, several asset characteristics were considered, including the impacts to the asset during historic storm events, occupation by vulnerable populations, and the elevation of the asset relative to the base flood elevation. All of these factors contribute, in varying degrees, to an asset's ability to withstand and recover from storm events.

To understand the impacts of historic storms to each municipality's identified assets; the Committee completed a questionnaire outlining the impacts to each of its assets during recent storms. Other information needed to complete the vulnerability scoring was obtained from site visits and national mapping data.

The qualitative characteristics listed above were entered into a matrix to obtain a quantitative vulnerability score that could be used in the Risk Assessment Tool. The vulnerability score is a numeric value of 1 through 5, with 5 representing the most vulnerable condition, and 1 representing the least vulnerable.

The vulnerability scoring process and the resultant scores were presented to and reviewed by the Committee and the NYS DOS planners to ensure acceptance and understanding of both methodology and results.

A completed example for a vulnerability score determination worksheet is provided in Section V.D, Exhibit V-2.

Risk Scoring

The information outlined above was entered into the Risk Assessment Tool for each municipality to calculate risk scores for each asset. The Risk Assessment Tool calculates risk score by multiplying the hazard score, exposure score, and vulnerability score:

Hazard x Exposure x Vulnerability = Risk

Quantitative risk scores enable a comparison of the risk to different assets within a community. Risk scores range from 0 to 75, with the following ranges signifying varying degrees of risk:

- <6: Residual risk
- 6-23: Moderate risk
- 24-53: High risk
- >53: Severe risk

Using the resulting risk scores, assets and asset groups were then drawn on risk area maps to visually depict the calculated risk and to identify the areas of each community with the highest concentration of assets at risk. The Ulster NYRCR Planning Committee reviewed the risk maps in conjunction with the completed Risk Assessment Tool to assess completeness and alignment with expectations.

Unmitigated Risk Scoring Results

Following the process discussed above, the risk scores without any projects in place, deemed "unmitigated" risk scores, were compiled for the assets and asset groups for all of the NYRCR Ulster Communities. The results for each community are presented in the sections below.

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Village of Ellenville

Though a large majority of Ellenville assets were not located within risk areas, the majority of those that were within risk areas were identified as subject to high or severe risk. Ellenville Senior Housing and Ellenville Central School are in the severe risk category as a result of the high vulnerability of each of the assets. Ellenville Senior Housing was reported to have sustained significant impacts from historic storms, and Ellenville Central School is at a low elevation relative to the FEMA base flood elevation (BFE), which is the tabulated water level for the 100-year storm. Furthermore, both assets are at elevated vulnerability due to their service of socially vulnerable populations. The Roslyn Street Pump Station is in the high risk category, as it is in an exposed location but was not reported to have sustained significant impacts during historic storms.

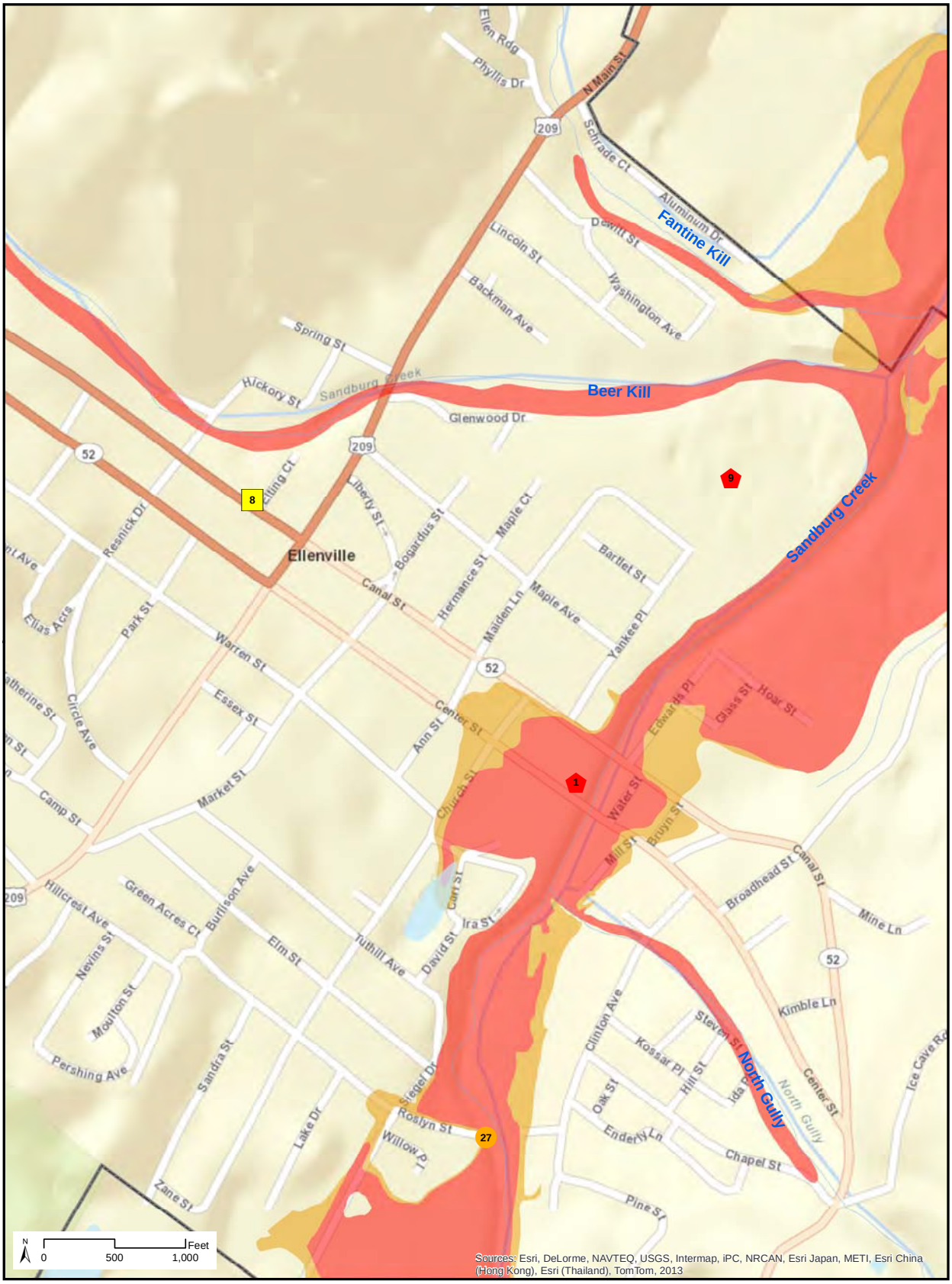
Additionally, though the many assets in the town's central business district were not in risk areas and thus not identified for risk scoring, it has been noted that these assets are inaccessible during flood events if Route 52 and Route 209 flood. Given these frequent, indirect impacts of flooding, it is important to note that such vulnerability could be alleviated by any projects targeting these two main transportation routes. Risk assessment results are presented in Figure II-11.

Unmitigated Risk Village of Ellenville

1 Ellenville Senior Housing
8 Ellenville Police Department
9 Ellenville Central School
27 Roslyn Street Pump Station

Notes: Assets not included in this list were not run through the risk assessment.

Figure II-11
Flood Risk to Assets - Ellenville



FEMA Flood Zone

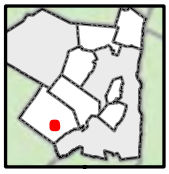
- 100-yr Floodplain
- 500-yr Floodplain

Risk Score Category

- Severe
- High
- Moderate
- Residual

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014



Town and Village of New Paltz

The New Paltz assets that are within risk areas are all located along the Wallkill River, running along the community's western edge. Two large sections of agricultural corridor, both north and south of the village's central business district, were identified as subject to severe risk. Though the structural components of these agricultural assets are not necessarily in the floodplain, many of these farms and orchards have large areas of cultivated land in low-lying areas along the river, without any geographic features to serve as buffers from the effects of a storm. These geographic conditions resulted in high exposure scores for these agricultural assets, ultimately resulting in severe risk scores.

In addition to the groups of agricultural assets at severe risk, there are three individual assets identified as subject to severe risk. These individual assets are the sewage treatment plant, the residential area on Springtown Road, and the Huguenot Street CSA. Though these assets all serve very different functions within the community, they are all in geographic locations that are highly exposed to the Wallkill River flood source and are all reported by the Planning Committee to have sustained significant impacts to service during historic storms.

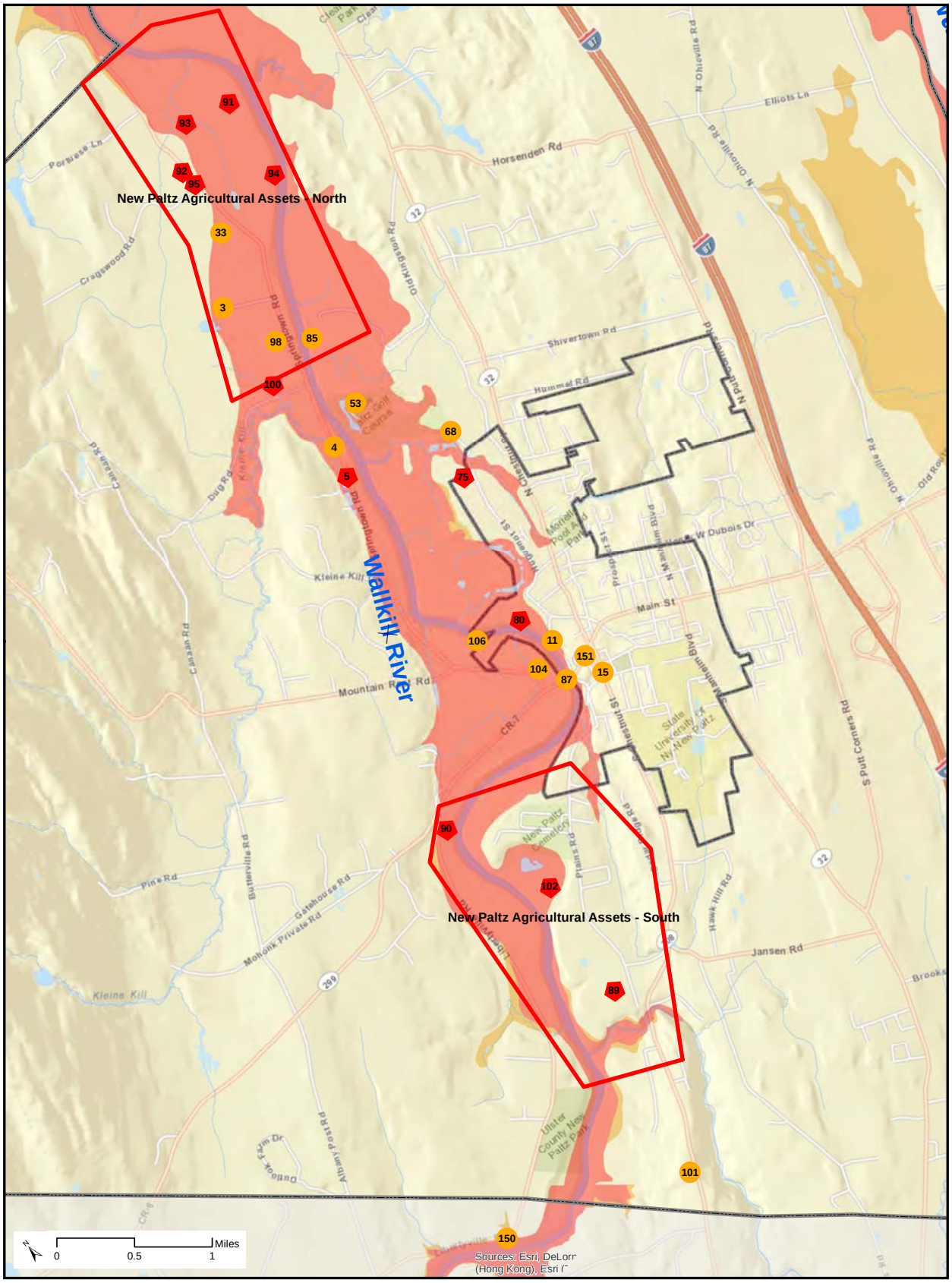
A number of the identified assets within the road and bridge system within New Paltz are at high risk, particularly those roads in low-lying areas along the Wallkill River. Coffey Road, Springtown Road, the Route 208 intersection, Route 299/Main Street, and Libertyville Road all enable vital access to portions of the community, and it is important to maintain usability of both this system as a whole and its individual components. Risk assessment results are presented in Figure II-12.

Unmitigated Risk Town and Village of New Paltz

3 Coffey Road
4 Springtown Road
5 Residential Flooding Springtown Road
8 Wallkill Valley Rail Trail
11 Towne and Country Apartments
15 Rte 208 Flooding
33 Johnson Fuel
53 New Paltz Golf Course
68 Locust Tree Building
75 Huguenot Street CSA & Community Gardens
80 Sewage Treatment Plant
85 Wallkill Valley Rail Trail
87 Carmine Liberta Bridge
89 Taliafiero Farm CSA
90 Wallkill View Farm
91 Million Dollar Farm
92 Ray Bradley Farm
93 Symanski Farm
94 Light-Joseph Farm
95 Kara Kenney Farm
98 Fackler Farm
100 Springtown Sweet View Farm
101 Dressels Orchards
102 Dodd Farm
104 Open Space Institute
106 Boat Launch
150 Libertyville Road
151 Rte 299--Main Street Flooding

Notes: Assets not included in this list were not run through the risk assessment.

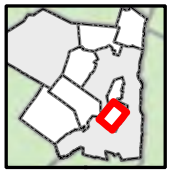
Figure II-12
Flood Risk to Assets - New Paltz



FEMA Flood Zone	Risk Score Category	
100-yr Floodplain	Severe	Moderate
500-yr Floodplain	High	Residual

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014



Town of Olive

Olive assets identified in risk areas are predominantly located in Boiceville and West Shokan. Outside these concentrated risk areas, there are a handful of roads and bridges, which were identified as subject to high risk. In Boiceville, the level of risk to assets appears to be divided by Route 28 – economic and infrastructural assets on the west side of the road are subject to high risk, and economic and residential assets on the east side of the road are subject to severe risk. The driving difference in the risk scores of these assets are the impacts of historic storms reported by the Planning Committee. While all of the assets, both east and west of Route 28, have high exposure scores, the assets on the east side of the road were reported to have sustained more serious impacts during historic storms, resulting in higher vulnerability scores. Assets on the northern end of Boiceville, including Chester Properties, Luky Petroleum, Beginnings Daycare, and Community Bank, are located within the 500-year floodplain, which corresponds to the moderate risk area, and thus have only moderate and residual risk scores, significantly lower than those Boiceville assets located within the 100-year floodplain.

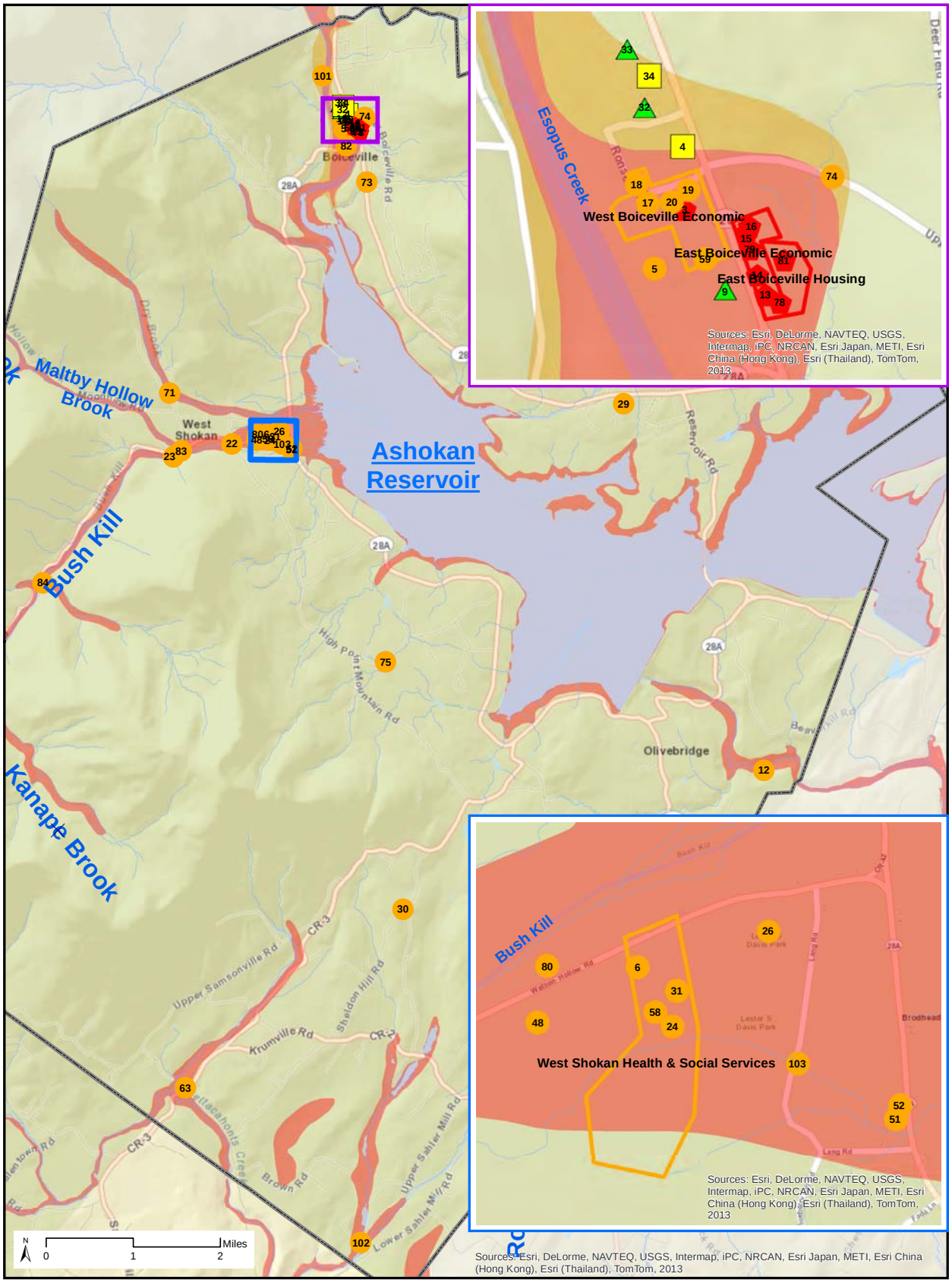
In West Shokan, all of the assets located within the floodplain were identified as subject to high risk. These high risk scores are due, in large part, to the highly exposed nature of the assets within the floodplain in West Shokan. In particular, all of these assets, including health and social services facilities, roads, bridges, and parks, are at low elevations relative to the BFE, which contribute to both the exposure and vulnerability scores. Risk assessment results are presented in Figure II-13.

Unmitigated Risk Town of Olive

3 Boiceville Market
4 Chester Properties inc.
5 Boiceville Wastewater Treatment Facility
6 Olive Fire Company #3
9 Olive Fire Company #5
12 Ashokan-Turnwood Covered Bridge
13 Boiceville Florist
14 The Landmark Grille
15 Maverick West Medical Facility
16 Johanansen Office Complex
17 Stucki Embroidery
18 Ronsen Piano Hammer Co., Inc.
19 Nekos Boiceville Pharmacy
20 Boiceville Wine & Spirits, Inc.
22 Bushkill Bridge--Co. Rte. 42
23 Watson Hollow Rd., Co. Rt. 42
24 Town of Olive Offices & Highway Complex
26 Lester S. Davis Park
32 Luky Petroleum, Inc.
33 Community Bank
34 Beginnings Day Care
48 St. Augustines Chapel
51 West Shokan Post Office
52 Joma Cafe
58 Town of Olive Dog Kennel
59 Roberts Auction
63 Samsonville United Methodist Church
71 Hillside Drive Bridge--Olive owned
73 DeSilva Road Bridge--Olive owned
74 Upper B'ville Rd. Bridge--Olive owned
75 Brodhead Rd. Bridges --Olive owned
78 Girard Residence
79 Daniels Residence
80 Seven Residences
81 Klippel Apartments
82 NYC Bridge--Five Arch
83 Ulster Maltby Hollow Bridge
84 South Hollow Bridge Flooding
101 Cold Brook Road and Esopus Creek
33 Community Bank
102 Upper Sahler Mill Road at Beaverdam Creek
103 Lang Road

Notes: Assets not included in this list were not run through the risk assessment.

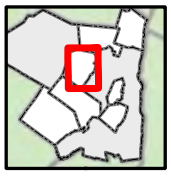
Figure II-13
Flood Risk to Assets - Olive



FEMA Flood Zone	Risk Score Category	
100-yr Floodplain	Severe	Moderate
500-yr Floodplain	High	Residual

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014



Town of Rochester

A number of Rochester assets are located in the floodplain and are subject to high and severe risk. In particular, two agricultural assets, Saunderskill and Kelder Farms, are in the severe risk category and subject to the highest risk in the community. Both of these farms were reported by the Planning Committee to be out of service for several months in the wake of historic storms, resulting in a high vulnerability score. When considered in combination with their exposed location relative to flood sources, these assets are deemed to be at severe risk.

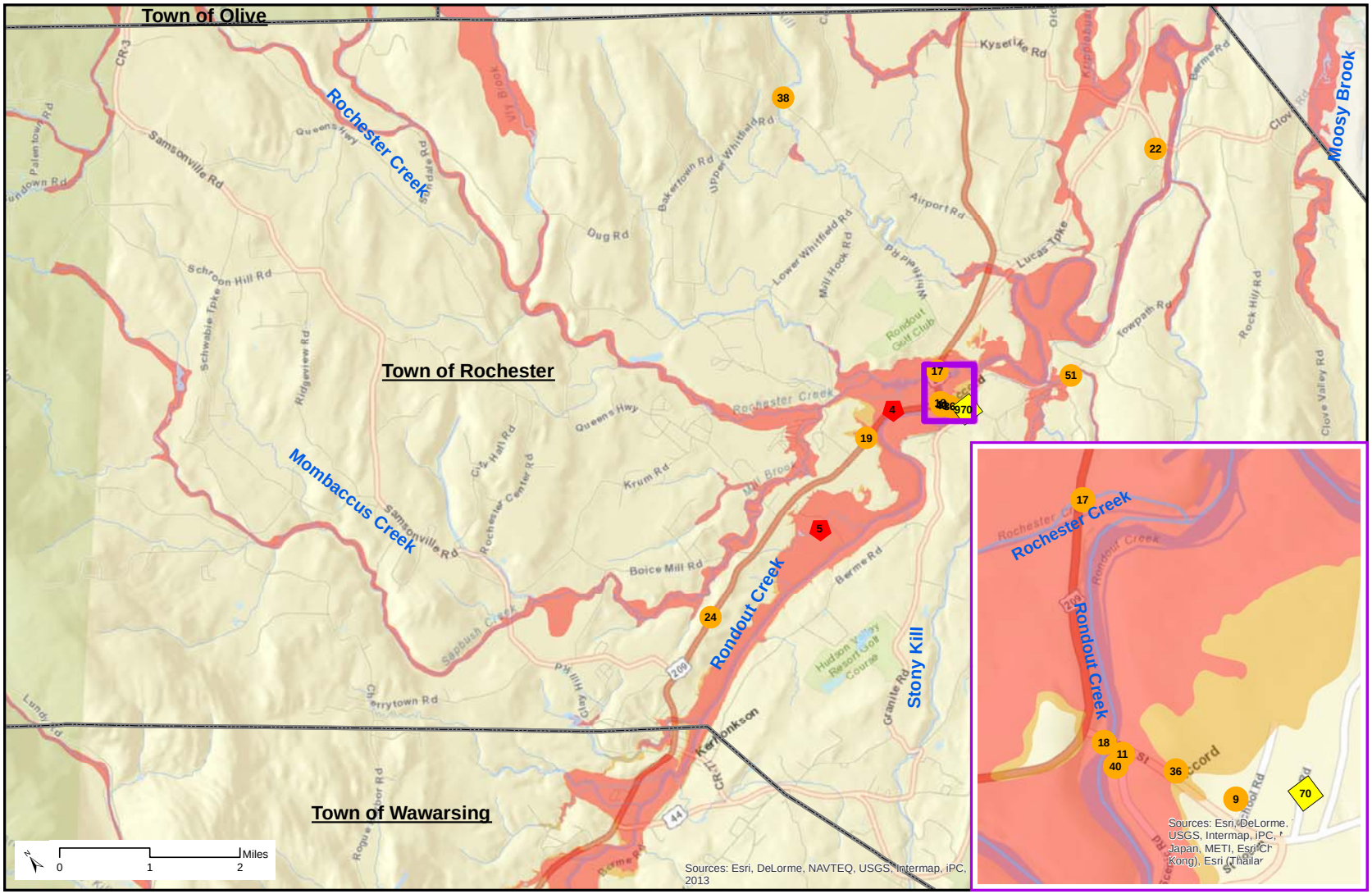
The emergency response system in Rochester is at high risk. Such assets as the Accord Fire District Accord Station, Accord Fire District Alligerville Station, and Kerhonkson Accord First Aid Squad, are in the high risk category due to highly exposed locations and elevated vulnerability. Furthermore, several infrastructure assets, including bridges and roads, are subject to high risk. The combined risk to emergency response assets and key access roads and bridges within the community could potentially jeopardize the ability of the community to respond to emergencies in certain parts of town. The most at-risk assets in the community are predominantly located along Route 209, in the floodplain of Rondout Creek. Risk assessment results are presented in Figure II-14.

Unmitigated Risk Town of Rochester

4 Saunderskill Farms
5 Kelder farms
9 Accord Fire District Accord Station
11 Town Hall
17 Rochester Creek Bridge
18 Accord Bridge
19 Rochester Reformed Church
21 Ulster County Sheriff Sub Station
22 Accord Fire District Alligerville Station (15)
24 Kerhonkson Accord First Aid Squad
36 Friends of Historic Rochester Museum
38 Whitefield Road Bridge-Flooding
40 D and H Rail Trail Entrance
51 Towpath Road
70 Rochester Community Center

Notes: Assets not included in this list were not run through the risk assessment.

Figure II-14
Flood Risk to Assets - Rochester



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Risk Score Category

- Severe
- High
- Moderate
- Residual

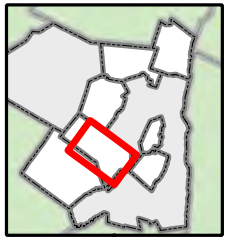
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Town of Rosendale

Assets in Rosendale are subject to flood risk from both the Wallkill River and Rondout Creek. Assets along the Wallkill River, including residential and infrastructural assets, were identified as being at high risk from flooding. Assets in the Rondout Creek floodplain, including a mix of residential, infrastructural, health and social services, and natural resources assets, are at a combination of high and severe risk. In particular, Island View Family Care and Family House are at severe risk as a result of the socially vulnerable populations that these assets serve, particularly in combination with their exposed locations relative to flood sources. Two residential areas, James Street and Residences West of Railroad Trestle, are also at severe risk. These high scores are driven by reports of significant adverse impacts during historic storms, resulting in high vulnerability scores.

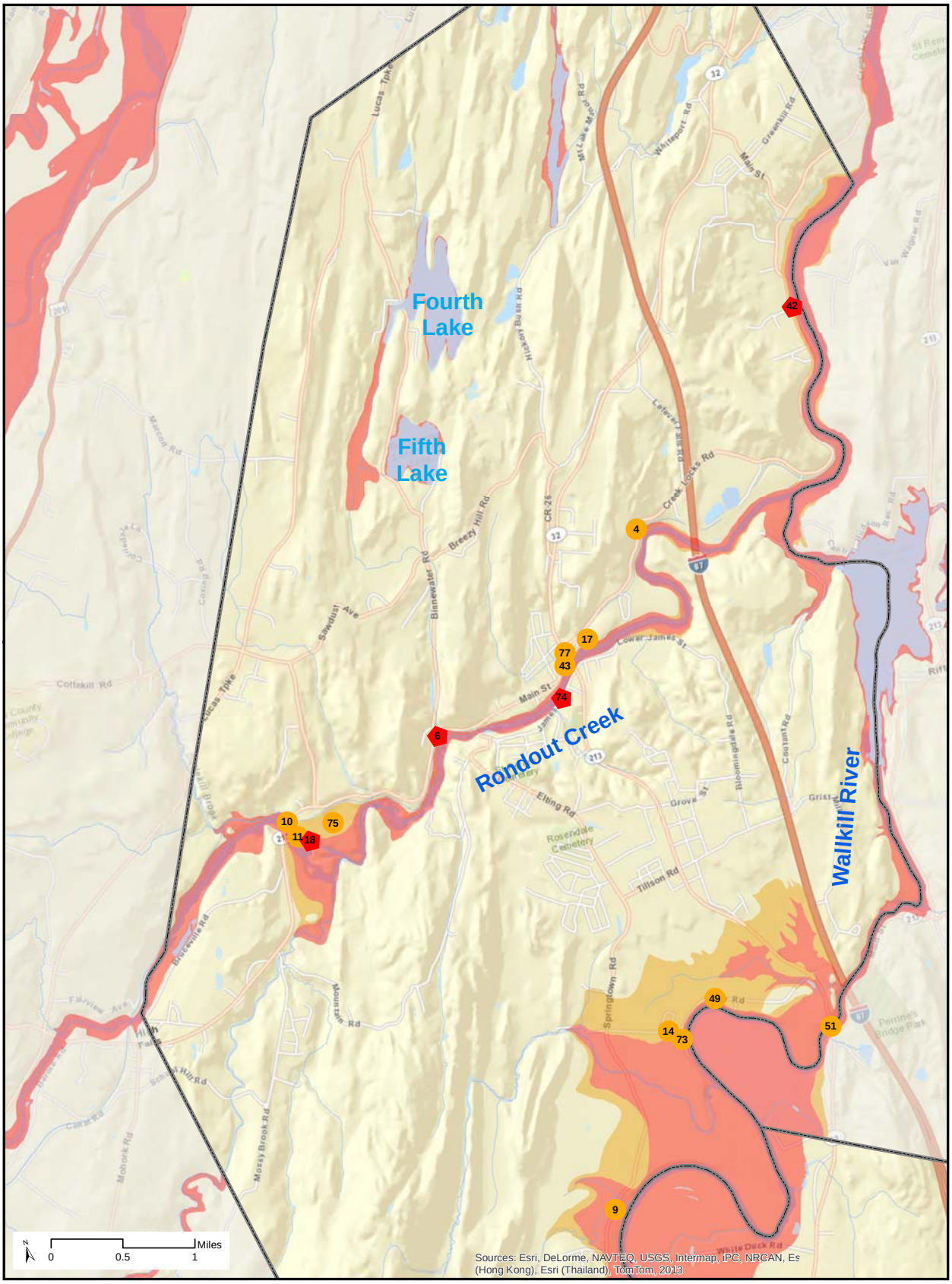
The remaining Rosendale assets within the floodplain are identified as high risk. The road and bridge systems throughout Rosendale are at high risk, due in large part to the common location of roads along low-lying areas adjacent to rivers. These roads, including Springtown Road, Creekside Lane, River Road, Riverview Drive, Route 213, Route 32/Rifton Bridge, Route 32 near Washington Park, and Creek Locks Road, are not only at risk themselves, but outages of service on these assets can indirectly affect other assets as well. For example, Route 32 near Washington Park provides the lone access point to the Washington Park Mobile Home Park, as well as the Fann's Plaza economic area. While neither of these assets is at direct risk of flooding, a restriction of access to them due to the flooding of Route 32 would have significant adverse impacts on their own ability to function. It is clear from the risk assessment results that the transportation infrastructure system in Rosendale is important due to its critical function and high risk. Risk assessment results are presented in Figure II-15.

Unmitigated Risk Town of Rosendale

4 Creek Locks Road
6 Residences West of Railroad Trestle
9 Springtown Road
10 Route 213
11 Creekside Lane
14 Mobile Home Park
17 Sewer Plant
18 Island View Adult Family Care
42 Family House
43 US Army Corps Flood Control System pump station
49 River Road
51 Route 32/Rifton Bridge
73 Riverview Drive
74 James Street
75 AJ Snyder Little League Field
77 Route 32

Notes: Assets not included in this list were not run through the risk assessment.

Figure II-15
Flood Risk to Assets - Rosendale



FEMA Flood Zone
- 100-yr Floodplain
- 500-yr Floodplain

Risk Score Category
- Severe
- High
- Moderate
- Residual

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

Town and Village of Saugerties

There are several assets in the Village and Town of Saugerties that are at high risk. The majority of these assets are located along Esopus Creek, which runs through the center of Saugerties. Two groups of assets, Esopus Creek Natural & Cultural Resources, and Esopus Creek Economic Assets – Marine, are composed of several assets at high risk. All of these assets are in exposed geographic locations without buffers to the flood source. In the case of the marine economic assets, which are largely marinas, this exposed location is by design and necessary for the function of the assets. Similarly, the natural and cultural resource group is comprised of beaches and nature preserves, both of which are located directly on Esopus creek either by design or definition.

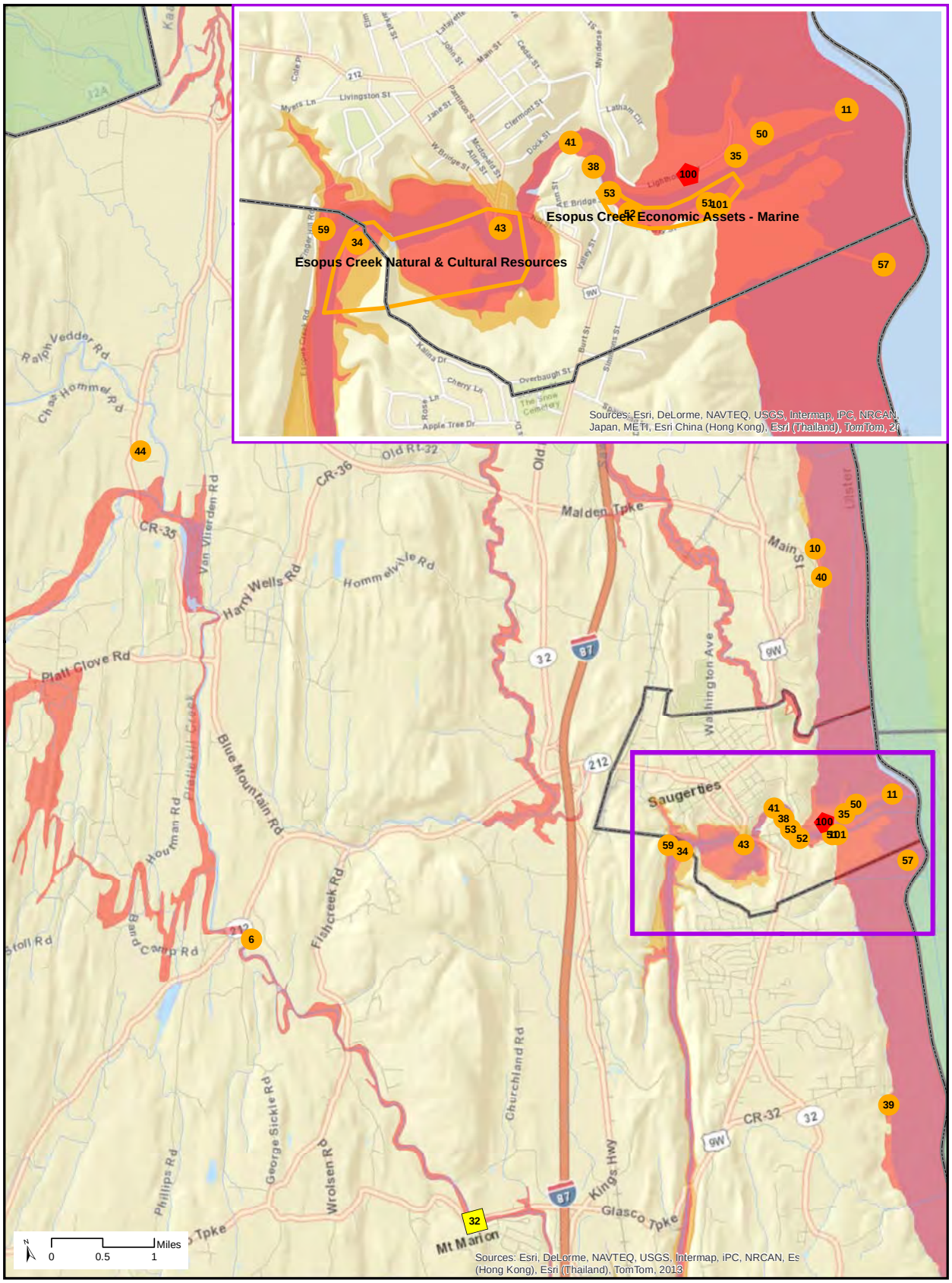
Though all of the assets located directly on Esopus Creek, including the Ruth Glunt Nature Trail, Arm of the Sea Theater, Tina Chorvas Park, and many others, are in highly exposed conditions, the vulnerability of these assets varies and thus results in differentiating risk scores. In particular, the vulnerability of the Lighthouse Drive Residences is higher than the surrounding assets due to asset type and historic impacts, resulting in a severe risk score for this asset. The surrounding assets along Esopus Creek, including infrastructure, economic, and natural and cultural resource assets, are all at high risk. Risk assessment results are presented in Figure II-16.

Unmitigated Risk Town and Village of Saugerties

6 Herrick's Bridge
10 Malden-on-Hudson Wastewater Treatment Plant
11 Lighthouse
32 Mount Marion School
34 Esopus Bend Nature Preserve
35 Coast Guard Station
38 Tina Chorvas Park
39 Riverfront Park - Glasco
40 Riverfront Park - Malden
41 Arm of the Sea Theater's studios and storage
43 Village Beach
44 Blue Mountain Manor
50 Ruth Glunt Nature Trail
51 Saugerties Powerboat Association
52 Lynch's Marina
53 Lighthouse Cove Marina
57 Ferry Dock
59 Oakledge Park Residential Neighborhood
100 Lighthouse Drive Residences
101 Saugerties Marina

Notes: Assets not included in this list were not run through the risk assessment.

Figure II-16
Flood Risk to Assets - Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Risk Score Category

- Severe
- High
- Moderate
- Residual

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014

Town of Wawarsing

The majority of the assets at risk in the community of Wawarsing are located in the Rondout Creek floodplain. These assets, including all classes and functions of assets, range from moderate to severe risk. At severe risk are the Ellenville Central School, Kerhonkson Elementary School, Ogden Lane Mobile Home Park, and Ulster Correctional Facility. These assets are all in exposed locations, but the driving force behind their severe risk scores is their increased vulnerability. All of these assets serve socially vulnerable populations, though in varying manifestations. This, in concert with reported impacts of historic storms, results in high vulnerability scores and, ultimately, severe risk scores.

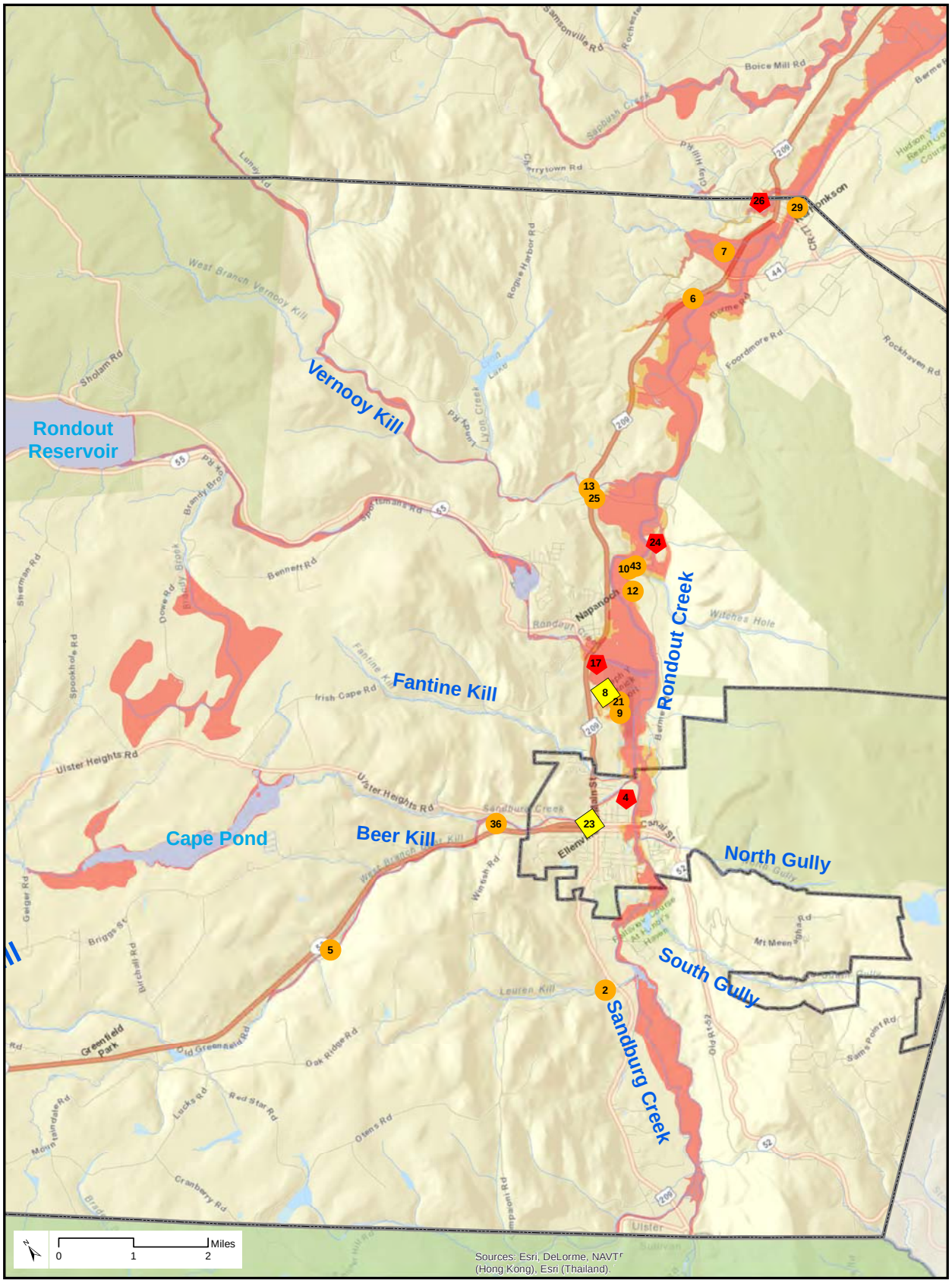
There is a broad range of assets at high risk. In particular, the system of roads and bridges throughout Wawarsing is at high risk. This is of particular note, as these assets, including Old Greenfield Road, Route 209, and Oak Ridge Road, provide critical means of access to certain parts of the community. In the event of closure of one of these assets, other assets, even assets not necessarily located within the floodplain, could be adversely impacted. The water and wastewater treatment system is also at high risk, and, similar to the transportation system, the effects of a loss of service of this system would be far-reaching. The Ellenville Regional Hospital is identified as a moderate flood risk due to the limited impacts of historic flooding, as reported by the community's Planning Committee, and the elevated location of the Hospital. Risk assessment results are presented in Figure II-17.

Unmitigated Risk Town of Wawarsing

2	Oak Ridge Road
4	Ellenville Central School
5	Old Greenfield Rd
6	Rte 209
7	Carlo Drive Area Housing
8	Ellenville Regional Hospital
9	Joseph Y Resnick Airport
10	Napanoch Sewer Imp Area wastewater treatment facility
12	Eastern Correctional Facility
13	Fantinekill Mobile Home Park
16	Kerhonkson Water District
17	Ogden Lane Mobile Home Park
23	Police Station Wawarsing
24	Ulster Correctional Facility
25	Wawarsing Christian Academy
26	Kerhonkson Elementary School
29	Kerhonkson Fire Company
36	Central Hudson - Sub Station
43	Rail Trail Route

Notes: Assets not included in this list were not run through the risk assessment.

Figure II-17
Flood Risk to Assets - Wawarsing



FEMA Flood Zone

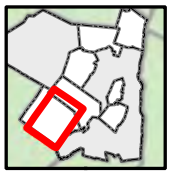
- 100-yr Floodplain
- 500-yr Floodplain

Risk Score Category

- Severe
- High
- Moderate
- Residual

Data Sources
Municipal Boundaries: NYS
Flood Zones: Ulster County
Base Map: ESRI

March 20, 2014



Town of Woodstock

The majority of assets identified as high risk in Woodstock are infrastructural, including the road and bridge system, water treatment plants, and pump stations. In particular, components of the road and bridge system in Woodstock were identified by the Planning Committee as vital community assets due to their ability to provide access to otherwise remote parts of the community. Route 212 in the center of town was identified by the Committee as a key asset and subject to frequent flooding. This asset provides access to the town's central business district and other important facilities. Given its exposed condition directly over a flood source and the community's reports of historic impacts to the asset, it has a high risk score. All of the component assets within the community's transportation system are subject to high risk. Many of these, including John Joy Road Bridge, Mink Hollow Road Bridge, Wittenberg Road Bridge, Silver Hollow Road Bridge, Reynolds Lane Bridge, and Church Road Bridge, serve as the sole means of access to residential areas and other important community assets.

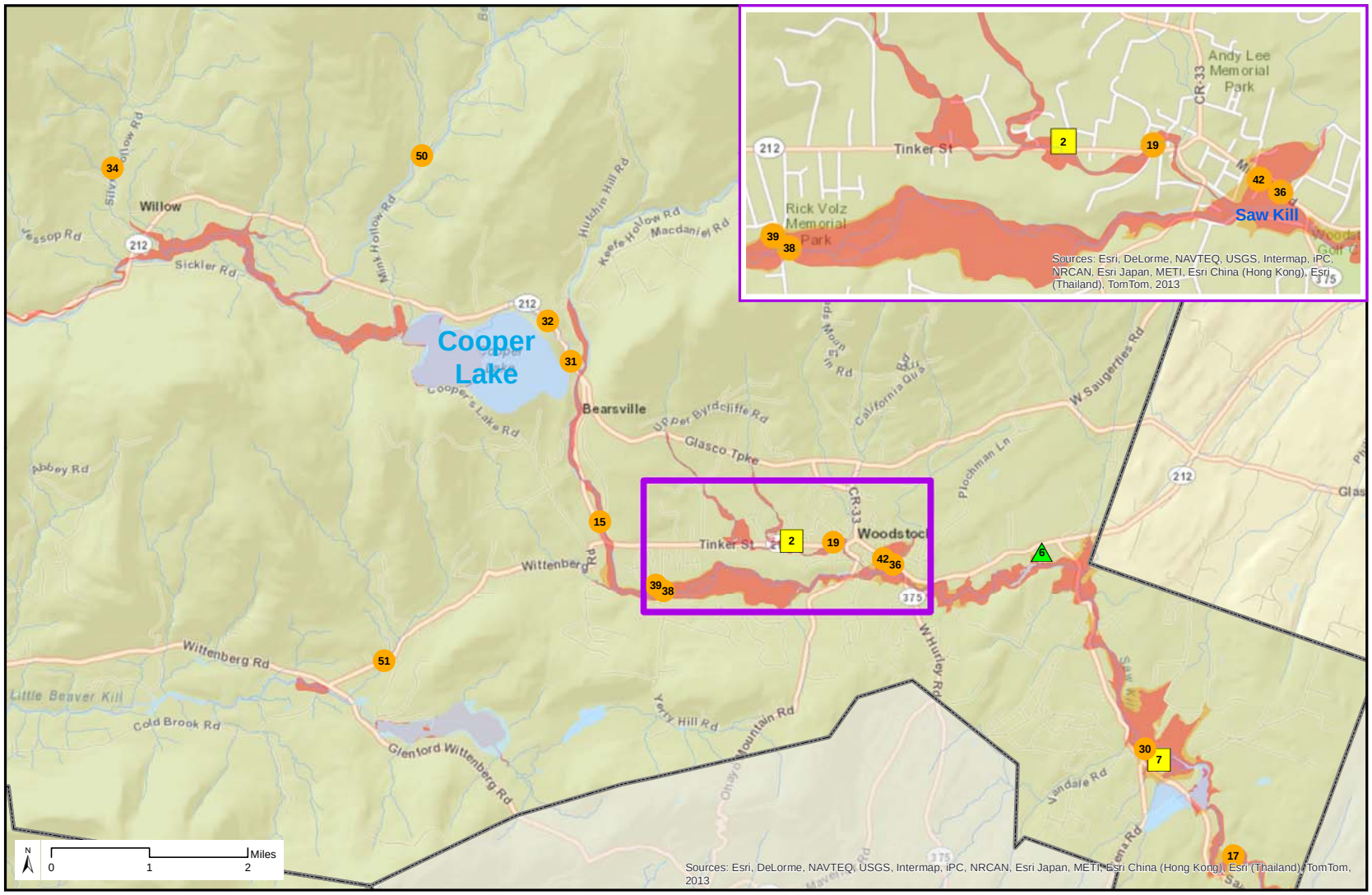
The Planning Committee reported that the Woodstock Wastewater Treatment Plant was not adversely affected by historic storms, and this, in concert with its elevated location relative to the BFE, resulted in a residual risk score. Similarly, Zena Elementary School, which was assessed for flood risk even though it does not currently function as an elementary school, was not reported to have been affected by historic storms and thus has only a moderate risk score. Risk assessment results are presented in Figure II-18.

Unmitigated Risk Town of Woodstock

2	Residential Neighborhood
6	Woodstock Wastewater Treatment Plant
7	Zena Elementary School
15	Woodstock Highway Facility
17	City of Kingston Water Treatment Plant
19	Woodstock Police & Emergency Dispatch
30	John Joy Road Bridge
31	Reynolds Lane Bridge
32	Church Road Bridge
34	Silver Hollow Road Bridge
36	Mill Hill Rd Bridge
38	Pump House 1
39	Pump House 2
42	Rt 212
50	Mink Hollow Bridge
51	Wittenberg Road Bridge

Notes: Assets not included in this list were not run through the risk assessment.

Figure II-18
Flood Risk to Assets - Woodstock



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Risk Score Category

- Severe
- High
- Moderate
- Residual

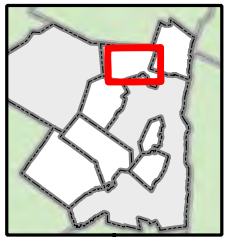
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



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B. Assessment of Needs and Opportunities

The NYRCR Ulster Communities reexamined their current emergency preparedness, response, and recovery systems following Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Systems that had once appeared resilient now became exposed in the face of unparalleled natural disasters. Firsthand experience of these events helped highlight the inadequacies of the existing flood mitigation systems in the NYRCR Ulster Communities, revealing their vulnerability but giving them the opportunity to identify and strengthen the key systems that support a community's recovery.

Throughout the visioning process, the Ulster NYRCR Planning Committee and the public worked to identify, assess, and conceptualize local and regional opportunities. The Committee and the public outlined short-, medium-, and long-range goals to help the NYRCR Ulster Communities build back better. These goals were developed to address education, emergency preparedness, resiliency, partnerships, and natural resource protection.

After completing the asset inventory and mapping, the Committee was able to better translate their community assets into systems that needed to be addressed. The Committee evaluated where gaps existed in current protective measures and identified the elements that needed to be addressed to make the community safer, all the while identifying opportunities to capitalize on a more adequate use of existing resources. Identifying vulnerable and exposed systems enabled the Committee to extract specific short and long-term needs. Focusing on these challenges and how they may be addressed helped reveal the numerous opportunities that exist to develop their own more resilient community networks. Some of these needs identified were immediate, such as providing water pumps at key town facilities during flooding, while others are identified with a long-term view of recovery, such as relocating facilities from floodplains to a safer areas.

NYRCR Ulster Communities Goals:

- Advance educational outreach to ensure our residents understand natural hazards and how they can protect themselves, their homes, neighborhoods, and communities against future disasters.
- Contribute to community recovery and regional preparedness with a defined approach to crisis planning, attracting and retaining volunteers, and enhanced communication between and among our municipalities and emergency services.
- Identify a plan for business continuity designed to ensure the availability of goods and services and to advance economic opportunity in the region.
- Develop policy, design, and construction standards to make our community more resilient in the future.
- Cultivate partnerships among private organizations, public agencies, and municipalities to address hazard mitigation, and ensure coordinated preparedness, and response.
- Identify and evaluate natural resources, waterways, and watersheds to restore, preserve, protect, and conserve our natural assets and reduce the vulnerability of our watersheds to storm-related hazards.

After a preliminary list of needs and opportunities was established, the Committee reached out to the larger Ulster County community and invited them to attend a public meeting and provide their feedback. The community meeting, the first of four Public Engagement events held throughout the planning process, was organized as a community open house. Attendees were provided with the Committee's initial list of needs and opportunities, gave feedback, and attached a high, medium, or low priority to each need. This valuable input was used to develop a more refined

assessment of the NYRCR Ulster Communities needs and opportunities that eventually informed the many projects developed by the Committee.

The RSF's were designed to "support local governments by facilitating problem solving, improving access to resources and by fostering coordination among State and Federal agencies, nongovernmental partners and stakeholders." (http://www.fema.gov/recovery-support-functions). The following sections summarize these RSFs and their relevance to the NYRCR Ulster Communities.

Although it is important that communities approach their needs and opportunities with their own experience and circumstances, there remains a common thread in community recovery. The following section provides an overview of the identified needs and opportunities organized by six key NYRCR Recovery Support Functions (RSF) that were established by President Obama in 2011 through the National Disaster Recovery Framework. The six RSFs and the core recovery capability of each RSF and the relevancy to the NYRCR Ulster Communities are described below.

Community Planning and Capacity Building

This Recovery Support Function addresses the ability for a municipality to respond to and implement short and long term recovery measures. It encompasses laws, regulations, and planning activities, as well as civic engagement and public education.

The Committee recognizes the need for multi-jurisdictional planning activities to mitigate future storm damage and identified several opportunities to address these needs. Watershed-wide studies and strategies that present ways to restore or enhance their ability to organize, plan, manage, and implement recovery have been proposed.

Ulster County recently completed a feasibility analysis and funding study of a Simulcast Transmitting Systems, which would move the County's emergency dispatch to VHF Simulcast Dispatch, allowing the simultaneous broadcast from existing communication towers (four new towers proposed throughout the County). This would improve coverage from the existing towers helping to fill dead zones as tower coverage is added.

The Committee noted significant opportunities to establish a framework, advisory committee, and/or project management team for continued regional coordination between the municipalities, local, state and regional agencies and government infrastructure to address regional planning and capacity building needs. The Ulster NYRCR Planning Committee organization would serve as the model for this implementation group. The Committee identified the opportunity for a public education campaign, which would include sessions on:

- Review of current and updated floodplain mapping and flood insurance programs;
- Building with flood proof materials, methods and financial resources for elevating and retrofitting structures;
- Emergency preparedness, including instating early warning systems, (reverse 911), location of local and regional shelters and preferred access routes to those shelters;
- Training for code enforcement officers and building code enforcement officers/building inspectors on enforcement issues related to flood mitigation techniques.

The latter two sessions would augment the Citizen's Preparedness Corps Training Program recently introduced by Governor Andrew M. Cuomo, to train approximately 100,000 New Yorkers in the proper preparation for emergencies and disasters.

Economic Development

The ability for a community to recover from disaster events is inherently tied to its capacity to return to business as usual following these events. Helping business that have suffered great irreplaceable loss, and bringing businesses that have been closed due to lack of power and flood damage back to working conditions as soon as possible is critical to recovery. People need to get back to work to resume normalcy and restore the community's normal operating conditions. This recovery support function looks to identify ways to fortify the current local and regional economy to make businesses more resilient during acute storm events and help them employ measures to recover quickly and efficiently after the storms have subsided.

The Committee focused on ways to protect vital business activities, which were interrupted during the storms. It is critical for municipalities to decrease their vulnerability and ensure their ability to recover more quickly after storm events. To that end, projects addressing flooding in central business corridors incorporate mitigation measures to minimize future risk.

The Ulster NYRCR Planning Committee identified various opportunities to increase business resiliency. Provision of financial, education, and construction assistance to area businesses could include flood mitigation and flood proofing measures, and relocation assistance; education for businesses who are developing in new locations about the financial and ecological value of green infrastructure and widespread education about Small Business Storm Recovery Programs, which provide grants and loans for remediation, mitigation and protection and support for seasonal businesses.

The Committee also identified the opportunity for creating public-private partnerships to provide mutual assistance during and after storm events. Such arrangements could include partnering with grocery stores, gas stations, pharmacies, and home stores to provide back-up generators to ensure continued operation during storms, and creating an inventory of "emergency recovery" materials, including batteries, plugs, extension cords, and larger infrastructure materials and identify a central storage facility for these materials.

Housing

This recovery support function seeks to identify and determine the sufficiency, condition and affordability of existing housing stock, provide current and future demographic and economic conditions to identify where stock and affordability gaps exist and identify strategies to address those gaps.

The Committee determined that a comprehensive review of the overall availability of housing was not a pressing *need* that they wanted to address. This determination was based on several factors. First, the recently completed *Three-County Regional Housing Needs Assessment: Orange, Dutchess and Ulster Counties From 2006-2020 (April 2009)*, identified and inventoried all types of housing stock in Ulster County, economic and demographic forecasts, condition and affordability issues, housing needs and gap analysis, municipal allocations, targets and strategies. This already completed initiative addressed the information requested in the recovery support function definition. The Committee agreed that there was no reason to repeat this initiative, but they would rather focus on their housing need.

The goal of the needs assessment for the NYRCR Program requires the communities to take a hard look at their most pressing needs and identify projects that meet those needs. The Committee asserted that their housing *need* required: identifying and allocating funding for rehabilitation and repair to homes damaged during the storms; revisions of local zoning regulations to restrict development from floodplains and

flood prone areas; and better education and financing for elevating and flood proofing homes that were vulnerable to future flooding.

During the public outreach period, the Committee identified the need to protect current vulnerable housing stock pre-disaster. A proposed strategy encourages the use of procedures such as elevating and flood-proofing homes. This will help keep housing stock sustainable and resilient.

Infrastructure Services

This recovery support function seeks to identify the community infrastructure that was damaged during the storms, components and facilities that have been patched up until permanent repair and replacement can occur, facilities that have been replaced, and those that remain untouched since the storm events still requiring significant attention.

Like many municipalities affected by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy numerous critical assets located in or near flood plains such as culverts, bridges, wastewater treatment plants, town halls, and fire stations were inundated by floodwaters. Extreme rains caused excess velocity in the Rondout Creek, Wallkill River, Esopus Creek, and their tributaries, resulting in extensive damage to infrastructure systems and waste water treatment facilities. This forced roads to close, stranding emergency vehicles, closing wastewater treatment plants, and general disruption in government services. Having government facilities within the floodplain, a lack of adequately sized culverts and bridge spans, and unprotected critical assets will continue to hinder the ability to safely evacuate residents during storm events, disrupt the ability of Town and Village governments to operate, and potentially cause environmental damage from failing wastewater systems.

The Committee identified flood modeling as the principal opportunity to improve the resiliency of the roadway and bridge network throughout the ten NYRCR Ulster Communities. Regional hydraulic and hydrologic modeling would result in system-wide recommendations to reconfigure roadways and bridge culverts, to accommodate sufficient capacity for waterflow during extreme storm events. When regional information is available, there is an opportunity to work with state and federal agencies to evaluate existing flood control systems and upgrade flood maps. Communities also reiterated opportunities detailed in the Community Planning and Capacity Building to review existing stormwater management ordinances and conduct engineering feasibility studies to upgrade and retrofit public stormwater systems.

Natural and Cultural Resources

The torrential rains during Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy (in the Town and Village of Saugerties) caused rivers, streams, and wetlands to flood and caused extensive damage to the watercourses. The Committee has proposed strategies that would restore the health of these natural systems. Projects include stream bank restoration and storm water control.

The Ulster NYRCR Planning Committee identified a fundamental priority need for modeling and updating flood mapping of the Rondout, the Wallkill and the Esopus watersheds and better coordination with state and federal agencies on water related issues. A systemic, coordinated modeling effort, would not only inform the scale and schedule for infrastructure improvements, but also present the opportunity for regional watershed management planning and phased implementation. Such a large-scale project would present the most efficient roadmap to regional resiliency. This modeling effort would also present the opportunity for local and regional coordination with state and federal regulatory agencies to consider flexible and innovative mitigations measures, including green and sustainable initiatives.

After examining local hydrology through the modeling effort, there may be opportunities for gravel removal. The modeling would also help identify priority areas for debris removal and establish an on-going maintenance plan and schedule. Based on this new data, the communities could take advantage of the opportunity to prepare and adopt alternative stormwater management measures, identify areas for green infrastructure and implement best practices for stream management and research implementation of water pollution control measures for both roadway runoff and wash-off from agricultural operations. The Committee identified the opportunity for a regional inventory of the sensitive environmental systems (wetlands, tidal areas, etc.) for use in flood control and storm surge barriers and consideration of wetland banking system as a mitigation tool.

Health and Social Services

During Hurricane Irene and Tropical Storm Lee, residents of Ulster County did not have adequate sheltering facilities. To address this issue, the Committee collaboratively devised strategies that address providing adequate shelter and allowing the continuity of essential health and social services, particularly those that serve vulnerable populations.

The Committee identified a pressing need for back up emergency power generators and pumps at emergency service and healthcare facilities and discussed the opportunity to procure this equipment through the Hazard Mitigation Grant Program and through partnerships with local home stores. Other opportunities included consideration of alternative renewable sources of energy (solar, geothermal and wind) at critical facilities to reduce the reliance on gas and oil, which may be inaccessible or in short supply during and after storms.

The Committee identified a need for additional local and regional emergency sheltering for persons displaced after storms, and an opportunity for public/private partnerships with motels, hotels and bed and breakfasts to provide reduced rates for temporary post storm housing. For those vulnerable persons that were not relocated, the Committee identified the need for services during and immediately after storm events, including access to food, medicine, medical needs and transportation. The Committee identified opportunities for a regional network of food pantries and establishing public/private partnerships with farmers and grocery stores to make sure residents have access to food pantries and that those pantries remain well stocked. Finally, the Committee highlighted the need for EMS, Fire, and utilities (Central Hudson) to maintain a list of vulnerable and homebound populations so that they can be well looked after during and after catastrophic storm events.

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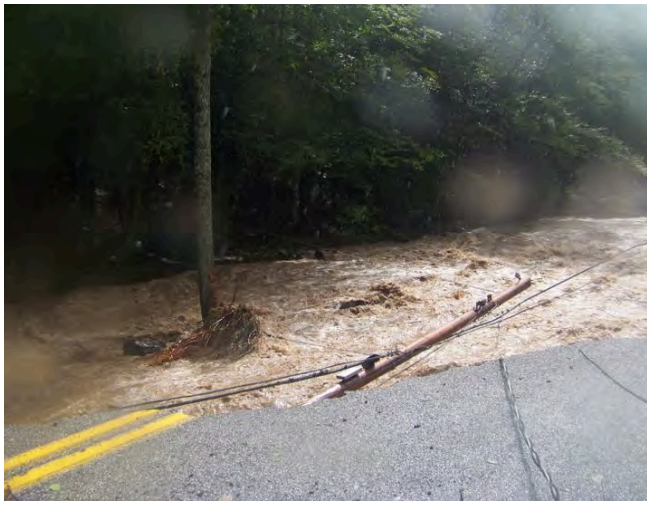
2014
NY RISING COMMUNITY RECONSTRUCTION PLAN

NYRCR ULSTER COMMUNITIES

Section III
Reconstruction and Resiliency Strategies

III Reconstruction and Resiliency Strategies

The Ulster NYRCR Planning Committee (Committee) developed preliminary strategies based on the inventory of community assets and known areas of vulnerability, flooding, and damage. The vision, goals, and needs and opportunities identified and refined through ongoing discussion at Committee meetings and Public Engagement events helped set the foundation for these strategies.



Downed Telephone Lines in Bushkill Creek, Town of Olive (Ed Kahill)

The strategies proposed in this Ulster NY Rising Community Reconstruction Plan consider emergency, disaster recovery, and long-term resiliency and economic development needs that remain unmet by existing planning and rebuilding initiatives. They represent statements of action that address how to best fortify community assets, capitalize on opportunities, resolve critical issues and meet short, medium, and long-term goals identified during the planning process.

Strategy 1. Optimize regional coordination and communication to better mitigate flooding, plan for future disasters, and protect communities.

The Ulster County Committee identified several actions and projects that would improve intermunicipal communication, particularly for emergency service providers, a specific stated need. Further, intermunicipal communication to implement projects that will cross municipal boundaries. Intermunicipal coordination would be the basis for many proposed projects and initiatives.

The NYRCR Ulster Communities envisioned that a successful process would result in "a regionally coordinated plan for resiliency" (Vision Statement). To achieve this vision, the Ulster NYRCR Planning Committee set a goal to "Cultivate partnerships among private organizations, public agencies, and municipalities to address hazard mitigation, and ensure coordinated preparedness and response (NYRCR Ulster Communities Goals)."

Improved emergency service coordination may include advanced technology for interagency communication, a cross-jurisdictional mapping of alternative evacuation routes available for people's smart phones, or simulcast dispatch allowing the same radio frequency to be used throughout the entire coverage area. The proposed coordination would take the form of joint initiatives that include watershed modeling and management plans throughout the County as well as stream bank restoration projects throughout the Rondout Watershed. To ensure that the proposed initiatives meet permitting standards and are approvable, a lasting regional implementation and project

management group could be formed. This group could draw from the Ulster NYRCR Planning Committee for a pool of participants, and also include representatives from county and state agencies.

This strategy addresses a range of needs and opportunities across several recovery support functions, but specifically addresses natural and cultural resource protection, infrastructure, and community and capacity building.

The Proposed and Featured Projects that would specifically further this stated vision and goal are presented in Table III-1.

Debris and Road Collapse in the Village of Ellenville

Table III-1
Strategy 1: Regional Coordination and Communication

Community	Project Name	Description	Estimated Cost	Category	Regional
Village of Ellenville, Town of Rochester, Town of Rosendale, Town of Wawarsing	Rondout Watershed Study and Improvements	Scoping and implementation of proposed improvements and flood mitigation for the Rondout watershed, which experienced severe localized flooding during Hurricane Irene and Tropical Storm Lee. The inundation of the communities from Rondout Watershed floodwaters impacted homes, businesses, roadways, bridges, culverts, and farms. The Town of Wawarsing, Village of Ellenville, Town of Rochester, and Town of Rosendale are working together to identify measures to minimize future flooding in the watershed and to implement those recommendations system wide to best address what is a widespread problem. Addressing the flooding issues at the source, will permanently mitigate the resulting damage to the communities. The study and the recommendations that result from the study could be implemented in phases.	Total Estimated Project Cost: $10,500,000 Potential CDBG-DR Funding: Village of Ellenville ($2,625,000), Town of Rochester ($2,625,000), Town of Rosendale ($2,625,000), Town of Wawarsing ($2,625,000)	Intermunicipal Proposed Project	Yes
Village of Ellenville, Town of Wawarsing	Stream Bank Restoration	Hurricane Irene and Tropical Storm Lee caused widespread flooding, resulting in stream bank and streambed erosion along major streams in Wawarsing, including but not limited to: the Good Beer Kill-east and west branch, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully, and Fantine Kill. Stream bank restoration analysis will determine the most effective methods for improving/restoring damaged streams. Implementation of the restoration measures will protect stream banks from future storms and improve functionality of natural drainage systems. After an initial evaluation of the reaches of the streams most in need of restoration, physical measures will be implemented to improve the health of the streams and the resiliency of the stream corridors. The Town of Wawarsing and the Village of Ellenville will coordinate to determine most effective methods for improving/restoring damaged streams. Stream bank restoration can be implemented in phases.	Total Estimated Project Cost: $3,674,000 Potential CDBG-DR Funding: Village of Ellenville ($1,174,000), Town of Wawarsing ($2,500,000)	Intermunicipal Proposed Project	Yes

Table III-1

Strategy 1: Regional Coordination and Communication

Community	Project Name	Description	Estimated Cost	Category	Regional
Town & Village of New Paltz	Flood Prevention Strategies and Stormwater Management for Wallkill River & Waterways (streams, tributaries, etc.)	Complete a Watershed Management Study to better understand the Wallkill Watershed and current causes of flooding to then develop and prioritize flood prevention strategies (both upstream and downstream). The study would consider alternative implementation strategies to control flooding including but not limited to bioswales, relief channels, flood water storage, reservoirs, rain gardens, use of permeable surfaces, building elevation, day lighting submerged waterways, protection of wetlands & green space, widening of river banks, stream bank reclamation, public education, etc. During Hurricane Irene and Tropical Storm Lee the Wallkill River and tributaries flooded nearby properties causing storm related damage.	$500,000	Proposed Project	Yes
Town of Olive	The Esopus Creek in Boiceville and The Bushkill and Maltby Hollow Creeks in West Shokan Flood Mitigation Project	Scoping, modeling (including hydraulic and hydrologic modeling) and implementation of recommended improvements to address repetitive flooding in the Rte 28 corridor and the Esopus Creek in Boiceville and the Bushkill and Maltby Hollow Creeks in West Shokan. During Hurricane Irene and Tropical Storm Lee, the Esopus Creek experienced extreme localized flooding . The scoping phase of this project would identify implementable measures to mitigate flooding. This project can be implemented in phases	$1,000,000	Proposed Project	Yes
Village of Saugerties	Water supply protection: supplemental source exploration	Scoping of required improvements to identify a secondary water source for the Village and Town. Storm activity (during Superstorm Sandy) caused water supply not to be viable during prolonged turbid events. Locating and developing a secondary source to supplement the reservoir would provide an alternative water supply during prolonged turbid events. Areas for ground water exploration have already been identified. The next phase of the study would include test drilling and additional ground water modeling. This project would be implemented in phases.	$385,000	Proposed Project	Yes
Town of Wawarsing	Stream Bank Restoration	Additional implementation of various stream bank restoration measures identified in the Proposed Rondout Watershed Management Study (Proposed Project) and the Stream Bank Restoration Project (Proposed Project). The Town has allocated additional funding for phased implementation to improve the health of the following streams and stream corridors: the Good Beer Kill-east and west branch, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully, and the Fantine Kill.	$12.5M	Proposed Project	Yes

Strategy 2. Implement measures to fortify and increase the resiliency of existing and future commercial development and critical infrastructure.

This strategy addresses a range of needs and opportunities across several recovery support functions, but relates specifically to supporting and supplementing infrastructure issues and economic resiliency. Flood damage from Hurricane Irene and Tropical Storm Lee compromised roads, bridges, and culverts, preventing roadway access. Many of the NYRCR Ulster Communities are bisected by rivers and streams, that, when flooded, inhibit through travel for residents and emergency service providers.

Project goal to: "Develop policy, design and construction standards to make our community more resilient in the future."

Resiliency initiatives are essential to enable buildings and utilities to maintain their structural integrity and to continue to provide uninterrupted service during and after acute storm events. Needs addressed by this strategy include roadway access upgrades, increases in required freeboard, and requirements for additional flood proofing measures. To best achieve measures to improve recovery through community planning and capacity building, the Ulster NYRCR Planning Committee Proposed Projects are presented in Table III-2.

In addition to the Proposed Projects presented in Table III-2, the Committee identified Additional Resiliency Recommendations (listed in Section V.A) to achieve this objective.

Table III-2
Strategy 2: Implement measures to fortify and increase the resiliency of existing and future commercial development

Community	Project Name	Description	Estimated Cost	Category	Regional
Town of Rosendale	Fann's Plaza Redevelopment	Conduct a master planning study for Fann's Plaza with the goal of providing a mix of uses and senior housing. Improving the vitality of this area is important to supporting the economic base of the Town. Development and stormwater management systems at the proposed plaza would be required to minimize impervious surfaces and implement green infrastructure improvements to ensure its long-term viability and sustainability.	$150,000	Proposed Project	No
Town of Rosendale	Stormwater Mitigation, Route 32/ Washington Park	Improve drainage along Route 32 at Fann's Plaza and Washington Park to address storm water flooding. Roadway flooding and road closures prevents through access and obstructs access to the mobile home park, during and after acute storm events. Drainage improvements will minimize localized flooding in future events.	$1,137,000	Proposed Project	No
Town of Woodstock	Upgrade Route 212	Upgrade the drainage system along an approximately one mile stretch of Route 212 from Route 375 to the Post Office using green infrastructure features for stormwater management. Currently, poor drainage leads to roadway inundation because storm drains become overwhelmed. Roadway inundation during Hurricane Irene and Tropical Storm Lee, resulting in road closures cutting off access to Woodstock's Central Business District, impacting business owners, and preventing residents from accessing much needed supplies. Upgrading the stormwater management system utilizing sustainable infrastructure would improve drainage along this one mile stretch of road protecting access during and after future storm events.	$2,500,000	Proposed Project	No

Strategy 3. Improve emergency preparedness and increase the resiliency of critical health and social service facilities

This strategy addresses the health and social services and infrastructure recovery support functions. These communities are facing emergency situations with increased frequency. Facilities that house emergency and health care services need to be increasingly well-protected and free from vulnerability. First responders should know that their bases of operation are safe from flooding and power failure, have clear and dry access routes, and are well-stocked with required equipment. In addition, communities should know that their drinking water supply will remain untainted even during the most destructive storms. To achieve this goal and meet the needs identified by all ten NYRCR Ulster Communities, the Committee proposes the following Proposed and Featured Projects, presented in Table III-3.

Table III-3
Strategy 3: Improve emergency preparedness and increase the resiliency of critical health and social service facilities

Community	Project Name	Description	Estimated Cost	Category	Regional
Village of Ellenville	Generators for Ellenville School and Village Water Supply	Purchase and install a generator at the Ellenville Central School radio station so that officials can reach residents on a large-scale basis during times of emergency. During flood events power outages were widespread, In addition, the project seeks to purchase and install two additional generators for the Village's water supply system, specifically the Fallsview and Center Street wells.	$225,000	Proposed Project	No
Town & Village of New Paltz	Consolidated Municipal and Emergency Operations Center	Create a Consolidated Municipal and Emergency Operations Center in an existing structure outside the floodplain that would consolidate the Town and Village municipal and emergency services and serve as an Emergency Service Providers Shelter. Town Hall was the designated emergency shelter for the community, but was cut-off during Hurricane Irene due to flooding.	$5,000,000	Proposed Project	Yes
Town of Olive	Relocate West Shokan Firehouse Co #3	Construct a new firehouse for the West Shokan Firehouse Co. #3 that is outside of the floodplain so that the fire company can continue to provide emergency services during flooding events. During Hurricane Irene and Tropical Storm Lee, apparatus, equipment and personnel had to be relocated to higher ground, severely compromising the ability of emergency service providers to assist in the recovery effort. Relocating the firehouse out of the flood plain would eliminate its existing vulnerability, and ensure the ability for the emergency service providers to access their equipment and vehicles during future flooding events.	$750,000	Proposed Project	No
Town of Olive	Relocate Boiceville Firehouse Co #5r	Construct a new firehouse for the Boiceville Firehouse Co. #5. Boiceville Firehouse #5 is located in the floodplain and was inundated with water during Hurricane Irene and Tropical Storm Lee severely compromising the ability of emergency service providers to assist in the recovery effort. The new firehouse would be located outside of the floodplain eliminating its existing vulnerability, and ensuring the ability for the emergency service providers to access their equipment and vehicles during future flooding events.	$750,000	Proposed Project	No
Town of Rosendale	Generators for Town Facilities	Purchase and installation of backup power generators for three critical Town facilities to keep them operational during storms. These facilities are: the flood control project, Rosendale Town Hall, and the pool house, which is used for showers during power outages. Power outages during Hurricane Irene and Tropical Storm Lee led to loss of service in critical Town facilities. Provision of a permanent back-up power supply will support these critical facilities during and after acute storm events.	$30,000	Proposed Project	No

Table III-3
Strategy 3: Improve emergency preparedness and increase the resiliency of critical health and social service facilities

Community	Project Name	Description	Estimated Cost	Category	Regional
Village of Saugerties	Water Supply Protection: Pre-filter	Install a pre-filter at the Village of Saugerties Potable Water Treatment Plant allowing the treatment plant to continue operating during storm events. Currently, the water supply is not protected from inflow of turbid water during storms and therefore the treatment plant must be taken off-line during turbid events. Excessively high turbidity experienced during Hurricane Irene and Tropical Storm Lee forced the shutdown of the Village of Saugerties Potable Water Treatment Plant. This will permanently increase the resiliency of the existing drinking water system in Saugerties.	$1,600,000	Proposed Project	Yes
Village of Ellenville	Mobile Water Pumps	Purchase of mobile water pumps to be used by the Fire companies to expedite removal of flood water from critical facilities. Facilities were damaged by inundation forcing closure and resulting in long term damage to properties, both during the storm events and after from water damage and mold. Mobile water pumps would serve the immediate needs and also prevent long term damage by removing standing water. Availability of these pumps would prevent that damage in future events.	$60,000	Featured Project	No
Town of Olive	Relocate Town Offices & Highway Complex Out of Flood Plain	Conduct a space allocation and needs analysis to determine requirements for the Town and Highway offices and equipment, so that they would be relocated out of the floodplain. Once needs have been identified, draft building plans would be prepared and property for relocation would be acquired. The new facility would be constructed using green technology and infrastructure. The new location outside the floodplain would enable the Town and Highway offices to serve as a Command Center during disasters to meet the FEMA'S National Incident Command System requirements.	$6,000,000	Featured Project	No
Town of Wawarsing	Mobile Water Pumps on Trailer	Purchase of mobile water pumps to be used by the DPW and Highway Department to expedite removal of flood water from critical facilities. Facilities were damaged by inundation forcing closure and resulting in long term damage to properties, both during the storm events and after from water damage and mold. Mobile water pumps would serve the immediate needs and also prevent long term damage by removing standing water. Availability of these pumps would prevent that damage in future events.	$60,000	Featured Project	No
Town of Wawarsing	Portable Generators & Transfer Switches	During Hurricane Irene and Tropical Storm Lee, key municipal and emergency service facilities lost power for extended periods. Portable generators would allow for emergency source of power where needed. Purchase and distribution of portable generators to be transported where needed, i.e., gas stations, banks, food stores etc. to assist in getting vital services up and running until a more permanent solution could be arranged.	$50,000	Featured Project	No

Strategy 4. Strengthen current emergency shelters at both a local and regional level and develop new sheltering opportunities where needed, particularly for vulnerable populations.

Even the most well-planned and executed emergency preparedness plan and resiliency rebuilding effort won't entirely eliminate the need for provision of emergency shelters. Creating refuge for those evacuated from their homes during and after storm events is the cornerstone to making sure that our communities and neighbors are safe. This strategy addresses several recovery support functions but focuses specifically on health and social services. During and after storm events, primary transportation routes were compromised due to roadway inundation, and the lack of alternate routes prevented residents from accessing existing shelters.

This strategy specifically addresses the need for shelters with services for medically vulnerable persons, the elderly, young children, babies, and pets. Roadway access to the shelters must be protected, because if roadways are flooded, the shelters are useless. Shelters need to be equipped with power generators, back-up water supply, kitchens, bathrooms with showers, and food supplies. The Committee's goal is to increase access to existing emergency shelters, and identify locations for new shelters with identified primary and secondary routes of access that are not vulnerable to roadway inundation.

To achieve this goal, and meet these stated needs, the Ulster NYRCR Planning Committee has identified the Proposed and Featured Projects presented in Table III-4.

Table III-4
Strategy 4: Strengthen current emergency shelters at both a local and regional level and develop new sheltering opportunities where needed, particularly for vulnerable populations

Community	Project Name	Description	Estimated Cost	Category	Regional
Village of Ellenville, Town of Wawarsing	Emergency Shelter	During Hurricane Irene and Tropical Storm Lee, residents that didn't evacuate were forced to leave their homes due to extensive flooding or power outages. There was insufficient shelter capacity to house them, existing shelters did not accommodate special needs (pets, handicap access, etc.), or were inaccessible due to road closures. Construction of additional shelter with sufficient resources would accommodate residents during/after future events. The project coordinates construction of an emergency shelter for use by the Town of Warwarsing and the Village of Ellenville that would be located in the Village of Ellenville. The shelter would include handicapped accessible bathrooms/shower facilities at two locations in the Village as well as emergency generators at both locations. Shelters would be configured to provide sufficient power for 02 charging stations as needed. The shelters will be pet-friendly and cat/dog crates will be provided.	Total Estimated Project Cost: $1,200,000 Potential CDBG-DR Funding: Village of Ellenville ($600,000), Town of Wawarsing ($600,000)	Intermunicipal Proposed Project	Yes

Table III-4
Strategy 4: Strengthen current emergency shelters at both a local and regional level and develop new sheltering opportunities where needed, particularly for vulnerable populations

Community	Project Name	Description	Estimated Cost	Category	Regional
Village of Ellenville, Town of Rochester, Town of Wawarsing	Temporary Regional Shelter Located in a New Wing to be Constructed at Ellenville Regional Hospital	Construction of a permanent wing at the Ellenville Regional Hospital which could be utilized to accommodate medically vulnerable persons during acute storm events if space allows. During Hurricane Irene and Tropical Storm Lee, medically vulnerable residents that didn't evacuate found insufficient shelter capacity to house/serve them, or where there was capacity, the shelters were not equipped to accommodate persons with specific medical needs, The cost associated with construction of the new Hospital wing represents a potential local share towards this project.	Total Estimated Project Cost: $1,000,000 Potential CDBG-DR Funding: Village of Ellenville ($400,000), Town of Rochester ($200,000), Town of Wawarsing ($400,000)	Intermunicipal Featured Project	Yes
Town of Rochester	Alligerville Emergency Station	Structural and roof repairs to the Alligerville Fire and Emergency Station on Creek Road so that the station may be used as an emergency shelter. Emergency station sustained structural damage and damage to its roof during Superstorm Sandy.	$50,000	Proposed Project	No
Town of Rochester	Rehabilitate Existing Community Center to Serve as Disaster Relief Shelter	Upgrade and rehabilitate the existing community center for use as a shelter during and after storm events. Improvements would include ADA upgrades, insulation, showers, and a backup power source. Floodwaters from Hurricane Irene and Tropical Storm Lee damaged numerous properties and infrastructure forcing residents to evacuate their homes, and in some cases preventing their return for extended periods. Residents were left without access to basic services, and in some cases were temporarily without homes. Upgrading the existing community center to provide shelter during/after storm events would provide residents with a safe alternative.	$75,000	Proposed Project	No

Strategy 5. Provide assistance to homeowners to protect themselves from future flooding through mitigation measures, elevation, acquisition, relocation and general flood proofing

The level of personal distress that accompanies major storm events escalates exponentially when people are forced to evacuate their homes, without a sense of when—or if—they will be able to return. The degree of damage to homes varied throughout the NYRCR Ulster Communities from limited power outages and basement flooding to massive first floor flooding that required significant replacement and repair. In some cases, homeowners did not receive sufficient insurance funds to repair the damage, and still remain without certificates of occupancy (and subsequently are unable to get insurance) because they are still financing essential repairs. Being stuck in this vicious cycle for years after the storm events prevents people from moving forward.

The NYRCR Ulster Communities envisioned that a more resilient community would "Protect our residents and our man-made and natural resources by implementing ecologically sound policies and programs…"

This strategy focuses on the housing and community and capacity building recovery support functions by identifying projects that protect existing homes from repetitive flooding, policy initiatives that can be adopted to prevent additional development from locating in the floodplain, and fortifying structures that are currently vulnerable. The Committee identified outreach objectives to better educate homeowners on how to protect themselves from flood damage, and from whom they can seek assistance if damage occurs. The need for homeowner flood recovery and resiliency assistance occurred in small pockets in most of the NYRCR Ulster Communities. While many have recovered, there are still many that require recovery assistance. Outreach assistance through the NY Rising Housing Recovery Program has occurred in several NYRCR Ulster Communities and additional assistance could be provided through the NY Rising Community Reconstruction Program.

In addition to the Proposed Projects presented in Table III-5, the communities have identified Additional Resiliency Recommendations to support resiliency efforts for residents of these communities, presented in Table V-1.

Table III-5
Strategy 5: Provide assistance to homeowners to protect themselves from future flooding through mitigation measures, elevation, acquisition, relocation and general flood proofing

Community	Project Name	Description	Estimated Cost	Category	Regional
Town of Rosendale	Flood Mitigation and Protection to Homeowners Prone to Flooding	Scoping and implementation of measures to address chronic residential flooding that was particularly acute and destructive during Hurricane Irene and Topical Storm Lee. Implementation measures could include: elevation and possible relocation to Creekside Lane (7-10 houses); Riverview Terrace; Island View Adult Home. Other considerations would include improvements along Route 213 west from Route 32 to the Rosendale Town Line and along Creeklocks Road.	$45,000	Proposed Project	No
Village of Saugerties	Dredging Assistance	The Village proposes to assist property owners by coordinating dredging along impacted properties. Superstorm Sandy, Hurricane Irene and Tropical Storm Lee contributed to silting of the harbor, which impairs waterfront access. The project would include public-private cost sharing: property owners would cover dredge contractor cost while the Village would assist by handling the engineering, permit process, environmental review costs, work oversight, and contingencies. Organizing a single project to serve multiple properties will help make dredging more affordable for individuals.	$45,000	Proposed Project	No
Village of Saugerties	Housing Flood-Proofing Assistance	Assess alternatives (including flood proofing, elevation, and relocation) for protecting houses along Lighthouse Drive and Ferry Street from flooding. Storm activity, during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee flooded homes along Lighthouse Drive and Ferry Street. The project would include flood proofing audits for homes along Lighthouse Drive and Ferry Street, to educate residents regarding various options	$120,000	Proposed Project	No

Strategy 6. Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability.

The NYRCR Ulster Communities prioritized recovery and resiliency initiatives for regional natural and man-made infrastructure indicating that a primary project objective is: "Identify and evaluate natural resources, waterways, and watersheds to restore, preserve, protect, and conserve our natural assets and reduce the vulnerability of our watersheds to storm-related hazards."

This strategy addresses all recovery support functions but specifically addresses infrastructure needs. Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy all resulted in significant damage to infrastructure, including roads, bridges, culverts, stormwater management infrastructure, wastewater/sewer treatment plants, residences, emergency services buildings, and communication infrastructure.

The need for immediate repair of stormwater management and wastewater treatment infrastructure, various roadway, bridge and culvert resizing has been identified by the Committee and reinforced throughout the planning process in the Public Engagement Meetings. Ulster County facilities suffered widespread damage as a result of the storms, as many structures were overwhelmed and compromised by the raging floodwaters. Table III-6 presents Proposed and Featured Projects that address Strategy #6.

The Committee identified Proposed and Featured Projects listed in Table III-6 that addressed the greatest need. The Committee identified a number of projects that addressed failed or damaged infrastructure in all ten NYRCR Ulster Communities are presented in Table V-1: Additional Resiliency Recommendations.

Table III-6
Strategy 6: Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability

Community	Project Name	Description	Estimated Cost	Category	Regional
Town & Village of New Paltz	Carmine Liberta Bridge	Scope and implement required improvements to the Carmine Liberta Bridge, which is in need of repair or replacement due to damaged sustained during Hurricane Irene and Tropical Storm Lee. The Bridge is the only roadway access to the west side of the river from New Paltz and heavily trafficked by residents, tourists, commercial vehicles and emergency services. Pedestrian and bicycle paths will be part of the redesign and construction.	$400,000	Proposed Project	Yes
Town & Village of New Paltz	Inflow and Infiltration Investigation and Permanent Wastewater Collection System Repairs	Scope and implement improvements to the existing collector sewer system, make point repairs and collector sewer replacement as needed. This project would reduce the inflow and infiltration associated with flooding events to safeguard the plant's processes. The existing sewer collection system was overwhelmed during Hurricane Irene and Tropical Storm Lee causing contaminated waters to go into the Wallkill River. Improvements to the collection system combined with hardening the WWTP would minimize failure of the infrastructure during future 100-yr storm events.	$1,500,000	Proposed Project	Yes
Town & Village of New Paltz	Route 299 West and Springtown Road	Scoping and implementation of required improvements to address flooding along Route 299 West and Springtown Road, from Main Street to Mountain Rest Road. This segment is currently a major access point from the eastern portion of the community to the west and regularly gets inundated, shutting off access to and from the Village. It is also a gateway to areas in western Ulster County and a thoroughfare for tourism and recreation.	$250,000	Proposed Project	Yes

Table III-6
Strategy 6: Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability

Community	Project Name	Description	Estimated Cost	Category	Regional
Town & Village of New Paltz	Sewer Treatment Plant Hardening	Install flood proofing measures to the wastewater treatment plant to mitigate the future risk of inundation by floodwaters (as occurred during Hurricane Irene and Tropical Storm Lee) during future 100-yr storm events. Flood proofing measures could include: construction of higher concrete berm at the current site and reinforcing the current site; and/or construction of a "Package Plant" at a nearby location.	$1,200,000	Proposed Project	Yes
Town of Rosendale	Rosendale Flood Control Project Improvement	Install flood control measures on the south side of the Rondout Creek along James Street from Rte. 32 toward the Keator Avenue Bridge, focusing on the lower portion of James Street, which gets washed out during high water events and collapsed during Irene and Lee. Improved flood control measures would prevent future roadway compromise or failure.	$600,000	Proposed Project	No
Town of Rosendale	Rosendale Sewer Treatment Plant Stormwater Management Study	Scoping and implementation of protection measures for the vulnerable Rosendale Sewer Treatment Plant, which flooded in Hurricane Irene and Tropical Storm Lee. The STP failed during the storm events because it was overwhelmed without sufficient capacity to accommodate the demand from stormwater inundation and Creek flooding. STP hardening and upgrades will prevent failure during future storm events.	$500,000	Proposed Project	No
Town of Saugerties	Bridge Abutment Replacement	Replace the abutment and bridge deck at Drummond Falls Road East, which was damaged during the Superstorm Sandy, Hurricane Irene and Tropical Storm Lee and is now at heightened risk of failure. This project would augment the capacity of the storm sewer, hence preventing similar flooding in future events.	$407,200	Proposed Project	No
Town of Saugerties	Harden Malden Sewer Plant against Flooding	Install and construct various flood proofing and hardening measures at the Malden Sewer Treatment Plant, which inundated with stormwater and required additional town resources to be brought in to keep the facility operational during Hurricane Sandy. Possible measures would include installation of backflow valves at the plant and in low lying residences to prevent sewage contamination during major flood events.	$165,000	Proposed Project	No
Town of Saugerties	Replace Culvert-Platte Clove	Replace an inadequately sized culvert at Platte Clove Road, which was overwhelmed during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee, and caused flooding, erosion, and damage to the infrastructure. Platte Clove Road is the only alternate route to Hunter Mountain when the main access from Route 23 is closed for repairs. Resizing the culvert to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms. The recent major storms and caused flooding, erosion, and damage to the infrastructure.	$274,300	Proposed Project	No
Town of Saugerties	Replace Culvert-Wilhelm Road	Replace an inadequately sized culvert at Wilhelm Road, which was overwhelmed during Hurricane Irene and Tropical Storm Lee, and Superstorm Sandy and caused flooding, erosion, and damage to the infrastructure. Widespread flooding due to insufficient culvert capacity led to roadway inundation Resizing the culvert to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms.	$200,450	Proposed Project	No
Town of Saugerties	Sewer Extension to Creekside Neighborhoods	Extend the municipal sewer system to residential properties along the Esopus Creek that currently rely on septic systems. During storm events, these septic systems release pathogens to the Esopus, endangering public health and reducing water quality. Extending municipal sewer service to these residences would mitigate compromises to water quality caused by contamination.	$1,500,000	Proposed Project	Yes

Table III-6
Strategy 6: Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability

Community	Project Name	Description	Estimated Cost	Category	Regional
Town of Saugerties	Storm Sewer Replacement	Replace storm sewers at Cotton Tail Lane, which were inadequately sized to accommodate the demand generated during 100 year storm events and were severely compromised during Hurricane Irene and Tropical Storm Lee, and Superstorm Sandy causing flooding and property damage.	$100,550	Proposed Project	No
Village of Saugerties	Repair Supporting Structures Adjacent to Lighthouse	Repair a large gap in the dike that protects the harbor channel and make bulkhead, pier, and dock repairs in and around the Lighthouse. Damage to the dike occurred during Hurricane Irene and Tropical Storm Lee. This project is a partnership between the Village and the Saugerties Lighthouse Conservancy. While the dike is important for preventing siltation of the harbor channel, the bulkhead and pier protect the lighthouse, which is a community asset and historic building. The pier and dike are also popular as public fishing sites.	$306,000	Proposed Project	No
Village of Saugerties	Water Supply Protection: Silt & Debris Removal	Remove accumulated silt and debris from the Village reservoir that was deposited as a direct result of stormwater from Hurricane Irene and Tropical Storm Lee. This project would restore reservoir capacity and protect water quality.	$365,000	Proposed Project	Yes
Town of Woodstock	John Joy Road Improvements	Raising approximately 400 feet of John Joy Road and installing two culverts will prevent the road from being inundated during future storm events. Low elevation and poor drainage led to roadway inundation of John Joy Road overwhelming the storm drain system. Resized culverts and elevating the road will minimize localized flooding of the road in during and after future storm events.	$75,000	Proposed Project	No
Town of Woodstock	Mink Hollow Bridge Protection	Install stacked rock wall sheet piling to protect Mink Hollow Bridge, which was damaged by Hurricane Irene and Tropical Storm Lee. Bridge fortification would protect the travelway, prevent future erosion and potential bridge failure both during and after future flood events.	$190,000	Proposed Project	No
Town of Woodstock	Replace culverts-Reynolds Lane and Church Road	Replace existing undersized metal culverts under the bridge at the intersection of Rte 212 and Reynolds Lane and at intersection of Church Rd and Rte 212 with appropriately sized concrete box culverts. During Hurricane Irene and Tropical Storm Lee, insufficient culvert capacity around Reynolds Lane and Church Road caused roadway flooding overwhelming the storm drainage system. Appropriately sized culverts will minimize localized flooding of the road in future storm events.	$125,000	Proposed Project	No
Town of Woodstock	Replace culverts-Lane Road	Replace inadequately sized culvert at intersection of Lane Road and Silver Hollow Road with appropriately sized concrete box culvert. During Hurricane Irene and Tropical Storm Lee, roadways were inundated and overwhelmed the storm drainage system. Widespread flooding due to insufficient culvert capacity led to roadway inundation around Lane Road and Silver Hollow Road. Resizing culverts to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms.	$450,000	Proposed Project	No
Town of Rochester	Rochester Creek Bridge Project	Design and reconstruct the Rochester Creek Bridge to improve flow, and minimize damage from future flooding. The Rochester Creek Bridge suffered damage during Hurricane Irene, Superstorm Sandy and Tropical Storm Lee contributing to flooding of adjacent areas. NYSDOT has identified the Rochester Creek Bridge for reconstruction. NY Rising funds would be allocated to determine the optimal design for complimentary creekside repair.	$300,000	Featured Project	Yes

Strategy 7. Strengthen the transportation network by developing alternative transit and emergency routes.

Roadway closures due to flooding, downed power lines, and roadway collapse created significant safety issues not only on the roads themselves, but also by preventing through travel for emergency service providers. Protecting residents' health, safety, and welfare was the primary objective of this program. In addition, due to the rural nature of the NYRCR Ulster Communities, road closures often require miles-long circuitous detours, which require significant additional energy resources. Immediately following Hurricane Irene and Tropical Storm Lee, many gas stations were left without power, or were out of gas, further compounding the problem. This strategy addresses recovery support functions that focus on infrastructure. Maintaining safe transportation access by identifying secondary access routes will reduce the communities' overall vulnerability to flooding.

Roadway Flooding at SUNY New Paltz (News Pulse)

To help address these needs, the Committee identified Proposed Projects that specifically address establishing alternative transportation routes and fortifying existing travelways. These projects are presented in Table III-7.

Table III-7
Strategy 7: Strengthen the transportation network by developing alternative and emergency routes

Community	Project Name	Description	Estimated Cost	Category	Regional
Town & Village of New Paltz	Springtown Road Rail Trail Approach Reconstruction	Reconstruct the approach to the rail trail bridge from Springtown Road to reinforce the access road and provide emergency vehicles means of crossing the Wallkill during storm events to access the western portion of the community. During Hurricane Irene and Tropical Storm Lee, this roadway was inundated, shutting off access to and from the Village.	$250,000	Proposed Project	Yes
Town of Wawarsing	Oak Ridge Road Flood Mitigation	Conduct an alternatives analysis for improvements to reduce flooding along Oak Ridge Road in and around the intersection of US Route 209. Both events caused general flooding and various stream restrictions led to localized flooding of Oak Ridge Road and surrounding properties. The analysis will determine the best method for improving flow and drainage in the area to prevent future flooding.	$76,300	Proposed Project	No
Town of Wawarsing	Route 209 Alternative Analysis	In both Hurricane Irene and Tropical Storm Lee, Route 209 in Kerhonkson flooded, which prohibited through access for residents and emergency service providers. The alternatives analysis would identify an alternative route for 2-way traffic flow, thereby providing a viable secondary access route when 209 is closed.	$75,000	Proposed Project	No

Strategy 8. Preserve and restore natural areas including floodplains, streams and wetlands to help mitigate flooding.

As noted in previous sections of this Plan, restoring natural resource infrastructure is a fundamental project goal and a need identified throughout the planning process. This strategy addresses recovery support functions that focus on infrastructure and natural resources, by fortifying the existing stream banks and developing holistic implementation and phasing plans that plan for resiliency throughout the watershed.

The Committee identified Proposed Projects to address this need, including incorporating resilient design features into existing recreation and open space, decreasing impervious surfaces, increasing the use of green infrastructure and natural groundcovers, and expanding the amount of open space in the area. Recreation and open space areas are ideal uses for the floodplain, providing additional storage areas for floodwaters and riverine overflow. As such, these uses should be further encouraged. These projects are presented in In Table III-8. In addition to Proposed and Featured Projects presented in Table III-8, the Committee identified a number of Additional Resiliency Recommendations, presented in Table V-1, that will help preserve and restore natural areas to better mitigate flooding.

Table III-8
Strategy 8: Preserve and restore natural areas including floodplains, streams and wetlands to help mitigate flooding

Community	Project Name	Description	Estimated Cost	Category	Regional
Town of Olive	Bushkill Creek Stream Restoration	Scoping and implementation of extensive stream reconstruction measures on the Bushkill Creek. Hurricane Irene and Tropical Storm Lee caused massive amounts of debris to flow downstream and aggregate under the span of the Watson Hollow Bridge creating scour of abutment and channel flow restrictions. When the bridge floods, 183+ homes are cut off from emergency services, food and fuel. Implementation measures will include reducing land erosion on the banks and may include sediment and tree removal. Sediment has aggregated within the Bushkill, particularly at the Watson Hollow Bridge and downstream near the Watson Hollow Road embankment.	$1,075,000	Proposed Project	No
Town of Rochester	Rochester/ Rondout Creek and Tributaries Immediate Repair	Repair the riparian buffer, and remove debris deposited by recent storms (downed trees, tires etc.) from the Rochester/Rondout Creek and its tributaries, including at the Route 209 & Rochester Creek bridge abutments. The force of the water flows in these waterways during Hurricane Irene and Tropical Storm Lee resulted in significant accumulation of debris constricting flow and causing flooding of adjacent properties. Removing debris will decrease flooding during and after future events protecting the riverbanks and adjacent development. Collection pits, sumps and drains will also be cleared. Repairs will restore the carrying capacity and minimize adjacent flooding caused by the current stream constrictions. Funding will also be allocated for detour and emergency signage and barriers and riparian repair.	$800,000	Proposed Project	No
Town of Rosendale	Flood Mitigation and Protection for Key Intersections in Town	Address widespread roadway flooding, which occurred during Hurricane Irene and Tropical Storm Lee at several key intersections including: Route 32 at Rifton Bridge (flooding closed Rte 32 and all cut off access and egress to/from the south side of Town); 4th Binnewater Lane & Binnewater Road (road closures isolated residents from emergency services); and Hickory Bush Road (road closures isolated residents from emergency services). Improvements at these intersections would eliminate widespread road closures maintaining roadway access for residents and emergency service providers.	$1,045,000	Proposed Project	No

Table III-8
Strategy 8: Preserve and restore natural areas including floodplains, streams and wetlands to help mitigate flooding

Community	Project Name	Description	Estimated Cost	Category	Regional
Town of Saugerties	Stream and Stream Bank Rehabilitation	Provide a local match to support funding for a recent stream rehabilitation assessment commissioned by the NYS DEC, and allocate funds to implement stream bank restoration recommendations identified in the assessment. The streams being assessed and rehabilitated were damaged during Hurricane Irene and Tropical Storm Lee.	$525,000	Proposed Project	Yes
Village of Saugerties	Parks Restoration	Repair several parks throughout the Village, including Village Beach, Tina Chorvas Waterfront Park, and Seamon Park that suffered damage from all three recent major storms (Hurricane Irene, Tropical Storm Lee and Superstorm Sandy). Repairs would include the replacement of damaged docks and repair to eroded boat ramps to maintain public access to Esopus Creek. In addition, repairs would be made to the retaining wall in Seamon Park along Sawyer Kill. Landscaping and plantings would also be installed to arrest further erosion.	$200,000	Proposed Project	No
Village of Saugerties	Shoreline Stabilization at and Adjacent to Tina Chorvas Park	Stabilize the shoreline and repair existing bulkheads at and adjacent to Tina Chorvas Park. Hurricane Irene, Tropical Storm Lee and Superstorm Sandy caused general flooding, which destabilized and damaged the bulkheads and shoreline near Tina Chorvas Park. This initiative is a public-private partnership with the non-profit cultural resource organization, 'Arm of the Sea'.	$300,000	Proposed Project	No

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2014
NY RISING COMMUNITY RECONSTRUCTION PLAN

NYRCR ULSTER COMMUNITIES

Section IV
Implementation - Project Profiles

IV Implementation – Project Profiles

As previously mentioned, each of the NYRCR Ulster Communities is eligible to receive up to $3 million to implement recovery projects through the NYRCR Program. While developing projects and actions for inclusion in the NYRCR Plan, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. The projects and actions listed in the NYRCR Plan are not ranked or listed in order of priority.

Proposed Projects are projects proposed for funding through the Community's allocation of CDBG-DR funding.

Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.

This section presents a unique detailed profile for each "Proposed" and "Featured" Project identified by the Ulster NYRCR Planning Committee, County residents, and business owners throughout the eight-month planning process. The NYRCR Plan also includes "Additional Resiliency Recommendations" which are inventoried in Section V. Additional Materials.

Risk Mitigation Analysis

Risk Mitigation Analysis evaluates the extent to which Proposed and Featured Projects will mitigate storm damage (environmental, social, and economic) and flooding risk to specific community assets when the project is in place. (The extent to which a Project mitigates risk is also considered a benefit in the CBA—as described in "Project Benefits" in the section that follows) Evaluating Risk "Mitigation" is different than the Risk "Assessment" process, which was described in detail in Section II of this Ulster NY Rising Community Reconstruction Plan. The *Risk Assessment* evaluated storm and flood risks to community assets prior to implementing the Project, whereas *Risk Mitigation* evaluates the reduced risk with the Project in place.

To determine how the implementation of Proposed and Featured Projects would impact the risk to assets and asset groups, the Consultant Team ran the Risk Assessment Tool for projects that are intended to reduce the risk of flood damage to assets. The result of this Risk Reduction Analysis is "mitigated" risk scores for assets and asset groups. The evaluation methodology included developing assumptions regarding exposure and/or vulnerability and altering these factors to reflect the effects of the project.

In addition, the Consultant Team identified three project areas, which corresponded with an effective FEMA detailed study of the contributing flood source, and evaluated the potential impact the projects would have using the detailed study as it is documented in the effective Flood Insurance Studies (FIS) and Flood Insurance Rate Maps (FIRM). Where an effective hydraulic model was available in the FEMA archive, the model was modified to generate a comparative hydraulic profile and inundation map for the existing and proposed conditions.

A complete description of the Risk Mitigation methodology and results is included in *Section V. Additional Materials* of this NYRCR Plan.

Cost-Benefit Analysis Methodology

The CBA developed the benefits and costs associated with Proposed and Featured Projects. The CBA provides the anticipated cost of implementation and a primarily qualitative evaluation of the benefits of the various Proposed and Featured Projects. The purpose of the CBA is to inform the Ulster NYRCR Planning Committee as they formulate and prioritize projects for implementation; and to help municipalities prepare grant applications for CDBG-DR funds and other funding opportunities identified in the future. The costs and benefits used to evaluate projects through the CBA are explained further below.

Project Costs

The Proposed and Featured Project Profiles include a summary of anticipated project cost. For some Proposed and Featured Projects, estimated costs were provided by the municipal engineering staff and consultants. Where that information was not available, the Consultant Team developed preliminary cost estimates for project costs, which include: construction and overall life-cycle costs. Due to various uncertainties, the estimates are just that—estimates: they provide the community with a practical understanding of the potential estimated costs of project implementation.

The CBA not only provides an assessment of the cost of implementing the projects, but also it provides a description of the future costs of not implementing the Proposed and Featured Projects. If projects are not implemented, long-term viability of municipalities to withstand and rebound following significant storm events may be negatively impacted. The costs of not implementing projects are more difficult to quantify, but are nonetheless critical to the analysis and are therefore addressed qualitatively. These costs include: repetitive damage to personal property and public infrastructure resulting from frequent recurring flooding and future storm events; economic loss to residents, local and regional employers as a result of the inability to work; and obstacles or limitations to the provision of life safety and emergency services resulting in repeated inability to access vast areas of the community.

Project Benefits

The types of benefits evaluated in the CBA are summarized below:

Risk Mitigation: The extent to which a Proposed or Featured Project mitigates the risk of damage to an identified community asset from a future storm event;

Economic Resiliency: The potential for a Proposed or Featured Project to minimize costs and reduce the time required for the local economy to rebound from a storm event. Economic assessment data included, where applicable: an estimate of permanent jobs secured/added; relationship to, and/or furtherance of, Regional Economic Development Council Plan goals; potential for additional economic activity; and the net effect on local municipal expenditures;

Health, Social and Public Safety Services: The potential for a Proposed or Featured Project to benefit the overall population due to improved access to health and social service facilities and public safety services; type and size of socially vulnerable population secured; and degree to which essential health and social service facilities are able to provide services to a community during a future storm or weather event as a result of the implementation of a Proposed or Featured Project; and

Environmental Protection: The potential for a Proposed or Featured Project to protect critical environmental assets, high-priority habitat, threatened and endangered species, migration or habitat connectivity; any clean-up resulting from the action; creation of open space or a new recreational assets

Detailed methodology for the estimates marked with an asterisk (*) is located in the “End Notes” in Section V.

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Intermunicipal Proposed Project

Village of Ellenville, Towns of Rochester, Rosendale, and Wawarsing

Rondout Watershed Study and Improvements

Project Description: Scoping and implementation of proposed improvements and flood mitigation for the Rondout Watershed, which experienced severe localized flooding during Hurricane Irene and Tropical Storm Lee. The inundation of the communities from Rondout Watershed floodwaters impacted homes, businesses, roadways, bridges, culverts, and farms. The Town of Wawarsing, Village of Ellenville, Town of Rochester, and the Town of Rosendale are working together to identify measures to minimize future flooding in the watershed and to implement those recommendations system wide to best address what is a widespread problem. Addressing the flooding issues at the source, will permanently mitigate the resulting damage to the communities. The study and the recommendations that result from the study could be implemented in phases.

Estimated Cost: $10,500,000

Potential CDBG-DR Funding:
$2.625M per municipality

Anticipated Regulatory Requirements:

This project may require an Article 15 and or Article 24 permit from the NYS Department of Environmental Conservation. The NYS Department of Transportation may be directly involved in some aspects of the project depending on the location.

Anticipated Timeframe: Two Years

Entities with Jurisdiction:

Village of Ellenville, Towns of Rochester, Rosendale, and Wawarsing

Anticipated Risk Reduction: A watershed wide improvement plan will reduce risk to assets in the communities throughout the watershed including: Rochester, Wawarsing, Ellenville and Rosendale. The improvement measures will increase the channel's ability to handle waterflow, thereby reducing hazard exposure of nearby assets. Critical assets in all the Towns, such as wastewater treatment plants, schools, emergency services and healthcare facilities (many of which serve socially vulnerable populations) are located near waterways and will be less exposed to flooding.

Cost Benefit Summary: Depending on the scale of projects to be implemented, improvements would reduce the risk of flooding throughout the watershed area for the foreseeable future with a useful life of 10 to 20 years, though some infrastructure improvements would provide permanent flood mitigation. The project's impacts on natural resources throughout the watershed would require an assessment. While no jobs or direct economic activity in the retail, industrial or construction sectors would be created, projects resulting from the mitigation study would support the Mid-Hudson Regional Economic Development Council's goal of leveraging natural resources that are a driver of tourism and quality-of-life attributes. Reduced flooding throughout the community would decrease the need for emergency response efforts (e.g., evacuation), reduce vulnerability of public facilities and infrastructure, lower reconstruction and rehabilitation costs following future storm events, all of which result in local government expenditure savings.

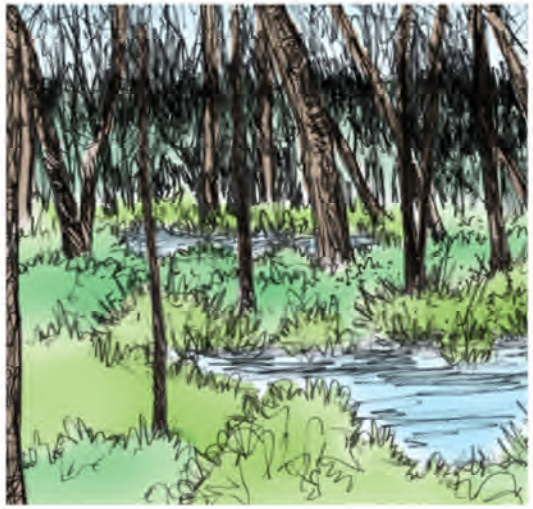
Wetland Pond Creation (AKRF, Inc.)

Co-Benefits of Project:

- Economic Benefits: The project would mitigate downstream flooding effects, restoring and protecting natural resource assets. The project would align with the region's economic development goals and is also expected to have a positive effect on local tourism. In addition, non-structural solutions to watershed management, including stream bank and channel restoration are less costly over time than structural improvements, which require additional operations and maintenance costs as well as replacement capital expenditures.

- Environmental Benefits: Watershed management planning and hydrologic modeling are intended to examine the runoff and storm flow characteristics of a watershed in order to plan for future remedial actions (e.g. detention facilities, stormwater conveyances, modifications to bridge crossings) and to plan for future land development options through zoning, master planning, and other land use controls. Creating a baseline hydrologic model of a watershed can be a critical initial step to select the best remedial actions to mitigate flooding impacts and to benefit water quality. The project will provide recommendations for man-made and natural restoration projects, creating a sustainable floodplain management plan to be implemented in phases. The project is expected to have significant flood mitigation benefits, such as natural floodplain reclamation and creation of additional flood storage, redesign of bridges and obstructions to minimize stream bank erosion and clogging, headwater stream channel and bank stabilization, and the potential for creating new recreational amenities including river walks and parkland.

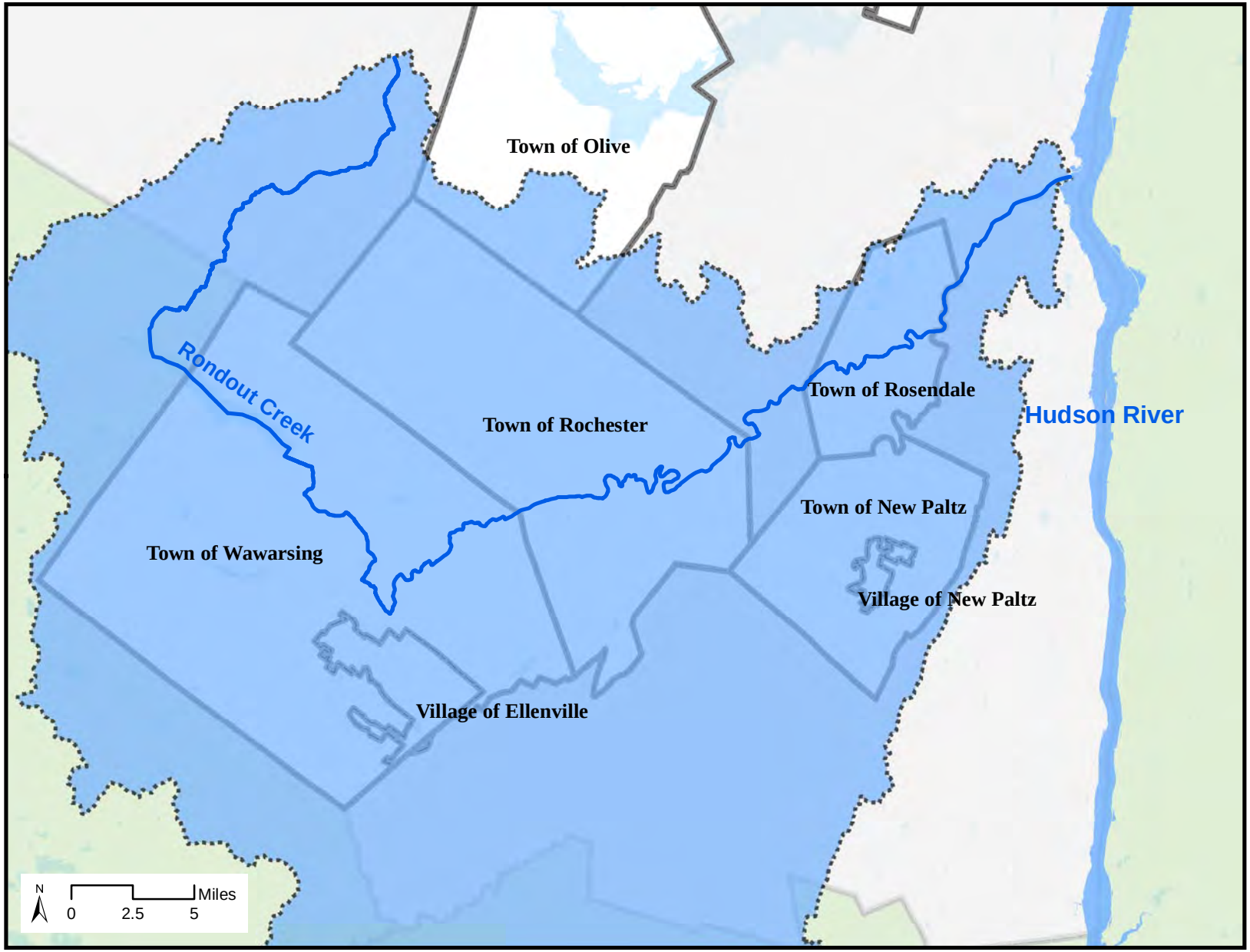
- Health and Social Service Benefits: Improvements to the watershed to be regionally implemented will minimize roadway flooding through Wawarsing, Rosendale, Rochester, Ellenville and potentially other communities in Ulster County thereby improving access by emergency service workers to various neighborhoods and access to health and social service facilities by multiple communities. Improved emergency response time during and after storm events reduces risk of injury to residents.



FLOODPLAIN HABITAT ENHANCEMENTS

(AKRF, Inc.)

Figure IV-1
Project Location - Rondout Creek Watershed



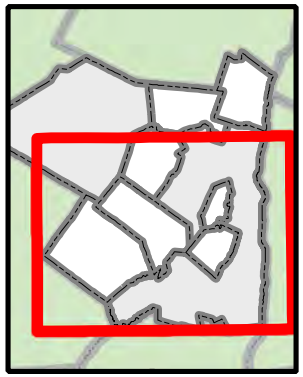
Rondout Creek Watershed

Data Sources

Municipal Boundaries: NYS

Hydrography: USGS

March 11, 2014



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Intermunicipal Proposed Project

Village of Ellenville and Town of Wawarsing

Stream Bank Restoration

Project Description: Hurricane Irene and Tropical Storm Lee caused widespread flooding, resulting in stream bank and streambed erosion along major streams in Wawarsing, including but not limited to: the Good Beer Kill-east and west branch, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully, and Fantine Kill. Stream bank restoration analysis will determine the most effective methods for improving/restoring damaged streams and stream corridors. Implementation of the restoration measures will protect stream banks from future storms and improve functionality of natural drainage systems. After an initial evaluation of the reaches of the streams most in need of restoration, physical measures will be implemented to improve the health of the streams and the resiliency of the stream corridors. The Town of Wawarsing will coordinate with the Village of Ellenville to determine the most effective methods for improving/restoring damaged streams. Stream bank restoration can be implemented in phases.

Estimated Cost: $3,674,000

Potential CDBG-DR Funding:
$1,174,000 – Village of Ellenville
$2,500,000 – Town of Wawarsing

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Village of Ellenville and Town of Wawarsing

Anticipated Risk Reduction: Excessive sediment and debris in a stream bed results in constrictions and reduced capacity of waterways. This project will increase the channel's ability to handle waterflow, therefore reducing hazard exposure of nearby assets. Critical assets in the Town of Wawarsing such as wastewater treatment plants, schools, emergency services and the Ellenville Regional Hospital (many of which serve socially vulnerable populations) are located near waterways and, with the implementation of this restoration project, would be less exposed to flooding.

Cost Benefit Summary: Implementation of this project would permanently mitigate flooding along stream corridors, resulting in sustainable benefits. The useful life of the flood mitigation would be over a period of 10 to 20 years. The potential effect on natural resources throughout the area from changes to streams' flow and restoration of stream banks and beds would require assessment. While implementation of the project would not inherently create new economic activity (retail, industrial, new construction, or permanent jobs), the project supports Mid-Hudson Regional Economic Development Council's goals to improve and leverage natural resources as drivers to tourism in the area. Other benefits include savings of local government expenditures from reduced flooding of the roadways, for improved emergency vehicle access and lower reconstruction and rehabilitation costs for roadways.

STRATEGIC BANK STABILIZATION *(AKRF, Inc.)*

Co-Benefits of Project:

- Economic Benefits: Stream bank and stream bed restoration would provide flood mitigation along the stream corridors and would potentially increase their attractiveness as a recreational and tourist attraction. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: This project will have significant environmental benefits including restoring the health, resiliency and capacity of the Good Beer Kill, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully and the Fantine Kill. Stream restoration involves the modification of a stressed/disturbed stream via morphological changes to its bed and banks, to make its flow, flooding behavior, and biological components more stable and sustainable. Streams, such as the Good Beer Kill, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully and the Fantine Kill, have had changes to their watersheds due to development and storm damage, and therefore generally suffer from increased rates of erosion, loss of adjacent wetlands and in-stream flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Such highly "stressed" streams, which suffer from these problems typically have poor quality and biological diversity and therefore would benefit significantly from stream restoration.

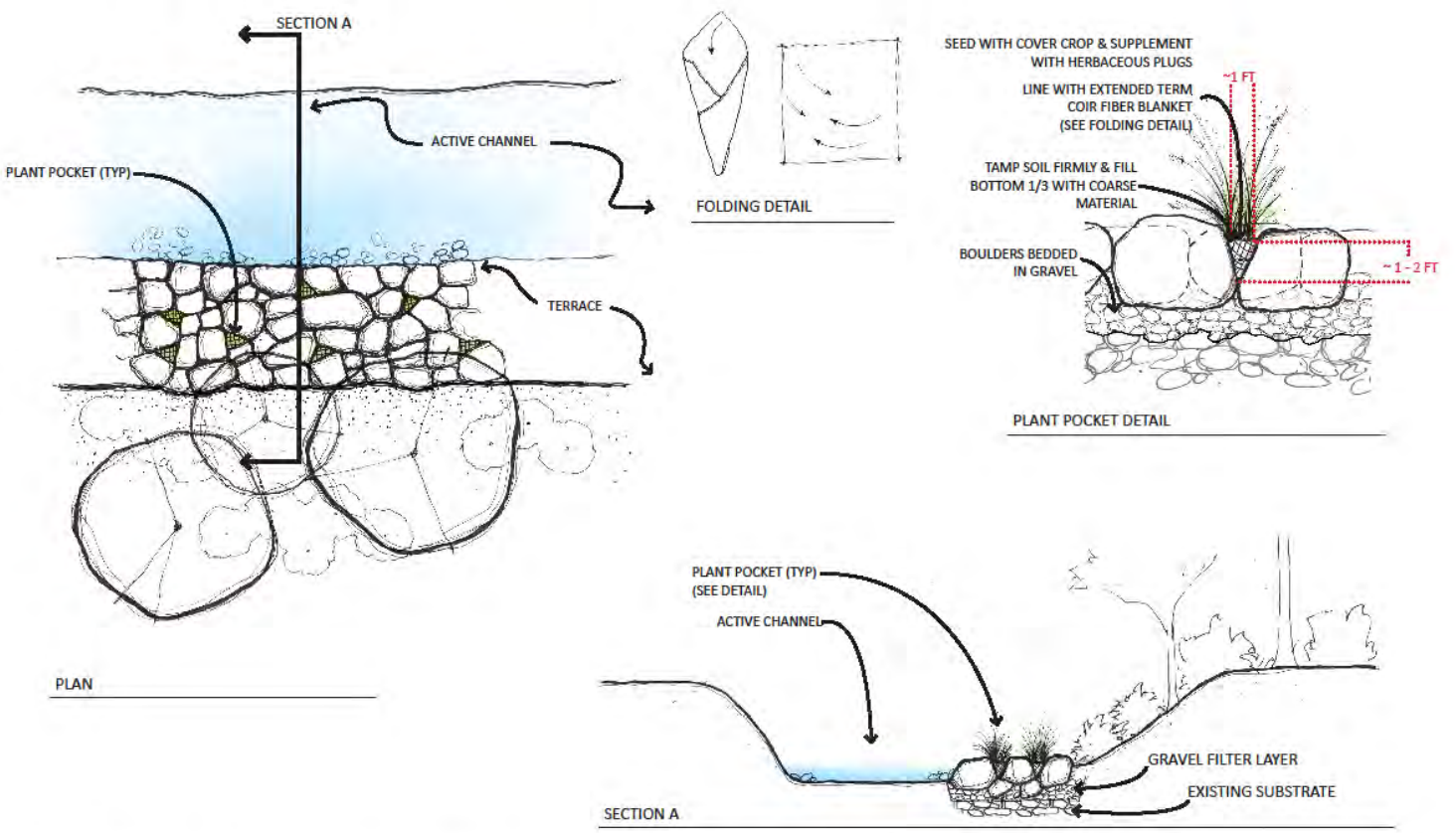
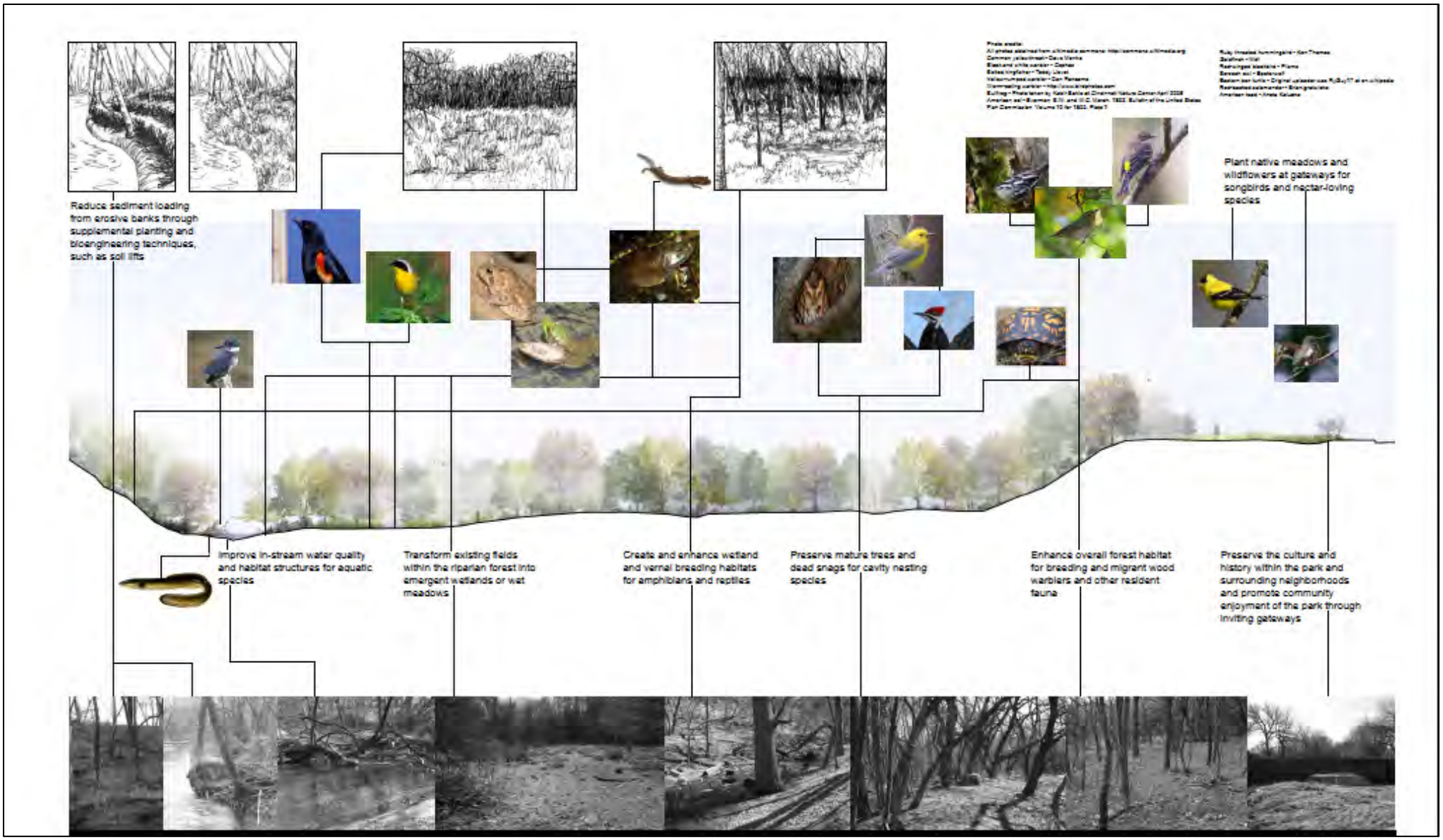


FIGURE 2. FLOODPLAIN TERRACE WITH PLANT POCKETS

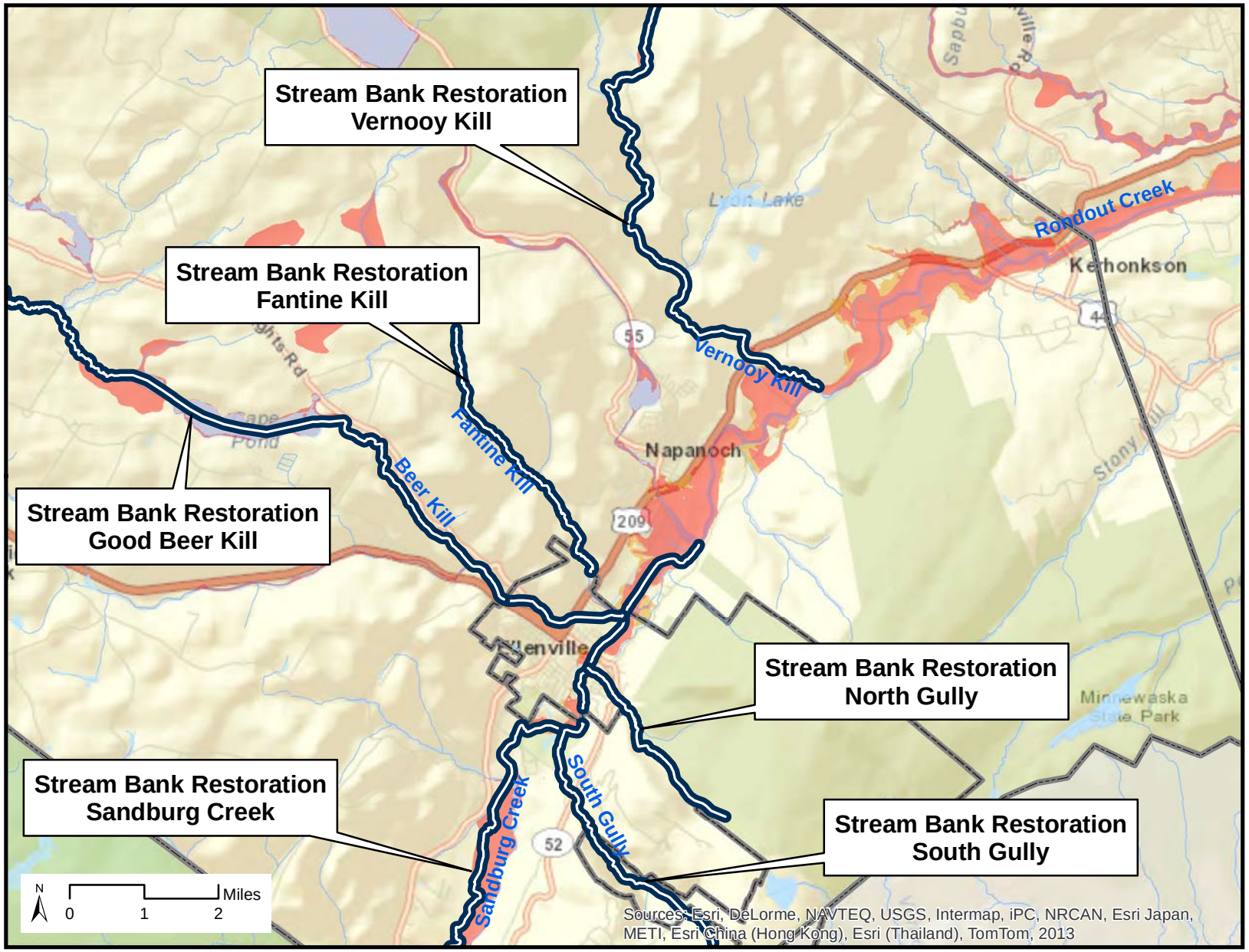
Floodplain Management Measures (AKRF, Inc.)

Health and Social Service Benefits: Regional stream restoration projects would not directly secure or provide better access to health and social service facilities or providers although the resulting reduction in roadway inundation will benefit the entire community and improve local and regional access to/from emergency, health and social service providers and facilities. Further, improved emergency response time during and after storm events reduces risk of injury to residents.



Stream Restoration (AKRF, Inc.)

Figure IV-2
Project Locations - Stream Bank Restoration: Ellenville & Wawarsing



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

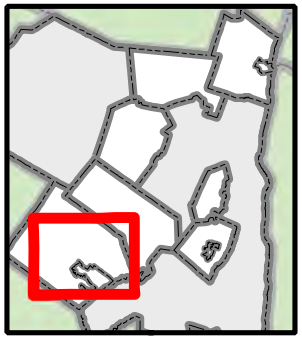
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Intermunicipal Proposed Project

Village of Ellenville and Town of Wawarsing

Emergency Shelter

Project Description: During Hurricane Irene and Tropical Storm Lee, residents that didn't evacuate were forced to leave their homes due to extensive flooding or power outages. There was insufficient shelter capacity to house them, existing shelters did not accommodate special needs (pets, handicap access, etc.), or were inaccessible due to road closures. Construction of additional shelters with sufficient resources would accommodate residents during/after future events. The project coordinates construction of an emergency shelter for use by the Town of Wawarsing and the Village of Ellenville that would be located in the Village of Ellenville. Handicapped accessible bathrooms/shower facilities would also be installed at two previously identified locations in the Village as well as emergency generators at both locations. Shelters would be configured to provide sufficient power for 02 charging stations as needed. The shelters will be pet-friendly and cat/dog crates will be provided.

Estimated Cost: $1,200,000

Potential CDBG-DR Funding:
$600,000 per municipality

Anticipated Regulatory Requirements:
None, unless Storm Water Pollution Prevention Plan is required.

Anticipated Timeframe: 12-18 Months

Entities with Jurisdiction: Village of Ellenville and Town of Wawarsing

Anticipated Risk Reduction: Construction of an emergency shelter would minimize risk to residents, and decrease their vulnerability during and after storm events by providing safe harbor.

Cost Benefit Summary: The construction of a permanent new emergency shelter is a sustainable project with an extended useful life. The potential environmental effects of new construction would require impact assessment. Opportunity costs include the potential benefits associated with other uses of the site (i.e., continued use as medical offices) including tax revenue, which would be lost. The use of the facility as a community center in non-emergency situations would require limited number of permanent staff. The emergency shelter would create a centralized emergency response facility (including emergency supply storage) and more efficient distribution of provisions and services (potential local government expenditure savings).

Co-Benefits of Project:

- Economic Benefits: The economic impact of providing emergency shelters during and post-disasters can be realized in several streams. First during the construction phase, economic benefit is realized in the form of local expenditures of goods, services, labor, materials and equipment. Second, provision of emergency shelters minimizes potential costs to municipal emergency service providers who may need to rescue residents who have not been able to seek shelter or where shelters are not accessible. When shelters are provided, emergency service personnel are able to allocate limited resources more efficiently. Third, community residents whose basic welfare needs are secured during storm events are able to focus their attention on community recovery- and getting back to work or businesses.
- Health and Social Service Benefits: The entire community, residents of the Town of Wawarsing and the Village of Ellenville would benefit from a permanent emergency shelter, that is centrally located and will provide safe and secure facilities including food, water, electricity, warmth, and communication services and facilities both during and after storm events. When basic needs are met, residents can focus their attention on recovery and resiliency efforts.

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Intermunicipal Featured Project

Village of Ellenville, Towns of Rochester and Wawarsing

Temporary Regional Shelter Located in a New Wing to be Constructed at Ellenville Regional Hospital

Project Description: Construction of a permanent wing at the Ellenville Regional Hospital, which could be utilized to accommodate medically vulnerable persons during acute storm events if space allows. The new wing would be part of the Ellenville Regional Hospital and would serve the general population year round. During Hurricane Irene and Tropical Storm Lee, medically vulnerable residents that didn't evacuate found insufficient shelter capacity to house/serve them, or where there was capacity, the shelters were not equipped to accommodate persons with specific needs. The cost associated with construction of the new Hospital wing is presented as a local cost share between the Village of Ellenville, the Town of Wawarsing and the Town of Rochester.

Estimated Cost: $1,000,000

Potential CDBG-DR Funding:
$400,000 each Ellenville & Wawarsing
$200,000 Town of Rochester

Anticipated Regulatory Requirements:

None, unless Storm Water Pollution Prevention Plan is required.

Anticipated Timeframe: TBD

Entity with Jurisdiction: Ellenville Regional Hospital

Anticipated Risk Reduction: Provision of a new wing to the hospital, which may provide emergency shelter to medically vulnerable persons during storm events, reduces risk to medically vulnerable populations that otherwise may not have access to emergency shelters.

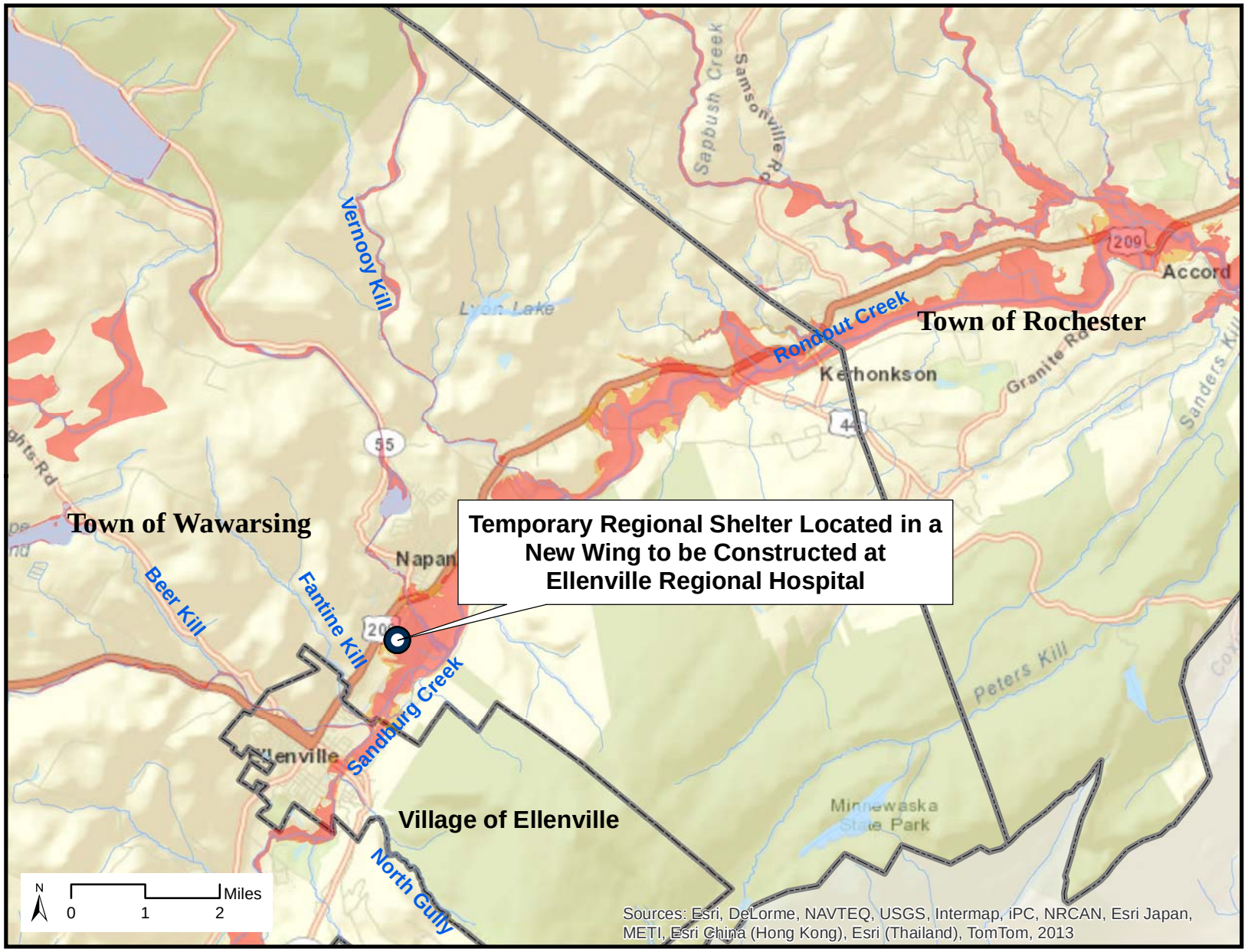
Cost Benefit Summary: Because this is a permanent structure, it will require an assessment of the potential environmental impacts of construction, but would result in a sustainable project with an extended useful life. Approximately 5 permanent jobs* could result from implementation of this project. Potential local government savings could result from the provision of space in a private facility for medically vulnerable persons that may otherwise have been accommodated in a temporary municipal shelter, or assisted directly by emergency service providers.

Co-Benefits of Project:

- Economic Benefits: A permanent wing at Ellenville Regional Hospital would provide respite space for medically vulnerable people, but overall benefits would depend on space's use during non-emergency situations. Construction of the facility would result in increased expenditures for goods, labor, service, materials and equipment and also long term benefits.
- Health and Social Service Benefits: The temporary emergency shelter at Ellenville Regional Hospital would be available to vulnerable populations, only, specifically benefitting those in need of special medical assistance.

Aerial photo of Ellenville Regional Hospital and location of proposed new wing (brown). (Ellenville Regional Hospital)

Figure IV-3
Project Location - Temporary Shelter at Ellenville Regional Hospital



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

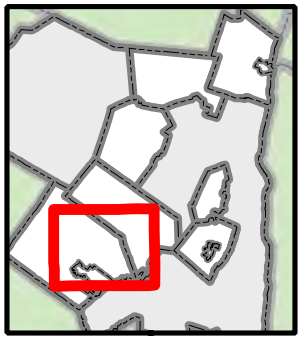
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Village of Ellenville

Generators for Ellenville School and Village Water Supply

Project Description: Purchase and install a generator at the Ellenville Central School radio station so that officials can reach residents on a large-scale basis during times of emergency. During flood events power outages were widespread. In addition, the project seeks to purchase and install two additional generators for the Village's water supply system, specifically the Fallsview and Center Street wells.

Estimated Cost: $225,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: Three Months

Entity with Jurisdiction: Ellenville Central School District and Village of Ellenville

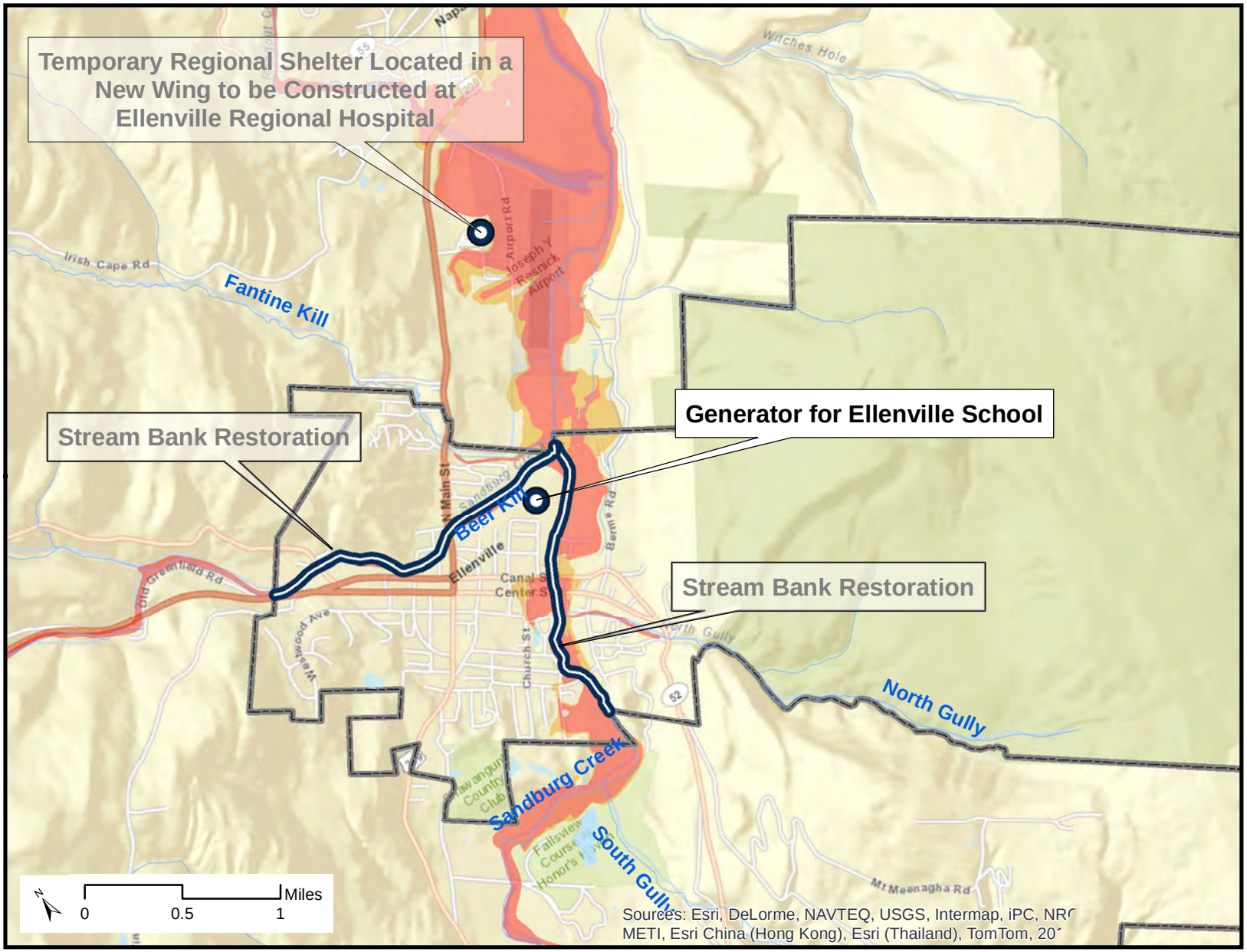
Anticipated Risk Reduction: The provision of a back-up generator reduces the vulnerability of the school facility (which serves socially vulnerable populations) and the water supply system, as it allows them to function more fully and recover more quickly after a storm.

Cost Benefit Summary: The purchase and fixed installation of power generators is a low cost measure, where the benefit significantly outweighs the costs of not having this essential power source during an emergency. Use of generators would likely require an air quality impact assessment. While their use is not generally considered "sustainable", they have a useful life of 10 to 20 years. This project would allow the school to be used as an emergency shelter, and would provide back-up power to the radio station, a central element of the Village's emergency communication system. In addition, the generators used for the water supply system would help decrease the vulnerability of the system. This would create savings in local government expenditure by improving the efficiency of the Village's emergency response efforts.

Co-Benefits of Project:

- Economic Benefits: The project would increase resiliency at the Ellenville Central School and the Village Water Supply; both facilities critical for the Village's emergency and recovery efforts. This low-cost project would greatly increase the Village's preparedness for future events. In addition, the project would strengthen emergency response capabilities by supporting the resiliency of the Village to meet the needs of its residents.
- Health and Social Service Benefits: The entire community would benefit from the fixed installation of power generators at key Village facilities. The generator would provide power to the School when used as an emergency shelter and also maintain power at the radio station, used for communicating during emergencies.

Figure IV-4
Project Locations - Ellenville



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

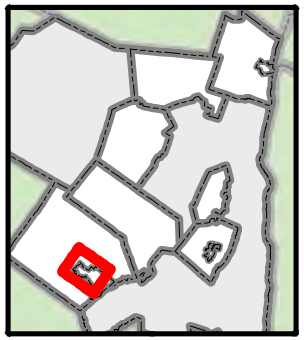
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

New Paltz (T/V)

Carmine Liberta Bridge

Project Description: Scope and implement required improvements to the Carmine Liberta Bridge, which is in need of repair or replacement due to damage sustained during Hurricane Irene and Tropical Storm Lee. The Bridge is the only roadway access to the west side of the river from New Paltz and heavily trafficked by residents, tourists, commercial vehicles and emergency service providers. Pedestrian and bicycle paths will be part of the redesign and construction.

Estimated Cost: $400,000

Anticipated Regulatory Requirements:

The NYS Department of Transportation would need to be involved as it is a state road.

The NYS Department of Conservation would likely need to issue an Article 15 permit.

Anticipated Timeframe: Two Years

Entity with Jurisdiction: Ulster County

Anticipated Risk Reduction: This project will reduce the vulnerability of the asset by fortifying the infrastructure, thereby decreasing its risk to future damage caused by flood water.

Cost Benefit Summary: Implementation of this project would result in sustainable benefits by reducing the risk of structural failure of the Carmine Liberta Bridge and inundation/closure of nearby roadways. Bridge improvements would have long-term benefits with a useful life of 50+ years. While implementation of the project would not generate any permanent jobs, reduced flooding near the bridge would result in more efficient emergency response efforts in the western portion of the community. Long-term bridge strengthening and reduced flooding and erosion damage on adjacent roadways would result in lower reconstruction and rehabilitation costs of the infrastructure following future storm events, thereby reducing local government expenditure.

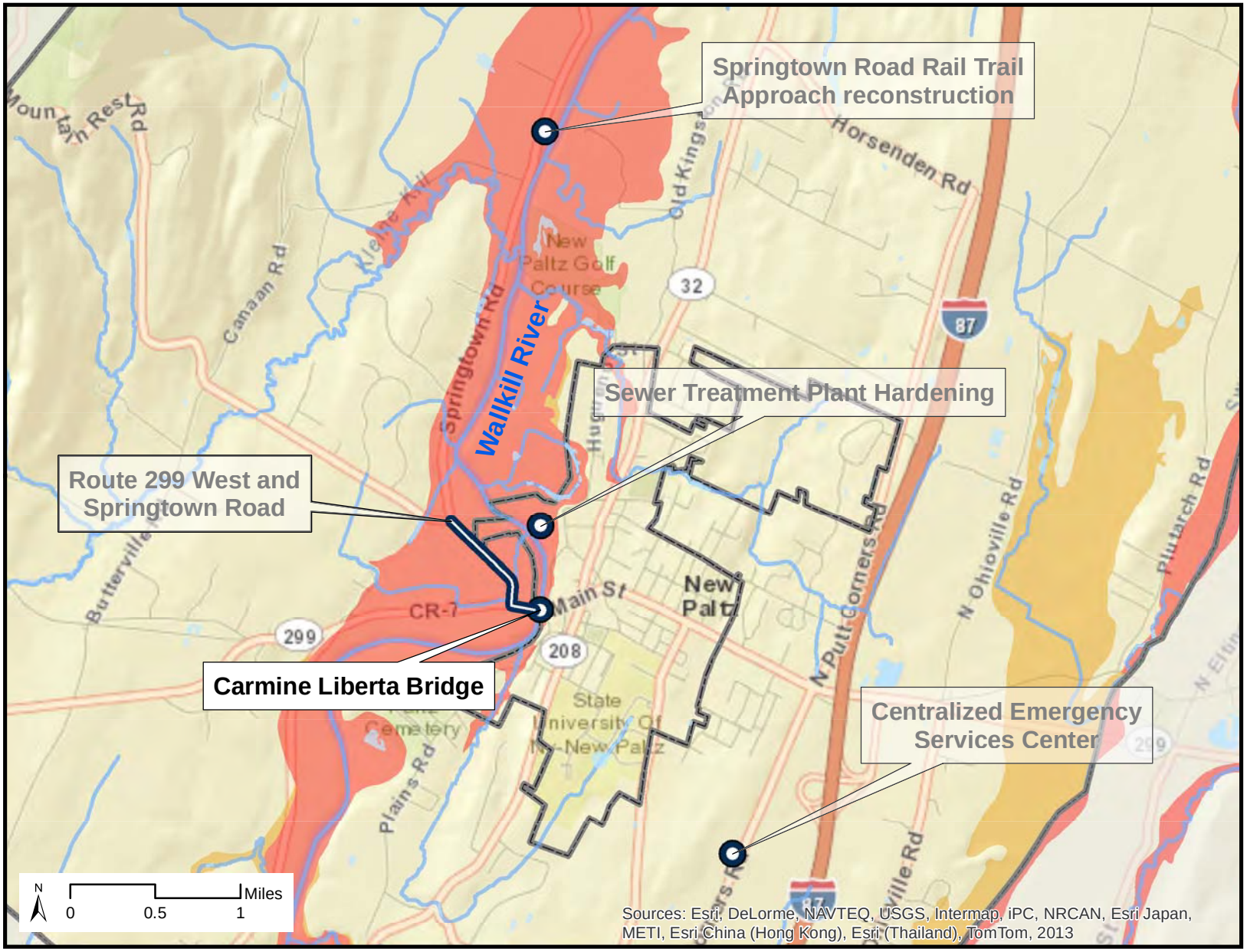
Co-Benefits of Project:

- Economic Benefits: This project would repair or replace the Carmine Liberta Bridge, the only roadway access to the west side of the river from New Paltz. This project would identify whether the bridge would be repaired to eliminate the existing damage or rebuilt entirely. In either case, the initial capital expenditure would be expected to reduce future maintenance and repair costs associated with flood damage. With the repair/replacement, this critical access point would be maintained for the foreseeable future.

- Environmental Benefits: The redesign of the Carmine Liberta Bridge would examine existing and future river storm flows so that the chosen design can both withstand future storm events without damage, and so that its floodway constriction characteristics can be understood in the context of regional floodplain management. Improving the flow capacity of the river minimizes rates of erosion, loss of adjacent wetlands and flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Such highly “stressed” waterways, which suffer from these problems typically have poor quality and biological diversity and therefore would benefit significantly from improved flow and mitigated upstream and downstream flooding.

- Health and Social Service Benefits: The Town and Village would benefit from improvements to the bridge and the resulting reduction in roadway flooding will provide uninterrupted access to vital health social service facilities and providers. Further, improved emergency response time during and after storm events significantly reduces risk of injury to residents.

Figure IV-5
Project Locations - New Paltz



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

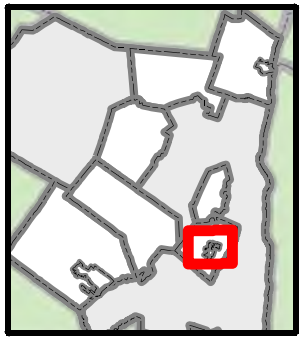
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

New Paltz (T/V)

Consolidated Municipal and Emergency Operations Center

Project Description: Create a Consolidated Municipal and Emergency Operations Center in an existing structure outside the floodplain that would consolidate the Town and Village municipal and emergency services and serve as an Emergency Service Providers Shelter. Town Hall was the designated emergency shelter for the community, but was cut-off during Hurricane Irene due to flooding.

Estimated Cost: $5,000,000

Anticipated Regulatory Requirements:

NYSDOT may have to issue a Highway Work Permit, or have some level of direct involvement based on the location.

Anticipated Timeframe: Two Years

Entity with Jurisdiction: New Paltz (T/V)

This project would be coordinated between the Town and Village of New Paltz.

Anticipated Risk Reduction: Construction of a Consolidated Municipal and Emergency Operations Center reduces risk by co-locating Town and Village emergency operations into a central location allowing more efficient planning and response coordination during storm events. Additionally, the proposed location can be accessed via Exit 18 off the NYS Thruway minimizing the exposure of the asset to flooded roadways and resulting in improved access for key response personal.

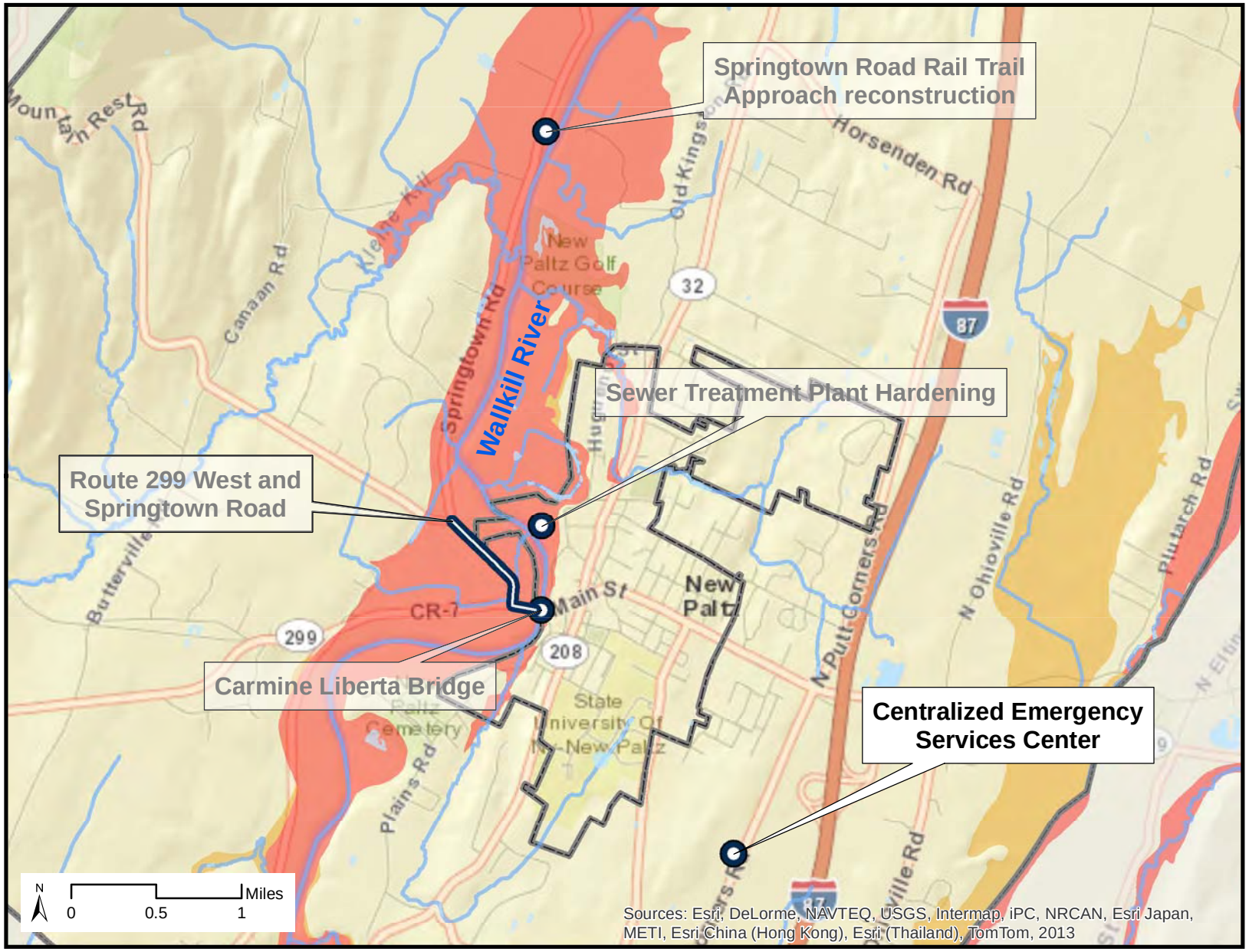
Cost Benefit Summary: A new Consolidated Municipal and Emergency Operations Center would provide long-term benefits by allowing the Town and Village to respond adequately to emergency situations in the coming 50+ years. The project's potential effect on natural resources resulting from development activities would require assessment. Opportunity costs may arise because the siting of any new emergency facilities may displace other uses providing public benefits and/or tax revenue. It is expected that implementation of the project would result in increased construction activity and that personnel currently involved in emergency response would be maintained. Savings in local government expenditures are likely to occur because this new emergency operations center would improve emergency coordination and response during storm events and during recovery. This project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in the established town and village centers.

Co-Benefits of Project:

- Economic Benefits: Consolidation of and cooperation between local government services and departments results in economic efficiencies. Tax revenue to support separate services can be more efficiently allocated reducing costs of service delivery and potentially per capita government expenditures. Consolidating services would reduce infrastructure operating and maintenance costs.

- Health and Social Service Benefits: In an emergent situation, the provision of key municipal and emergency services would provide significant health and social service benefits to the community by efficiently securing the right personnel to assist residents in recovery efforts. Municipal officials are able to dispatch their emergency service personnel most efficiently and also coordinate with adjacent communities to make sure residents are secure and protected. Crisis counseling for rescuers and patients following a disaster can be dispatched from a central location. These individuals may need to interact with departmental personnel from several divisions as well as with personnel from adjacent communities. Some disasters may require that certain key department personnel gather periodically to be informed of disaster related developments and to make decisions about how best to fulfill the mission of the department. This is most easily achieved when key personnel are aggregated.

Figure IV-5
Project Locations - New Paltz



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

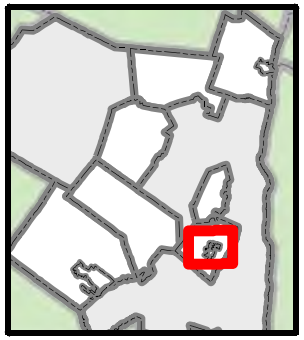
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

New Paltz (T/V)

Flood Prevention Strategies and Stormwater Management for Wallkill River & Waterways

Project Description: Complete a Watershed Management Study to better understand the Wallkill Watershed and current causes of flooding, and develop and prioritize flood prevention strategies (both upstream and downstream). The study would consider alternative implementation strategies to control flooding including but not limited to bioswales, relief channels, flood water storage, reservoirs, rain gardens, use of permeable surfaces, building elevation, day lighting submerged waterways, protection of wetlands & green space, widening of river banks, stream bank reclamation, public education, etc. During Hurricane Irene and Tropical Storm Lee the Wallkill River and tributaries flooded nearby properties causing storm related damage.

Estimated Cost: $500,000

Anticipated Regulatory Requirements:

This project would likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: 18-24 Months

Entity with Jurisdiction: New Paltz (T/V)

This project would be coordinated between the Town and Village of New Paltz.

Anticipated Risk Reduction: The study of flood management measures and their phased implementation would reduce risk to the entire community by implementing coordinated permanent flood mitigation measures throughout the length of the River.

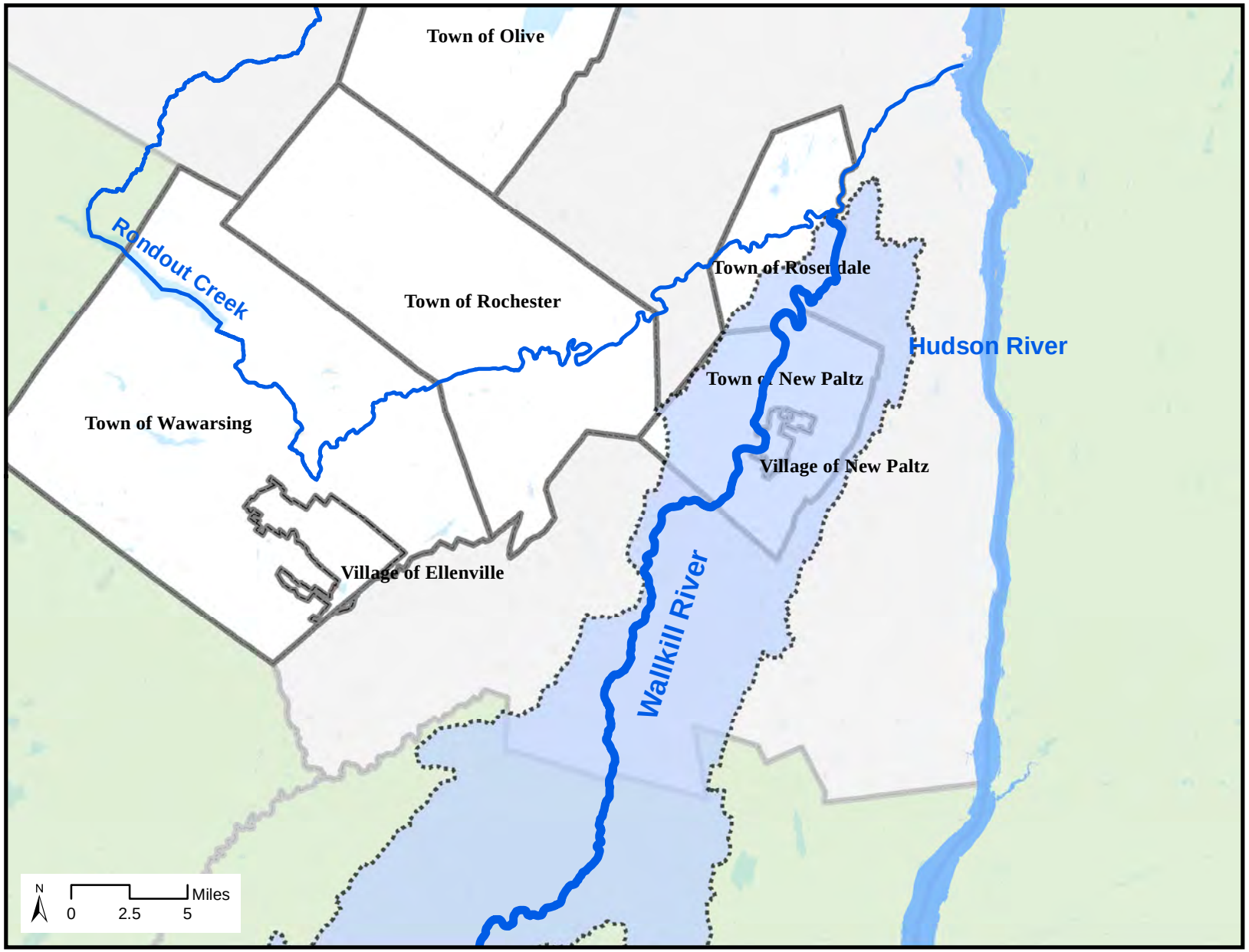
Cost Benefit Summary: This project would provide wide-ranging flood mitigation for the foreseeable future. Improvements such as stream restoration would have a useful life of 10 to 20 years. Potential effects of improvements on natural resources would require further assessment. Improvements to natural areas such as the Wallkill River and its tributaries may attract additional visitors to the area, generating economic activity. Watershed improvement projects would support the Mid-Hudson Regional Economic Development Council's goal of leveraging natural resources that are a driver of tourism and quality-of-life attributes. Savings in local government expenditures are expected because flood mitigation would help improve access for emergency services throughout the community, reduce flooding at a wide range of local facilities, and reduce the cost of rehabilitation and reconstruction after storm events.

Co-Benefits of Project:

- Economic Benefits: Watershed management, stream bank and stream bed restoration initiatives would provide flood mitigation along the River and stream corridors and potentially increase their attractiveness as recreational and tourist attractions. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.
- Environmental Benefits: Potential stormwater management strategies could include an examination of existing stormwater management regulations in the Towns tributaries to the Wallkill with the goal of increasing the effectiveness of such practices as infiltration, detention, and water quality treatment. In addition, flood prevention strategies may include resizing culverts, guidance on bridge sizing/design, and in-stream debris removal. All of these measures have the potential to decrease rates of erosion, loss of adjacent wetlands and flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Removing the stresses would improve water quality and biological diversity.
- Health and Social Service Benefits: Improvements to the watershed to be implemented on a regional basis will minimize roadway flooding through various communities along the Wallkill, thereby improving access by emergency service workers to various neighborhoods and access to health and social service facilities by multiple communities.

Bioswale (AKRF, Inc.)

Figure IV-6
Project Location - Lower Wallkill River Watershed



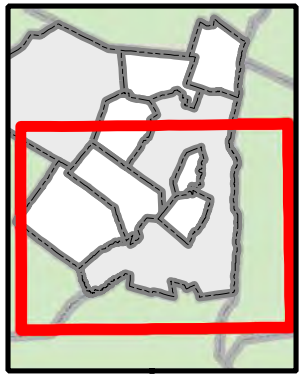
Lower Wallkill River Watershed

Data Sources

Municipal Boundaries:
NYS

Hydrography:
USGS

March 20, 2014



Proposed Project

New Paltz (T/V)

Inflow and Infiltration Investigation and Permanent Wastewater Collection System Repairs

Project Description: Scope and implement improvements to the existing collector sewer system, and make point repairs and collector sewer replacement as needed. This project would reduce the inflow and infiltration of stormwater associated with flooding events to safeguard the plant's processes. The existing sewer collection system was overwhelmed during Hurricane Irene and Tropical Storm Lee causing contaminated waters to go into the Wallkill River. Improvements to the collection system combined with hardening the waste water treatment plant (WWTP) would minimize failure of the infrastructure during future 100-yr storm events.

Estimated Cost: $1,500,000

Anticipated Regulatory Requirements:

The NYS Department of Transportation may be directly involved depending on the precise locations of work.

Anticipated Timeframe: One Year

Entity with Jurisdiction: New Paltz (T/V)

This project would be coordinated between the Town and Village of New Paltz.

Anticipated Risk Reduction: The risk reduction benefits associated with this project include continuous provision of waste water treatment, an essential service during disasters, reduced vulnerability of residential neighborhoods to contamination of their water supply, and a reduction of risk of additional damage and future repair/maintenance to municipal systems and facilities.

Cost Benefit Summary: Improvements and repairs to the existing system would increase capacity, durability, and general system resilience in the long-term. These protective measures would contribute to fewer incidents of compromised waste water system issues and associated damages, thereby resulting in local government expenditure savings. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting economic infrastructure investments in established city or village centers.

Co-Benefits of Project:

- Economic Benefits: The project would increase capacity and safeguard the sewage treatment plant from compromise or failure. As an infrastructure project, it would address the region's economic development goals and can help to improve the Towns preparedness for future disaster events.
- Environmental Benefits: By repairing existing sanitary sewer lines, the unwanted portion of incoming flows entering broken pipes from runoff or from combined storm/sanitary lines can be eliminated or reduced. Eliminating these flows frees up existing sewage treatment plant capacity, minimizes releases of poorly treated wastewater, and saves costly treatment plant upgrades, allowing treatment facilities to be devoted solely to wastewater treatment.
- Health and Social Service Benefits: Permanent improvement to the wastewater collection system would have indirect benefits to the entire community by protecting the treatment of the communities' wastewater system.

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Proposed Project

New Paltz (T/V)

Route 299 West and Springtown Road

Project Description: Scoping and implementation of required improvements to address flooding along Route 299 West and Springtown Road, from Main Street to Mountain Rest Road. This segment is currently a major access point from the eastern portion of the community to the west and regularly gets inundated, shutting off access to and from the Village. It is also a gateway to areas in western Ulster County and a thoroughfare for tourism and recreation.

Estimated Cost: $250,000

Anticipated Regulatory Requirements:

This project may require an Article 15 or Article 24 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Ulster County

Anticipated Risk Reduction: It is anticipated that project scoping will recommend improvements to Route 299 West and Springtown Road, which would reduce flood inundation levels eliminating the hazard and reducing risk associated with roadway closure and impeded access.

Cost Benefit Summary: Implementation of this project would provide flood mitigation to Springtown Road for the foreseeable future. Such improvements would have a useful life of 10 to 20 years. Although no direct increase in economic activity is expected, such improvement measures would help maintain access for emergency vehicles to the western portion of the community and would reduce the cost of reconstruction and rehabilitation of facilities and roadways after storm events.

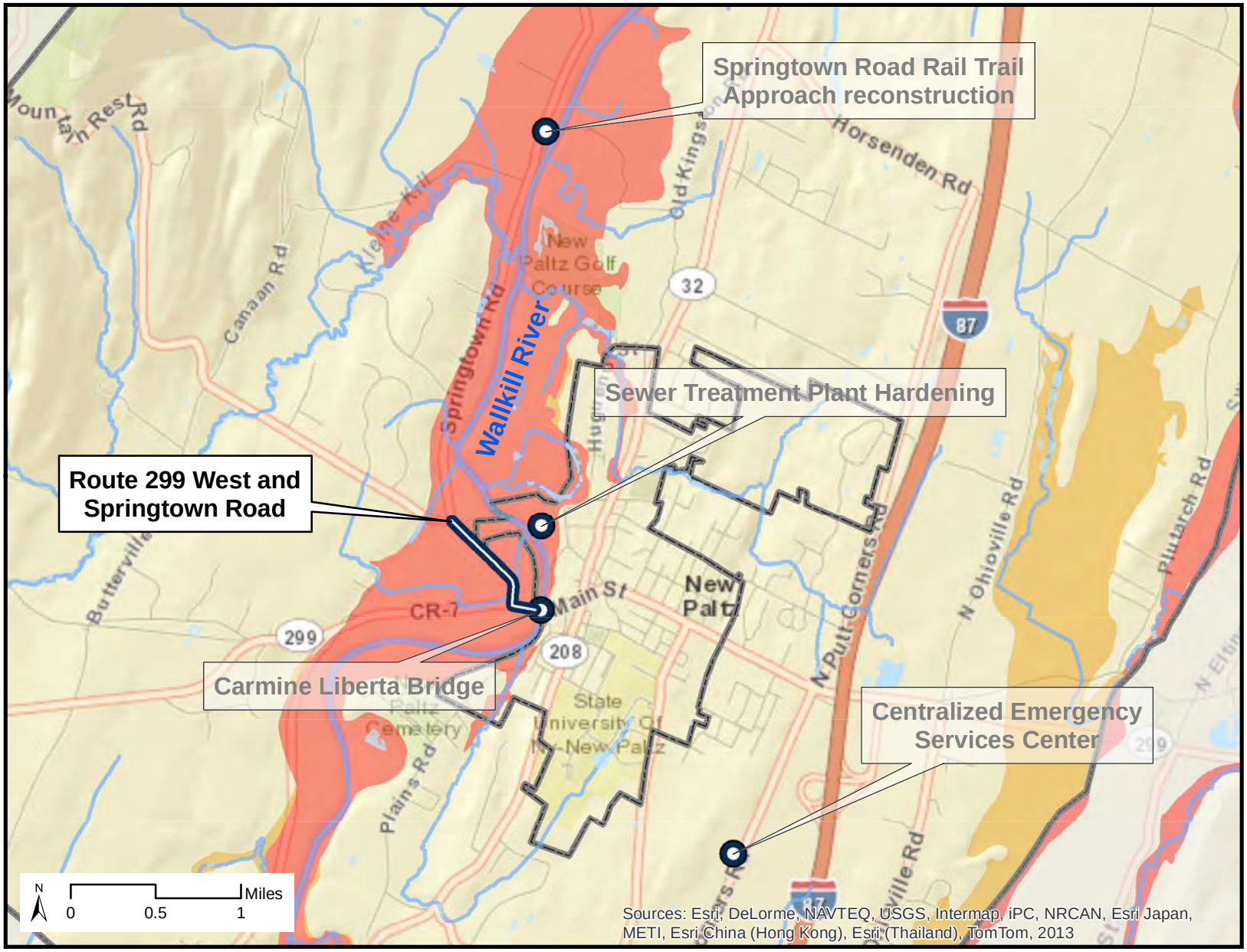
Co-Benefits of Project:

- Economic Benefits: The project would provide flood mitigation to key local and regional access routes. It would implement drainage improvement measures to provide flood mitigation along the stream corridors, protecting a critical access road for regional tourism and recreation opportunities including the rail trail. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: Roadway improvement projects require examination of existing and future stream storm flows and floodway constriction characteristics so that the chosen design can withstand future storm events without damage. Improving the flow capacity of waterways minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property.

- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health social service facilities and providers.

Figure IV-5
Project Locations - New Paltz



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

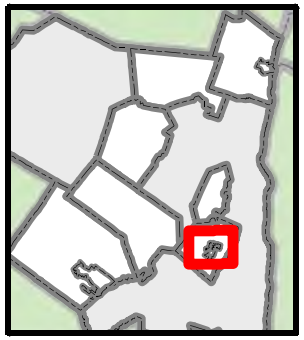
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

New Paltz (T/V)

Sewer Treatment Plant Hardening

Project Description: Install flood proofing measures to the wastewater treatment plant to mitigate the future risk of inundation by floodwaters (as occurred during Hurricane Irene and Tropical Storm Lee) during future 100-yr storm events. Flood proofing measures could include: construction of higher concrete berm at the current site and reinforcing the current site; and/or construction of a "Package Plant" at a nearby location.

Estimated Cost: $1,200,000

Anticipated Regulatory Requirements:

NYS Department of Environmental Conservation and NYS Department of Health review likely.

Anticipated Timeframe: 18-24 Months

Entity with Jurisdiction: New Paltz (T/V)

This project would be coordinated between the Town and Village of New Paltz.

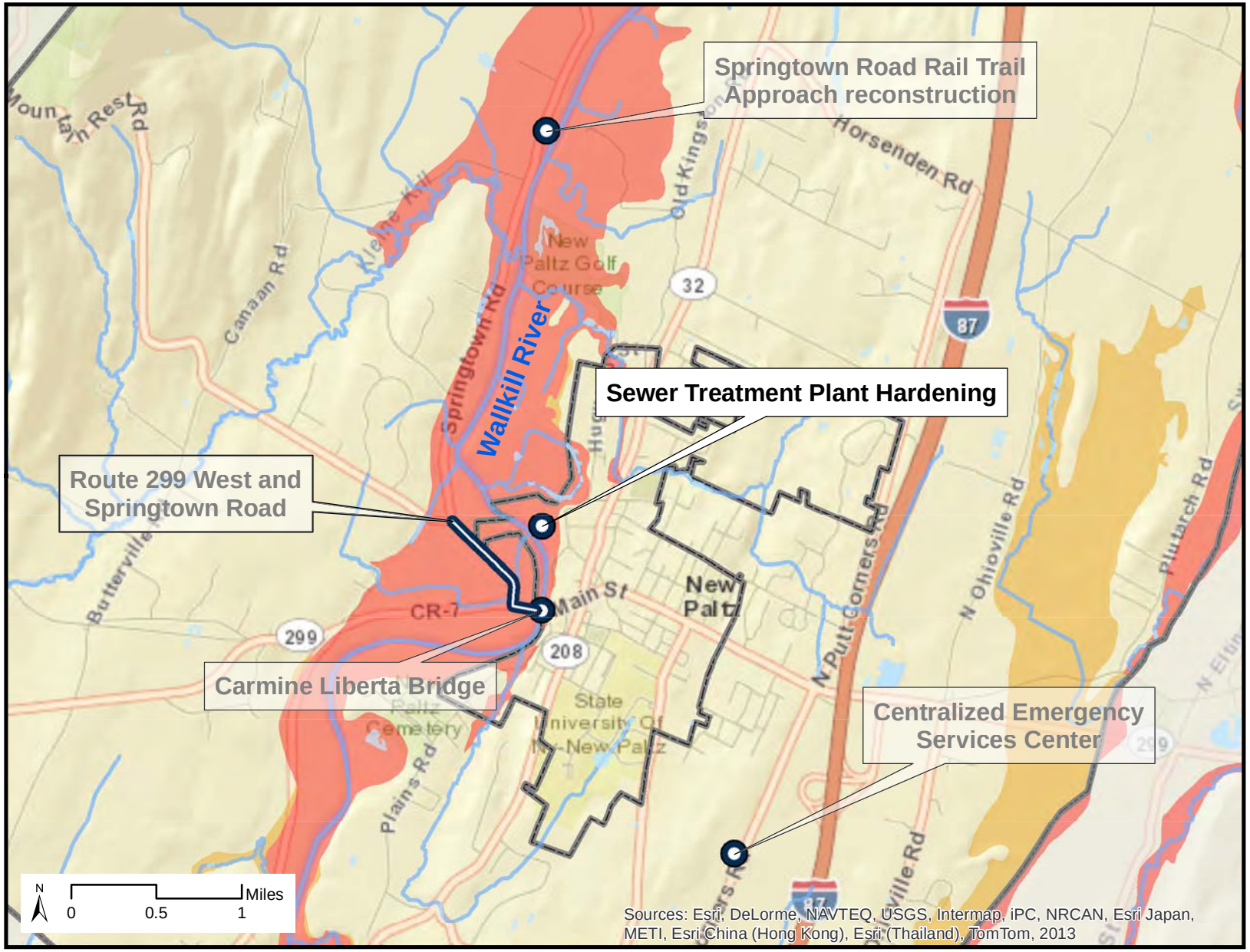
Anticipated Risk Reduction: Hardening the wastewater treatment plant will reduce its vulnerability by improving the ability of the facility to function in storm or flood conditions.

Cost Benefit Summary: Implementation of this project is expected to increase resiliency and durability of the facility in the long-term, without any negative effects on natural resources. Savings in local government expenditure are expected because reducing flooding at and roadways near the sewer treatment plant would result in more efficient emergency response and fewer damages to infrastructure.

Co-Benefits of Project:

- Economic Benefits: Hardening the Sewer Treatment Plant would increase its resiliency thereby protecting Village and Town assets from releases of poorly treated wastewater. As an infrastructure project, it would address the region's economic development goals and can help to improve the Town and Village's preparedness for future disaster events.
- Environmental Benefits: This project will have environmental benefits by protecting the waste water treatment plant from inundation and preventing degradation. The installation of flood proofing measures at the waste water treatment plant, including installation of backflow valves, and repair of existing sanitary sewer lines, would reduce or eliminate the unwanted portion of incoming flows entering broken pipes from runoff or from combined storm/sanitary lines. Eliminating these flows frees up existing sewage treatment plant capacity, minimizes releases of poorly treated wastewater, and saves costly treatment plant upgrades, allowing treatment facilities to be devoted solely to waste water treatment.
- Health and Social Service Benefits: Hardening the Sewer Treatment Plant would have indirect benefits to the entire community by protecting the treatment of the communities' wastewater system.

Figure IV-5
Project Locations - New Paltz



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

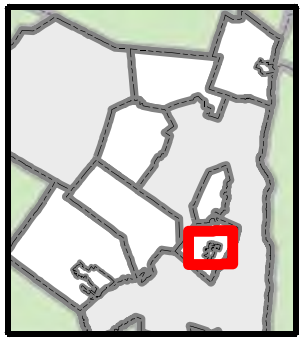
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

New Paltz (T/V)

Springtown Road Rail Trail Approach Reconstruction

Project Description: Reconstructing the approach to the rail trail bridge from Springtown Road would reinforce the access road toprovide emergency vehicles means of crossing the Wallkill during storm events to access the western portion of the community. During Hurricane Irene and Tropical Storm Lee, this roadway was inundated, shutting off access to and from the Village.

Estimated Cost: $250,000

Anticipated Regulatory Requirements:

Potential for Highway Work Permit

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Ulster County

This project would be coordinated between the Town and Village of New Paltz.

Anticipated Risk Reduction: The proposed improvements decrease the vulnerability of the rail trail, a key recreational and tourism asset. By strengthening the bridge approach, the roads ability to function during a storm is improved by allowing uninterrupted emergency vehicle roadway access.

Cost Benefit Summary: Reconstructing the Springtown Road Rail Trail approach would provide an additional emergency access route to the western portion of the community for the foreseeable future. A reconstructed bridge approach is likely to have a useful life of 50+ years. This project would reduce emergency response times and provide a more efficient access to the western side of New Paltz, thereby providing savings in local government expenditures.

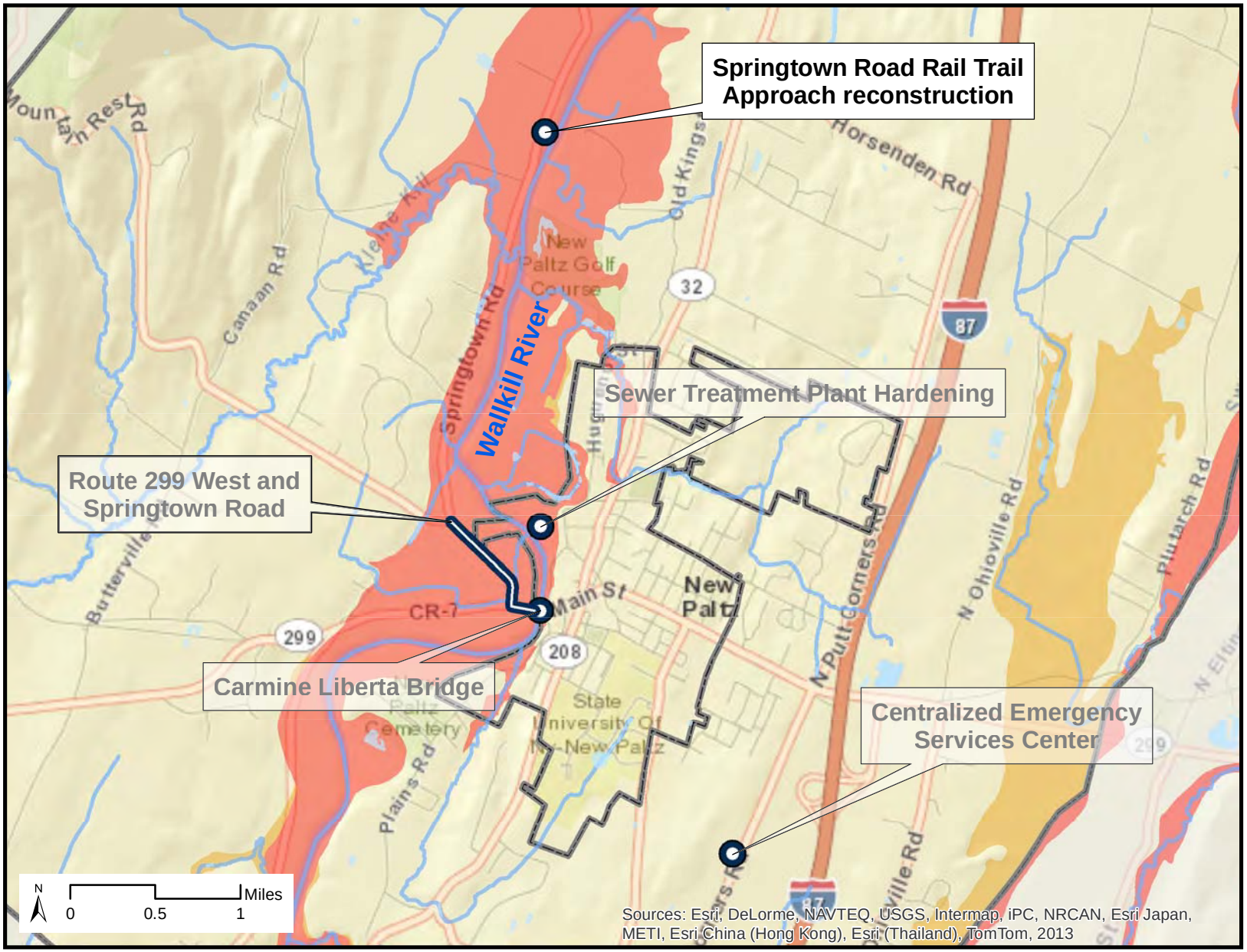
Co-Benefits of Project:

- Economic Benefits: Reconstructing the approach to the Rail Trail for use by emergency service providers would significantly improve emergency response efforts. The project would provide flood mitigation of a key access route for the local community and the region. Drainage improvement measures would provide flood mitigation along the waterway protecting a critical access road for regional tourism and recreation opportunities including the rail trail. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: Roadway improvement projects require examination of existing and future stream storm flows and floodway constriction characteristics so that the chosen design can withstand future storm events without damage. Improving the flow capacity of the waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways public and private property from inundation.

- Health and Social Service Benefits: This project would benefit the entire community and potentially adjacent communities by creating an emergency crossing over the Wallkill River via Springtown Road, minimizing access time for provision of emergency services.

Figure IV-5
Project Locations - New Paltz



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

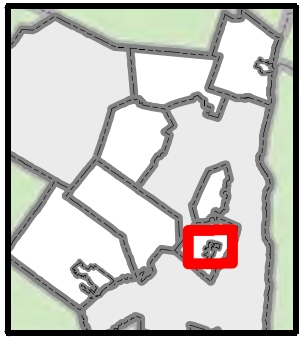
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Olive

Bushkill Creek Stream Restoration

Project Description: Scoping and implementation of extensive stream reconstruction measures on the Bushkill Creek. Hurricane Irene and Tropical Storm Lee caused massive amounts of debris to flow downstream and aggregate under the span of the Watson Hollow Bridge creating scour of the abutment and channel flow restrictions. When the bridge floods, 183+ homes are cut off from emergency services, food and fuel. Implementation measures will include reducing land erosion on the banks and may include sediment and tree removal. Sediment has aggregated within the Bushkill, particularly at the Watson Hollow Bridge and downstream near the Watson Hollow Road embankment.

Estimated Cost: $1,075,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Olive

Anticipated Risk Reduction: This project is intended to implement necessary stream reconstruction measures along the stretch of Bushkill Creek that runs through West Shokan. Excessive sediment and debris in a streambed result in constrictions and reduced capacity of waterways. This project will increase the channel's ability to handle waterflow, therefore reducing hazardous exposure of nearby assets. Assets serving socially vulnerable populations will be less exposed to flooding.

Cost Benefit Summary: Stream reconstruction including sediment removal would provide flood mitigation for the foreseeable future. Periodic sediment removal would provide a short-term improvement, but overall stream reconstruction would have a useful life of 10 to 20 years. The project's potential effect on natural resources would require an assessment. Stream restoration may improve the Bushkill Creek's attractiveness as a recreational area and tourist attraction, and would support the Mid-Hudson Regional Economic Development Council's goal of leveraging natural resources that are drivers of tourism and quality-of-life attributes. Savings in local government expenditure are possible because mitigation of flooding on and around the Watson Hollow Bridge would improve access for emergency response, reduce damage, and limit reconstruction and rehabilitation costs for the Town.

Co-Benefits of Project:

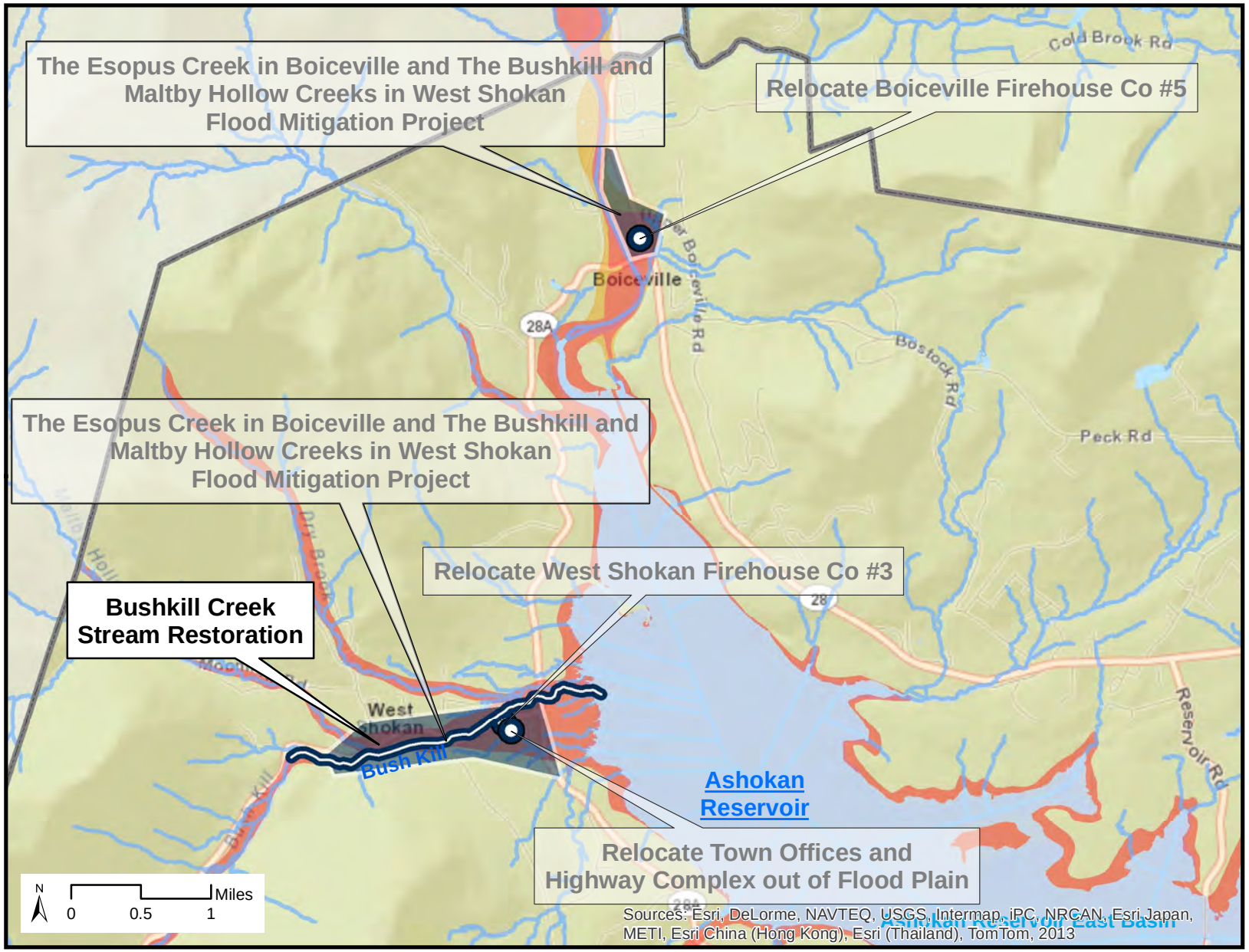
- Economic Benefits: Stream bank and stream bed restoration and reconstruction would provide permanent flood mitigation for Watson Hollow Bridge and Watson Hollow Road and may improve the area's attractiveness as a recreational and tourist attraction. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: This project will have significant environmental benefits including restoring the health, resiliency and capacity of the Bushkill Creek. Stream restoration involves the modification of a stressed/disturbed stream via morphological changes to its bed and banks, to make its flow, flooding behavior, and biological components more stable and sustainable. Streams, such as the Bushkill Creek have had changes to their watersheds due to development and storm damage, and therefore generally suffer from increased rates of erosion, loss of adjacent wetlands and in-stream flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Such highly "stressed" streams which suffer from these problems typically have poor quality and biological diversity and therefore would benefit significantly from stream restoration.

- Health and Social Service Benefits: Regional stream restoration projects would not directly secure or provide better access to health and social service facilities or providers although the resulting reduction in roadway inundation will benefit the entire community and improve local and regional access to/from emergency, health and social service providers and facilities.

Created Wetland Pond (AKRF, Inc.)

Figure IV-7
Project Locations - Olive



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

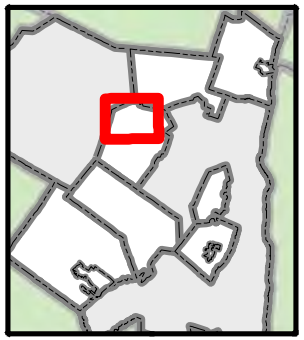
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Olive

Relocate Boiceville Firehouse Co #5

Project Description: Construct a new firehouse for the Boiceville Firehouse Co. #5. Boiceville Firehouse #5 is located in the floodplain and was inundated with water during Hurricane Irene and Tropical Storm Lee severely compromising the ability of emergency service providers to assist in the recovery effort. The new firehouse would be located outside of the floodplain eliminating its existing vulnerability, and ensuring the ability for the emergency service providers to access their equipment and vehicles during future flooding events.

Estimated Cost: $750,000

Anticipated Regulatory Requirements:

None, unless Storm Water Pollution Prevention Plan is required.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Olive

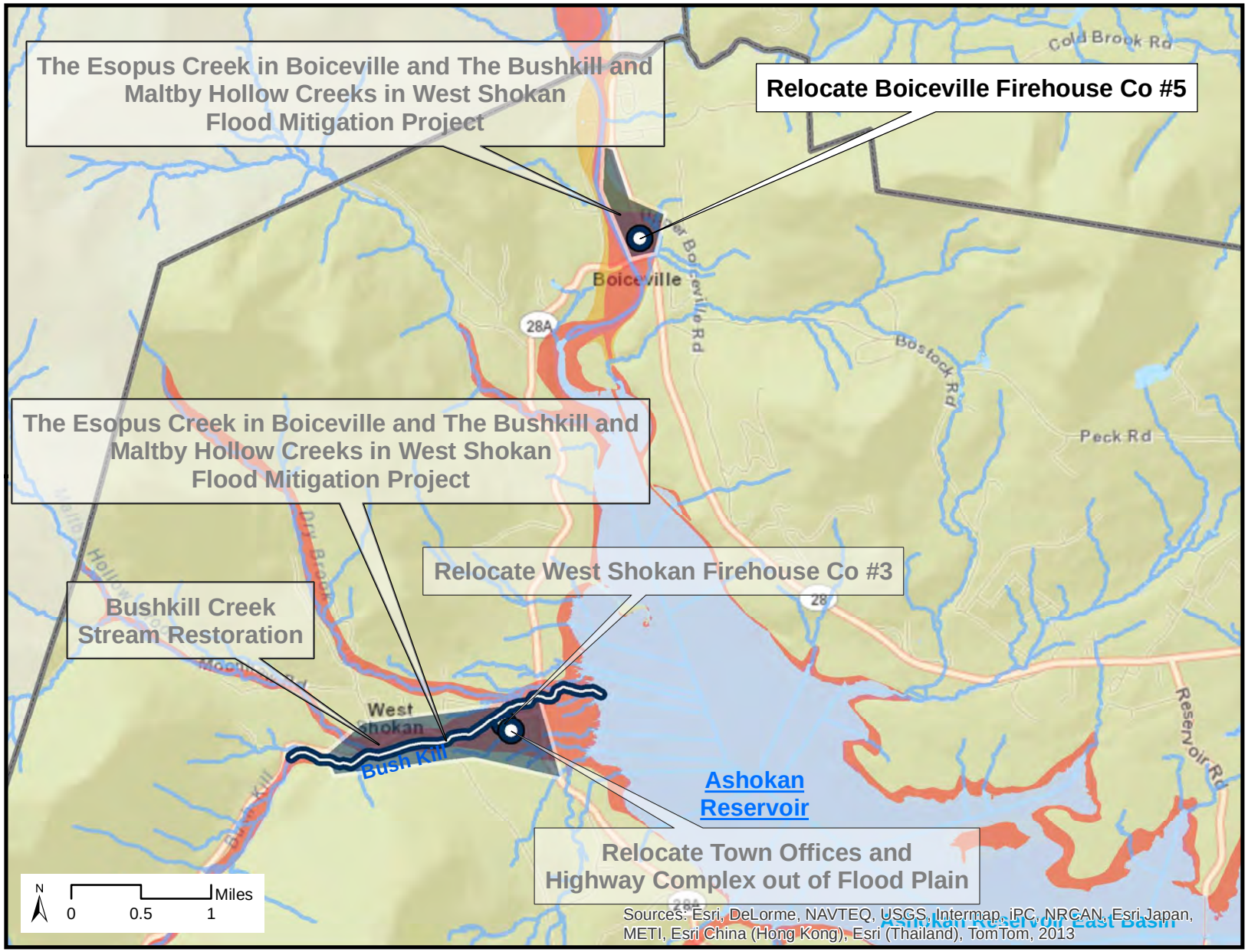
Anticipated Risk Reduction: This project intends to relocate Olive Fire Company #5 (Boiceville Firehouse Co. #5) to a location outside of the floodplain, thereby removing the asset from a risk area and reducing the asset's exposure.

Cost Benefit Summary: This project would provide long-term benefits to the community because construction of a new firehouse would provide a permanent facility for fire protection. The project's potential effects of new construction (including effects on traffic and noise from sirens) would require assessment. Opportunity costs may exist because the siting of a new firehouse may displace other uses providing public benefits and/or tax revenue. Construction of a new firehouse out of the floodplain would allow for continued operation during flood events, thereby ensuring, improving and securing emergency response. The risk of damage to the facility and equipment would be reduced, as would local government expenditure for rehabilitation, reconstruction, or replacement of damaged equipment.

Co-Benefits of Project:

- Economic Benefits: Relocation of firehouse would provide for continued provision of emergency services and would significantly reduce the risk of damages to the facility and equipment. In addition, moving the firehouse out of the floodplain, would reduce flood insurance and minimize costs to the Town and the Fire District. Short term economic stimulus would be realized during construction in the form of goods, service, labor, materials and equipment expenditures. Longer term economic benefit would include eliminating the need for recurrent maintenance, repair or reconstruction to the facility caused by flood damage.
- Environmental Benefits: The rebuilt firehouses could be equipped with energy efficient features including ground source heat pumps, emergency power generators, and rainwater harvesting systems to fill fire trucks.
- Health and Social Service Benefits: Relocating Boiceville Firehouse Co. #5 out of the floodplain will benefit the entire community by securing provision of fire and Emergency Medical Services both to the Town of Olive, and adjacent communities, who participate in mutual aid agreements.

Figure IV-7
Project Locations - Olive



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

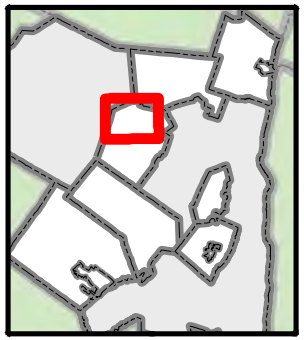
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Olive

Relocate West Shokan Firehouse Co #3

Project Description: Construct a new firehouse for the West Shokan Firehouse Co. #3 that is outside of the floodplain so that the fire company can continue to provide emergency services during flooding events. During Hurricane Irene and Tropical Storm Lee, apparatus, equipment and personnel had to be relocated to higher ground, severely compromising the ability of emergency service providers to assist in the recovery effort. Relocating the firehouse out of the flood plain would eliminate its existing vulnerability, and ensure the ability for the emergency service providers to access their equipment and vehicles during future flooding events.

Estimated Cost: $750,000

Anticipated Regulatory Requirements:

None, unless Storm Water Pollution Prevention Plan is required.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Olive

Anticipated Risk Reduction: This project intends to relocate Olive Fire Company #3 (West Shokan Firehouse Co. #3) to a location outside of the floodplain, thereby removing the asset from a risk area and reducing the asset's exposure.

Cost Benefit Summary: This project would provide long-term benefits to the community because construction of a new firehouse would provide a permanent facility for fire protection. The project's potential effects of new construction (including effects on traffic and noise from sirens) would require assessment. Opportunity costs may exist because the siting of a new firehouse may displace other uses providing public benefits and/or tax revenue. Construction of a new firehouse out of the floodplain would allow for continued operation during flood events, thereby ensuring, improving and securing emergency response. The risk of damage to the facility and equipment would be reduced, as would local government expenditure for rehabilitation, reconstruction, or replacement of damaged equipment.

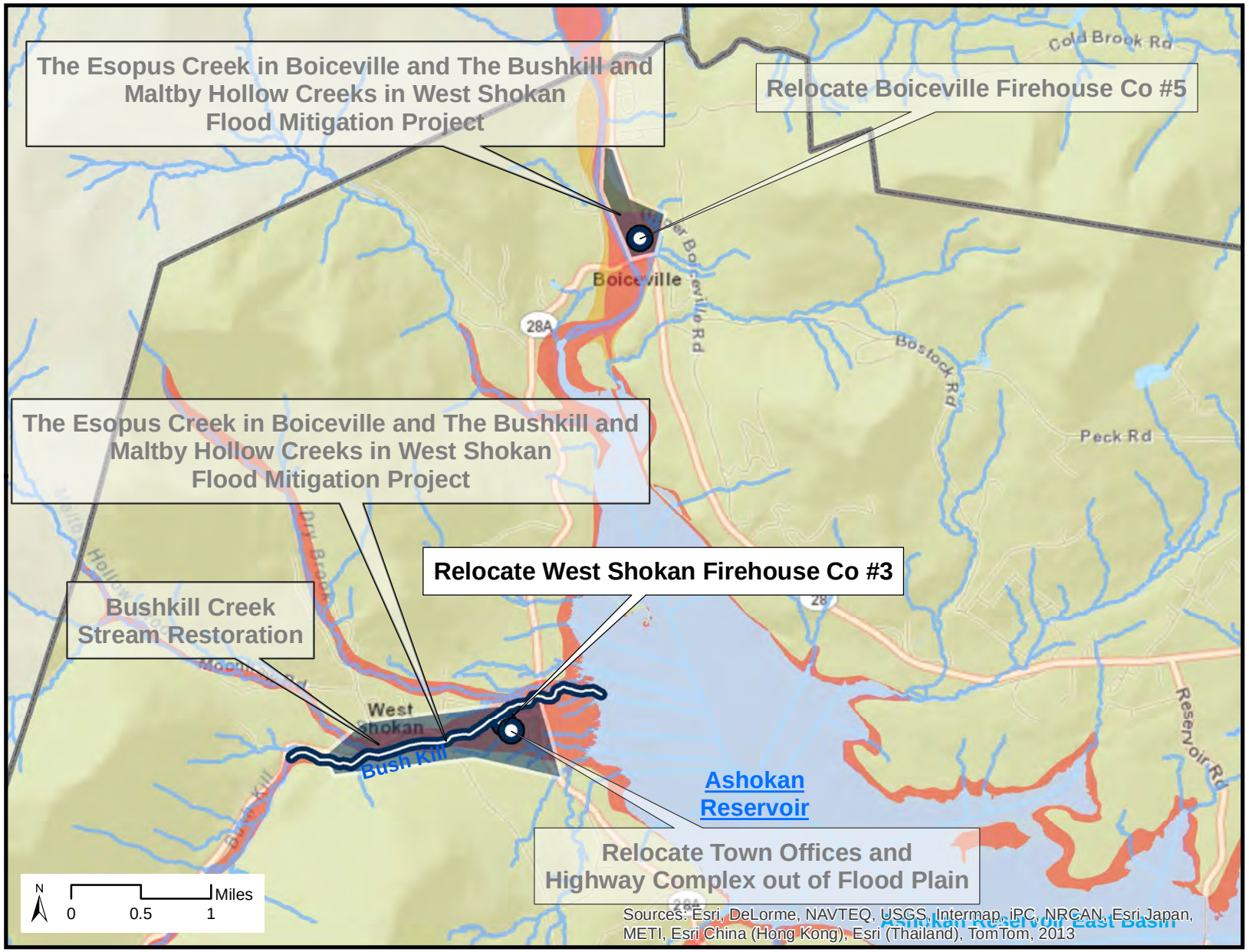
Co-Benefits of Project:

- Economic Benefits: Relocation of firehouse would provide for continued provision of emergency services and would significantly reduce the risk of damages to the facility and equipment. In addition, moving the firehouse out of the floodplain, would reduce flood insurance and minimize costs to the Town and the Fire District. Short term economic stimulus would be realized during construction in the form of goods, service, labor, materials and equipment expenditures. Longer term economic benefit would include eliminating the need for recurrent maintenance, repair or reconstruction to the facility caused by flood damage.

- Environmental Benefits: The rebuilt firehouses could be equipped with energy efficient features including ground source heat pumps, emergency power generators, and rainwater harvesting systems to fill fire trucks.

- Health and Social Service Benefits: Relocating Boiceville Firehouse Co. #3 out of the floodplain will benefit the entire community by securing provision of fire and Emergency Medical Services both to the Town of Olive, and adjacent communities, who participate in mutual aid agreements.

Figure IV-7
Project Locations - Olive



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

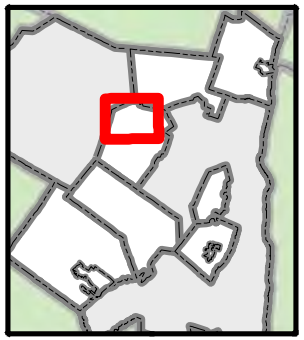
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Olive

The Esopus Creek in Boiceville and The Bushkill and Maltby Hollow Creeks in West Shokan Flood Mitigation Project

Project Description: Scoping, modeling (including hydraulic and hydrologic modeling) and implementation of recommended improvements to address repetitive flooding in the Rte 28 corridor, the Esopus Creek in Boiceville and the Bushkill and Maltby Hollow Creeks in West Shokan. During Hurricane Irene and Tropical Storm Lee, the Esopus Creek experienced extreme localized flooding. The scoping phase of this project would identify implementable measures to mitigate flooding. This project can be implemented in phases.

Estimated Cost: $1,000,000

Anticipated Regulatory Requirements:

NYS Department of Environmental Conservation Article 15 permitting will be required.

US Army Corps of Engineers review of waterway disturbance is likely.

NYS Department of Transportation review of impacts to state roads will be required.

NYC Department of Environmental Protection review of potential impacts to their facility is likely.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Olive

Anticipated Risk Reduction: Given that the project proposes to build some type of defensive flood protection measure, the exposure score for all assets in the floodplain to be protected was reduced. Assets serving socially vulnerable populations will be less exposed to flooding.

Preliminary modeling analysis was performed to evaluate a levee as a potential flood mitigation measure. The analysis considered a levee adjacent to Route 28 along the right banks of the Esopus Creek from the State Route 28A Bridge to approximately 2,900 feet upstream with allowance for a three foot freeboard above the base flood elevation. The preliminary analysis indicates a levee, similar the one evaluated, may effectively protect a portion of the community previously inundated including Route 28 and should certainly be studied further.

Cost Benefit Summary: Implementation of this project would permanently mitigate flooding along stream corridors and Route 28, resulting in sustainable benefits in the foreseeable future. The useful life of some of the flood mitigation meausres would be over a period of 10 to 20 years, while some improvements may even provide permanent flood mitigation. The potential effect on natural resources would require further assessment. The project will result in an increase in economic activity (both in retail and tourism) in the main commercial area in Boiceville. Current jobs will likely be secured because improved conditions will increase business and job retention in the area. New businesses may also be attracted to the area. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers. Local government may see savings in their expenditure because reduced flooding and improved access would result in more efficient emergency response efforts, reduction of vulnerability of public facilities and infrastructure, and lower reconstruction and rehabilitation costs following future storm events.

Created Wetland Pond (AKRF, Inc.)

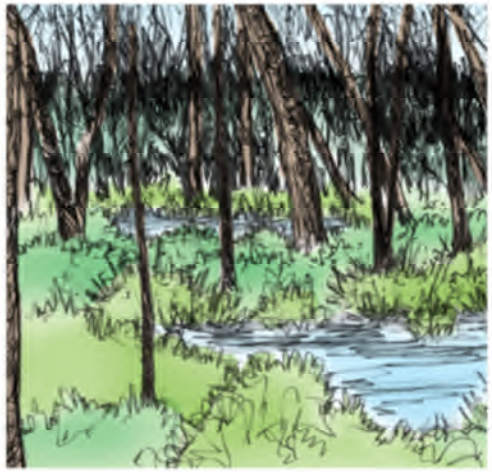
Co-Benefits of Project:

- Economic Benefits: Improvements would provide flood mitigation along Route 28 and would improve conditions in the Boiceville and West Shokan Central Business Districts. The project would mitigate downstream flooding effects in the Town, restoring and protecting natural resource assets. The project would align with the Regional Economic Development Council's goals and is also expected to have a positive effect on local tourism. In addition, non-structural solutions to watershed management, including stream bank and channel restoration are less costly over time than structural improvements, which require additional operations and maintenance costs as well as replacement capital expenditures.

- Environmental Benefits: Watershed management planning and hydrologic modeling are intended to examine the runoff and storm flow characteristics of a watershed in order to plan for future remedial actions (e.g. detention facilities, stormwater conveyances, modifications to bridge crossings) and to plan for future land development options through zoning, master planning, and other land use controls.

  Creating a baseline hydrologic model of a watershed can be a critical initial step to select the best remedial actions to mitigate flooding impacts and to benefit water quality. The project will provide recommendations for man-made and natural restoration projects, creating a sustainable floodplain management plan to be implemented in phases. The project is expected to have significant flood mitigation benefits, such as natural floodplain reclamation and creation of additional flood storage, redesign of bridges and obstructions to minimize stream bank erosion and clogging, headwater stream channel and bank stabilization, and the potential for creating new recreational amenities including river walks and parkland.

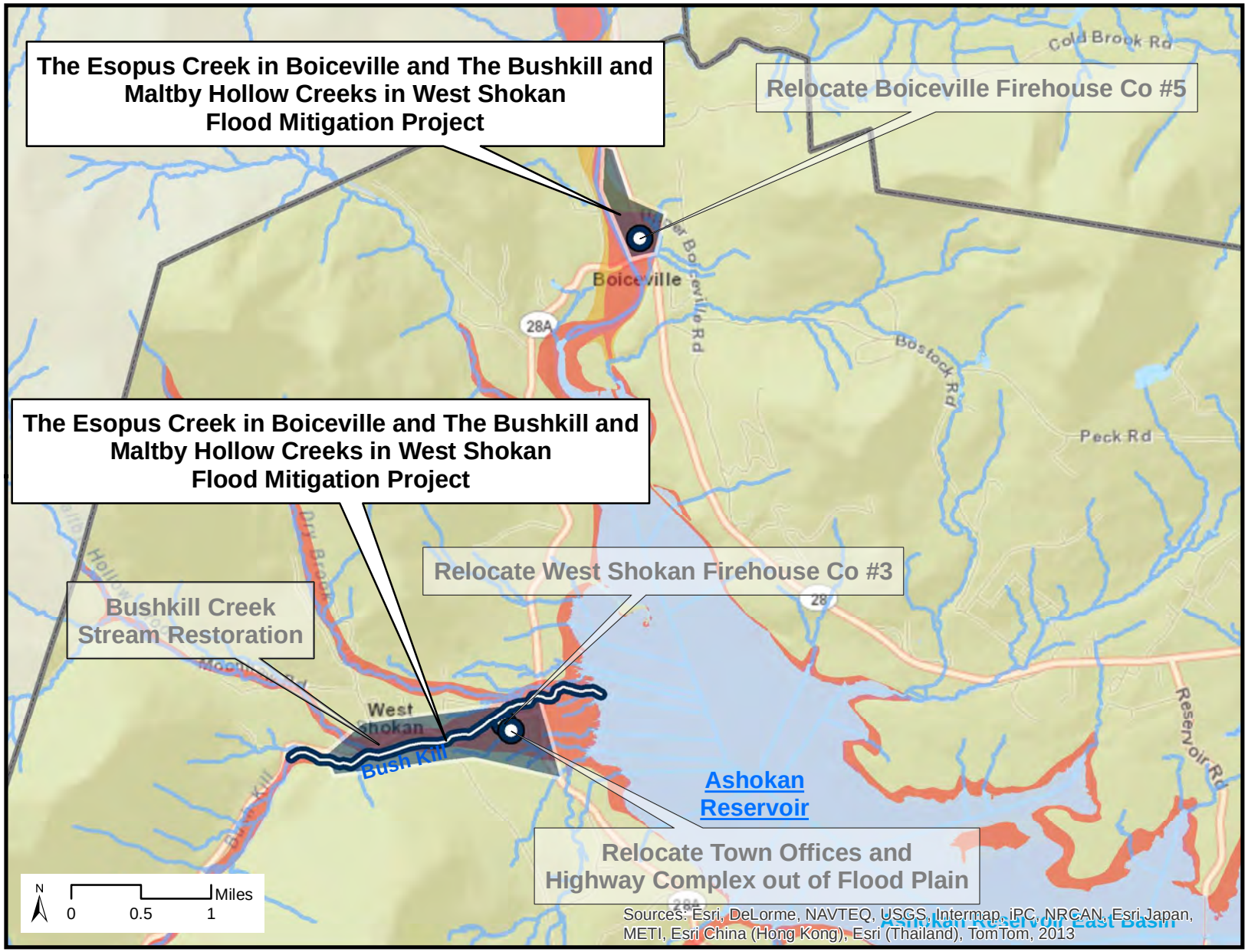
- Health and Social Service Benefits: Improvements to the watershed will minimize roadway flooding throughout the Town of Olive and potentially other communities in Ulster County thereby improving access by emergency service workers to various neighborhoods and access to health and social service facilities by multiple communities.



FLOODPLAIN HABITAT ENHANCEMENTS

(AKRF, Inc.)

Figure IV-7
Project Locations - Olive



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

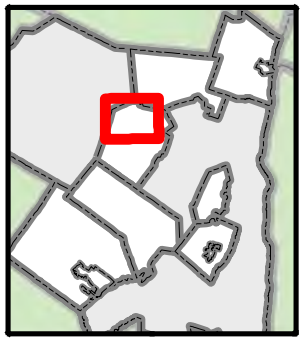
Data Sources

Municipal Boundaries: NYS

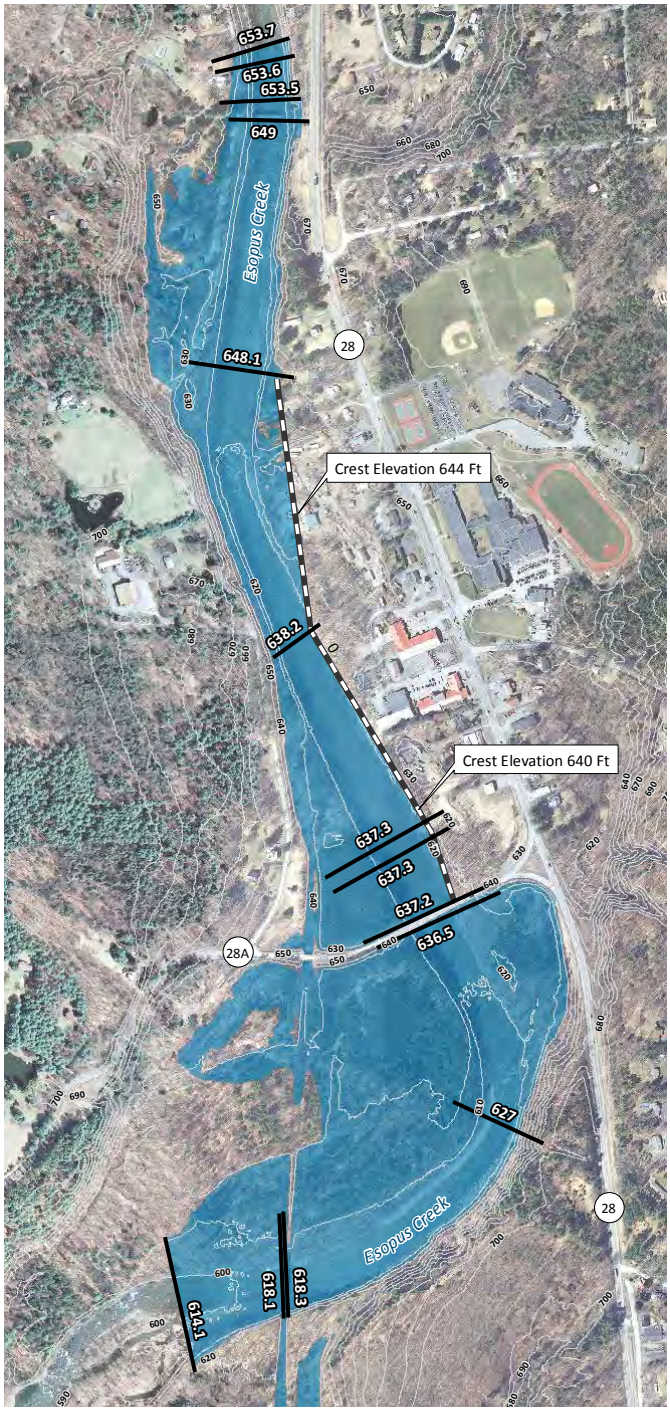
Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Figures IV-8 and Figure IV-9
Project Detail - Esopus Levee Flood Modeling



N

BFE Base Flood Elevation (1% Annual Chance Flood)

Effective HEC-2 Cross Section

Potential Levee

1% Annual Chance of Flood

0 250 500 750 1,000 Feet

Sources:
1984 Flood Insurance Study (HEC-2), U.S. Army Corps of Engineers

New York State 2 Meter DEM, West of Hudson 2009 Collection (NYSGIS Clearinghouse). NAVD 88.

Olive, NY

Figure IV-8 - Existing Condition
Figure IV-9 - Proposed Condition

Proposed Project

Town of Rochester

Alligerville Emergency Station

Project Description: Structural and roof repairs to the Alligerville Fire and Emergency Station on Creek Road so the station may be used as an emergency shelter. The Alligerville Emergency station sustained structural damage and damage to its roof during Superstorm Sandy.

Estimated Cost: $50,000

Anticipated Regulatory Requirements:

No regulatory review is expected.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Rochester

Anticipated Risk Reduction: Structural and roof repairs to Emergency Station will reduce risk to an emergency service provider facility by shoring up the facility and decreasing its vulnerability. In addition, the project would ensure uninterrupted provision of emergency services to the community.

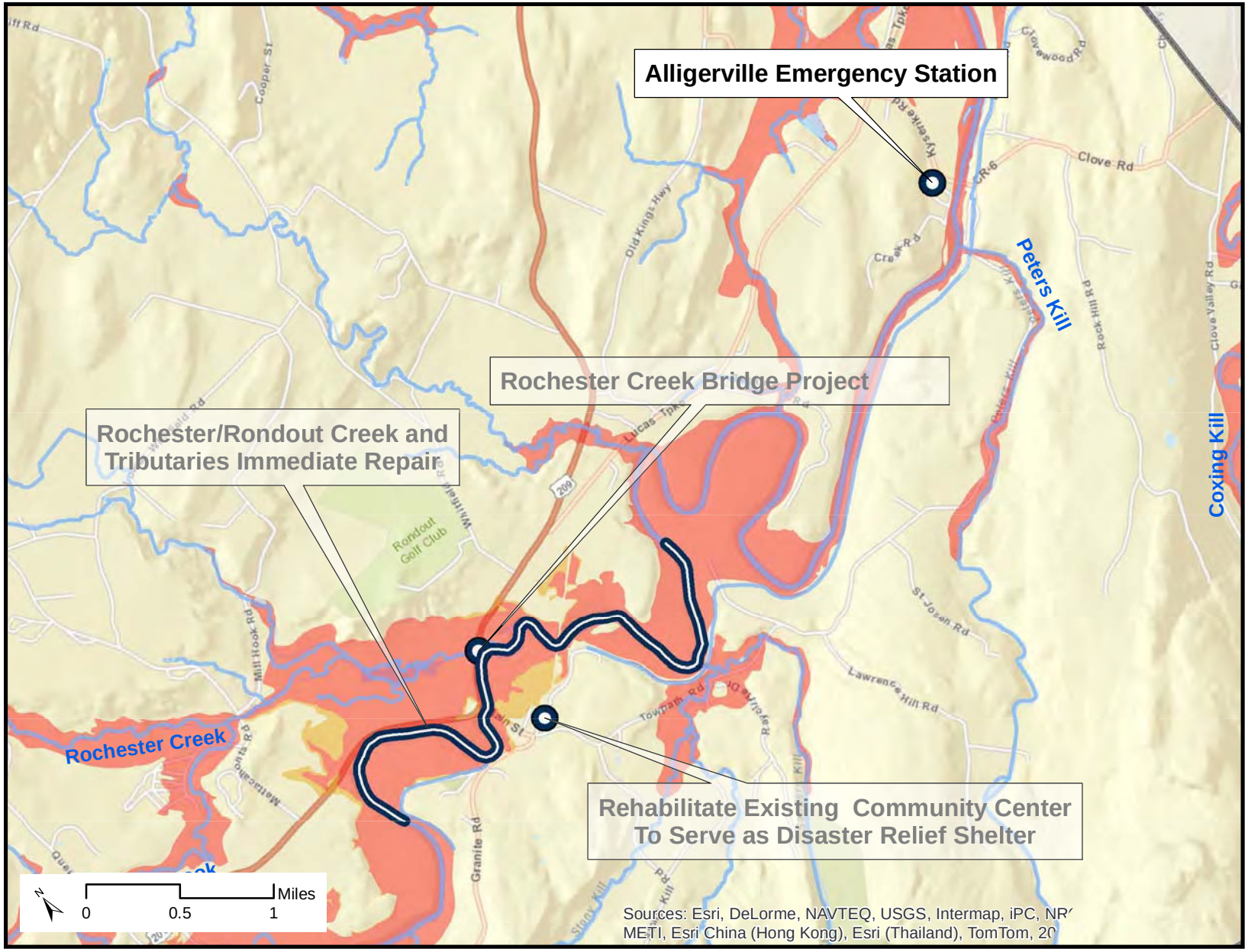
Cost Benefit Summary: This project would result in long-term benefits to the community through permanent improvements to the emergency station that are expected to have a useful life of 50+ years. Although no permanent jobs are likely to be created, the project is expected to result in a short-term increase in construction activities. Improvements to the Alligerville Emergency Station will help improve emergency response to the whole Town, increasing its resiliency and ability to recover more quickly. The project will allow further savings in local government expenditures because making use of an existing facility allows the Town to save money otherwise needed for the construction of a new disaster relief shelter and emergency station.

Co-Benefits of Project:

- Economic Benefits: The project would repair an existing, currently unusable facility to house an emergency response center that would coordinate community-wide emergency response efforts. The economic impact of providing emergency shelters during and post-disasters can be realized in several streams. First during the construction phase, economic benefit is realized in the form of local expenditures of goods, services, labor, materials and equipment. Second, provision of emergency shelters minimizes potential costs to municipal emergency service providers who may need to rescue residents who have not been able to seek shelter or where shelters are not accessible. When shelters are provided, emergency service personnel are able to allocate limited resources more efficiently. Third, community residents whose basic welfare needs are secured during storm events are able to focus their attention on community recovery- and getting back to work or businesses.

- Health and Social Service Benefits: Structural and roof repairs to the Alligerville Emergency Station will benefit the entire community by securing provision of fire and EMS services both to the Town of Rochester and adjacent communities, who participate in mutual aid agreements, and by providing an additional emergency shelter location. During and after storm events, the emergency shelters would provide basic health and social services including food, water, electricity, warmth, and communication services and facilities. When basic needs are met, residents can focus their attention of recovery and resiliency efforts.

Figure IV-10
Project Locations - Rochester



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

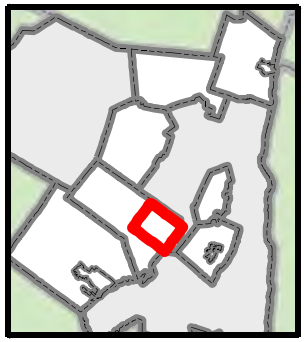
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Rochester

Rehabilitate Existing Community Center to Serve as Disaster Relief Shelter

Project Description: Upgrade and rehabilitate the existing community center for use as a shelter during and after storm events. Improvements would include ADA upgrades, insulation, showers, and a back up power source. Floodwaters from Hurricane Irene and Tropical Storm Lee damaged numerous properties and infrastructure forcing residents to evacuate their homes, and in some cases preventing their return for extended periods of time. Residents were left without access to basic services, and in some cases were temporarily without homes. Upgrading the existing community center to provide shelter during/after storm events would provide residents with a safe alternative.

Estimated Cost: $75,000

Anticipated Regulatory Requirements:

None

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Rochester

Anticipated Risk Reduction: The intent of this project is to rehabilitate the Rochester Community Center into a disaster relief shelter. The installation of solar power or another backup power source would reduce the vulnerability of the facility. The Community Center will serve socially vulnerable populations who will be able to benefit from a nearby disaster relief shelter.

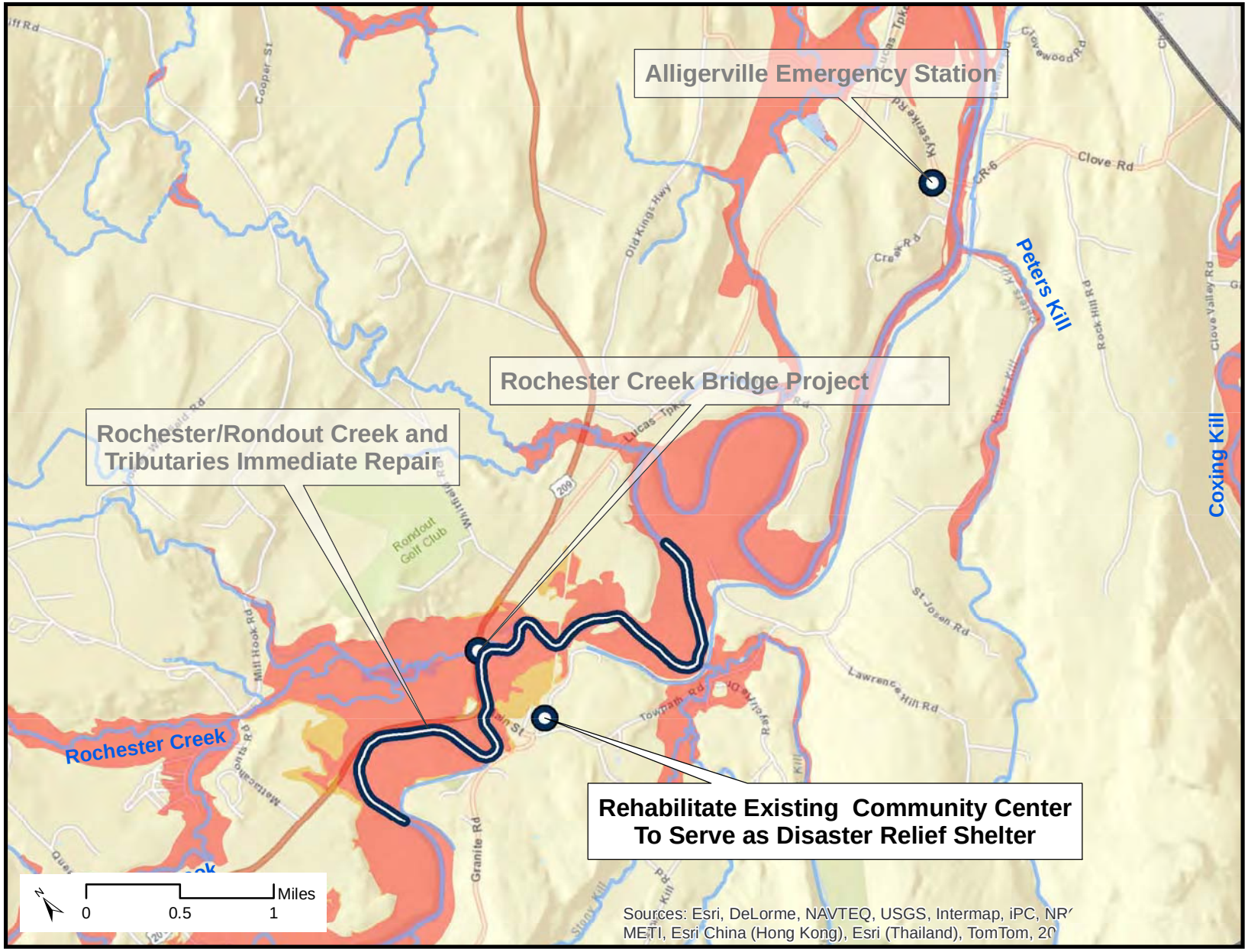
Cost Benefit Summary: Rehabilitating the existing community center to serve as a disaster relief shelter would result in permanent improvements to the existing facility and is expected to have a useful life of 50+ years. While this long-term project has the potential to generate opportunity costs, the costs are not expected to be significant if the majority of the facility can still be used as a community center. The project will allow further savings in local government expenditures because making use of an existing facility allows the Town to save money otherwise needed for the construction of a new disaster relief shelter.

Co-Benefits of Project:

- Economic Benefits: The project would upgrade a community facility to house an emergency response center that would coordinate the community-wide emergency response efforts. The economic impact of providing emergency shelters during and post-disasters can be realized in several streams. First during the construction phase, economic benefit is realized in the form of local expenditures of goods, services, labor, materials and equipment. Second, provision of emergency shelters minimizes potential costs to municipal emergency service providers who may need to rescue residents who have not been able to seek shelter or where shelters are not accessible. When shelters are provided, emergency service personnel are able to allocate limited resources more efficiently. Third, community residents whose basic welfare needs are secured during storm events are able to focus their attention on community recovery- and getting back to work or businesses.

- Health and Social Service Benefits: The entire community, residents of the Town of Rochester and potential neighboring communities would benefit from an emergency shelter, that is centrally located and will provide safe and secure facilities both during and after storm events. During and after storm events, the emergency shelters would provide basic health and social services including food, water, electricity, warmth, and communication services and facilities. When basic needs are met, residents can focus their attention of recovery and resiliency efforts.

Figure IV-10
Project Locations - Rochester



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

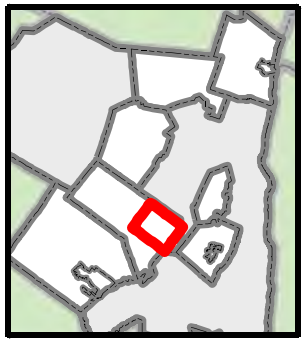
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Rochester

Rochester/Rondout Creek and Tributaries Immediate Repair

Project Description: Repair the riparian buffer, and remove debris deposited by recent storms (downed trees, tires etc.) from the Rochester/Rondout Creek and its tributaries, including at the Route 209 & Rochester Creek bridge abutments. The force of the water flows in these waterways during Hurricane Irene and Tropical Storm Lee resulted in significant accumulation of debris constricting flow and causing flooding of adjacent properties. Removing debris will decrease flooding during and after future events protecting the riverbanks and adjacent development. Collection pits, sumps and drains will also be cleared. Repairs will restore the carrying capacity and minimize adjacent flooding caused by the current stream constrictions. Funding will also be allocated for detour and emergency signage and barriers and for riparian repair. Governor Andrew M. Cuomo announced in Janurary 2104 that the bridge that the bridge that carries US Rt. 209 over the Rochester Creek will be replaced and funded by New York State.

Estimated Cost: $800,000

Anticipated Regulatory Requirements:
This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Rochester

Anticipated Risk Reduction: Excessive sediment and debris in stream beds result in constrictions and reduced capacity of waterways. This project may increase the channel's ability to handle waterflow, therefore reducing hazard exposure of nearby assets. Many assets in the Town of Rochester such as the Town Hall (which serves socially vulnerable populations) are located near waterways and will be less exposed to flooding. Initial evaluation of potential debris removal, based on a review of the existing Flood Insurance Study and Flood Insurance Rate Maps (FIRM), indicate that debris removal may be most effective for higher frequency, lower intensity floods but could have limited impact for larger floods. The components of the project would be determined through further analysis.

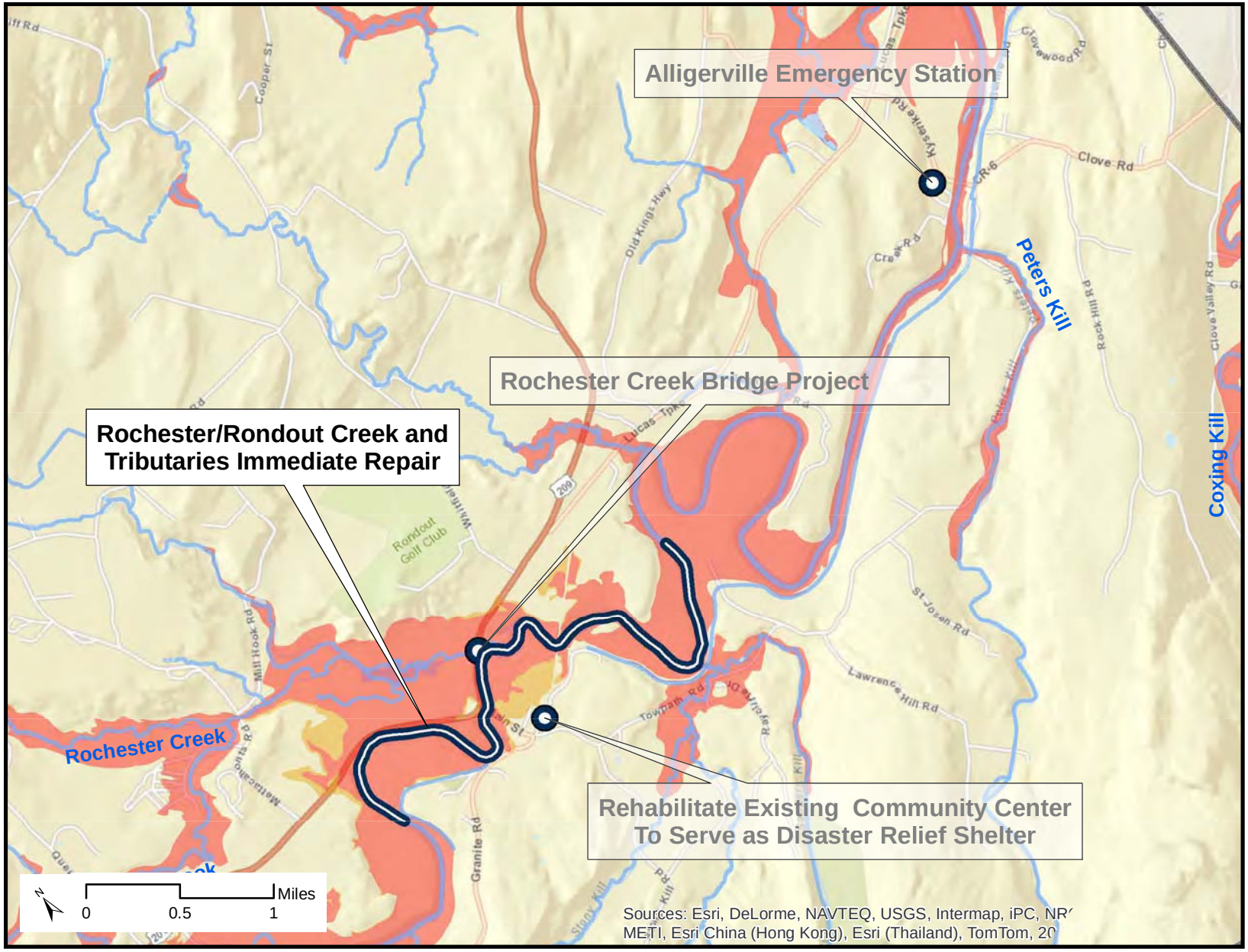
Cost Benefit Summary: Immediate repair to the Rochester and Rondout Creeks and tributaries would restore flow and capacity of the waterways, thereby reducing the risk of flooding and mitigating stormwater effects throughout the next 10 to 20 years. While no jobs or direct economic activity in the retail, industrial or construction sectors would be created, this project would support the Mid-Hudson Regional Economic Development Council's goal of protecting natural resources and assets that are major drivers of tourism in the region. Reduced flooding throughout the community and downstream of the affected waterways would result in more efficient emergency response, increasing the Town's resiliency and ability to recover more quickly from storm events.

Co-Benefits of Project:

- Economic Benefits: The project would mitigate downstream flooding effects in the Town. Because the project would restore and protect natural resource assets, it is expected to have a positive effect on local tourism.
- Environmental Benefits: Accumulation of debris, which can increase constructions at bridges and culverts generally, has detrimental effects on upstream flooding. Removal of this debris is intended to increase the flow capacity of the waterway, culvert or other conveyance. Stream restoration involves the modification of a stressed/disturbed stream via morphological changes to its bed and banks, in order to make its flow, flooding behavior, and biological components more stable and sustainable. The Rondout and Rochester Creek and its tributaries have had changes to their watersheds due to development and storm damage, and therefore generally suffer from increased rates of erosion, loss of adjacent wetlands and in-stream flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Such highly "stressed" waterways which suffer from these problems typically have poor quality and biological diversity and therefore would benefit significantly from stream restoration.
- Health and Social Service Benefits: The project does not specifically secure a health and social service facility. However, the entire community and adjacent municipalities will benefit from reduced roadway flooding and uninterrupted access to and along Route 209, a regional through route connecting various communities to vital health social service facilities and providers and significantly improving access for emergency service providers.

Stream Channel Relocation (AKRF, Inc.)

Figure IV-10
Project Locations - Rochester



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

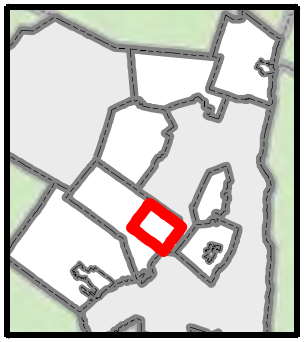
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Fann's Plaza Redevelopment

Project Description: Conduct a master planning study for Fann's Plaza with the goal of providing a mix of uses and senior housing. Improving the vitality of this area is important to supporting the economic base of the Town. Development and stormwater management systems at the proposed plaza would be required to minimize impervious surfaces and implement green infrastructure improvements to ensure its long-term viability and sustainability.

Estimated Cost: $150,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Rosendale

Anticipated Risk Reduction: It is anticipated that implementation of redevelopment recommendations from the Master Plan, and ensuing redevelopment of the Plaza will reduce risk to the asset from inundation, decrease it's vulnerability by incorporating green infrastructure and create a vibrant mixed use development, supporting the local economy and the communities' long term financial resiliency.

Cost Benefit Summary: Implementation of this project would ensure the long-term use of the Fann's Plaza area and ensure the viability of stormwater management improvements. The project's potential effect on natural resources resulting from improved drainage would require an assessment. Although redevelopment may temporarily displace some existing businesses, it could also allow for denser development that would add permanent jobs. Economic activity is likely to increase, because redevelopment of the plaza will result in construction activities and the potential addition of senior residences could spur health care related activities at the plaza. Potential local government savings could result from more efficient emergency response to retail and residential areas along Route 32 that would be otherwise cut off during flooding events and would result in lower construction and rehabilitation costs following future storm events. Maintaining retail in its current location will also continue to generate taxes for the Town. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

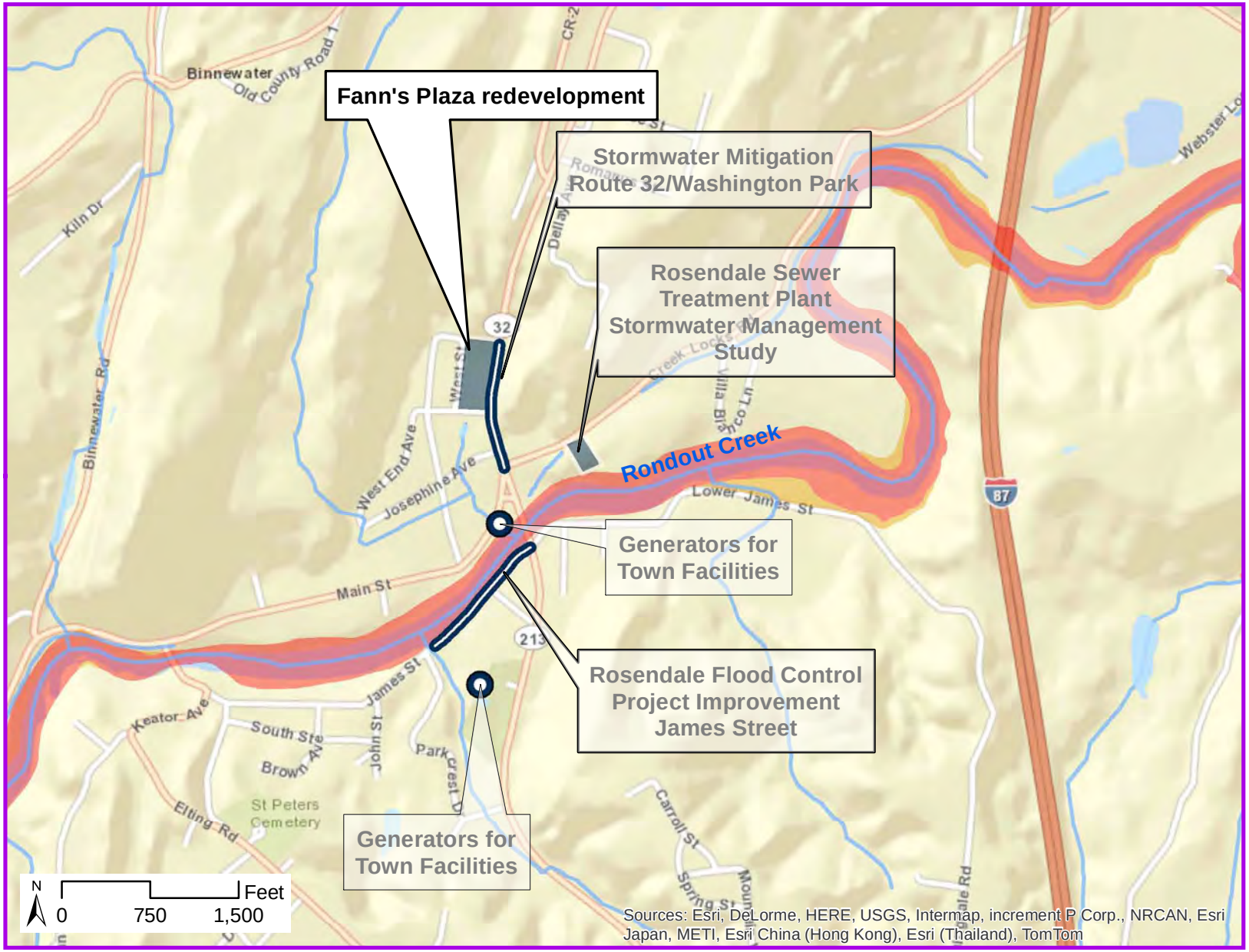
Co-Benefits of Project:

- Economic Benefits: The entire community would benefit from a vibrant, mixed use development on this currently underutilized parcel. With the implementation of resiliency measures and sustainable infrastructure improvements, the development would be better able to recover from future extreme weather events. Short term economic benefits would result from labor, service, equipment and materials expenditures. Longer term benefits include residential property tax revenue, expansion of the commercial tax base, sales tax revenue and the potential for additional job creation.

- Health and Social Service Benefits: Depending on the types of projects and improvements envisioned, the project may improve access to nearby health and social services in the future.

A before and after rendering of green infrastructure being installed in a pedestrian plaza. (AKRF, Inc.)

Figure IV-11-a
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

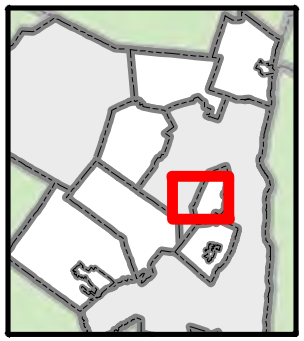
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Flood Mitigation and Protection for Key Intersections in Town

Project Description: Address widespread roadway flooding, which occurred during Hurricane Irene and Tropical Storm Lee at several key intersections including: Route 32 at Rifton Bridge (flooding closed Rte 32 and all cut off access and egress to/from the south side of Town); 4th Binnewater Lane & Binnewater Road (road closures isolated residents from emergency services); and Hickory Bush Road (road closures isolated residents from emergency services).Improvements at these intersections would eliminate widespread road closures maintaining roadway access for residents and emergency service providers.

Estimated Cost: $1,045,000

Anticipated Regulatory Requirements:

This project may require an Article 15 and/or Article 24 permit from the NYS Department of Environmental Conservation. The NYS Department of Transportation (NYSDOT) will review any impacts to state roads.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Rosendale, NYSDOT, and Ulster County

Anticipated Risk Reduction: The risk reduction benefits include a substantial decrease in safety risks for vehicles during storm events by minimizing road inundation. Implementation of the improvement measures would reduce risk to adjacent residents of isolation due to road inundation, by ensuring that key intersections remain open providing uninterrupted access during and after storm events.

Cost Benefit Summary: Implementation of this project would result in long-term sustainable benefits by reducing the risk of flooding of the roadways in the target area for the foreseeable future. The project's impacts on natural resources would require further assessment. Although no permanent jobs are likely to be created, the project is expected to result in a short-term increase in construction activities. In addition, the reduction in flooding on roadways would result in more efficient emergency response to residential areas that would be otherwise cutoff during flooding events, increasing the Town's resiliency and ability to recover more quickly. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

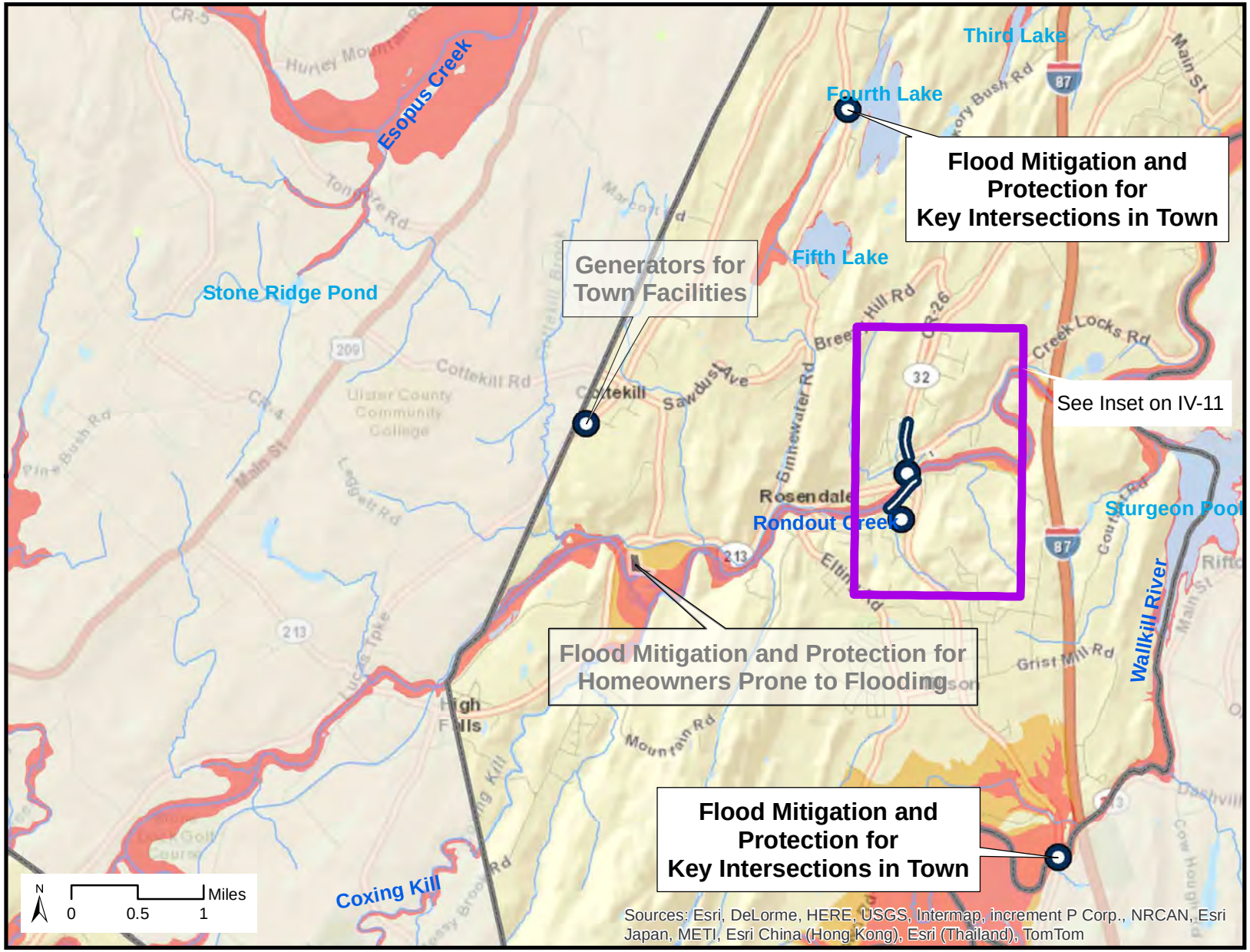
Co-Benefits of Project:

- Economic Benefits: The project would mitigate flooding risk at several locations throughout the Town, and will likely improve the Town's emergency response and recovery efforts. Flood mitigation to key access route for local community and the region also provides long-term protection of Town assets including homes and businesses, which is critical to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: Roadway improvement projects require examination of existing and future stream storm flows and floodway constriction characteristics so that the chosen design can withstand future storm events without damage. Improving the flow capacity of a waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property.

- Health and Social Service Benefits: The entire community will benefit from improved drainage and the resulting reduction in roadway flooding at key Town intersections, which provide access to vital health social service facilities and providers.

Figure IV-11-b
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

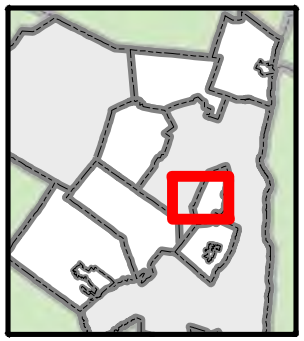
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Flood Mitigation and Protection to Homeowners Prone to Flooding

Project Description: Scoping and implementation of measures to address chronic residential flooding that was particularly acute and destructive during Hurricane Irene and Topical Storm Lee. Implementation measures could include: elevation and possible relocation to Creekside Lane (7-10 houses); Riverview Terrace; Island View Adult Home. Other considerations would include improvements along Route 213 west from Route 32 to the Rosendale Town Line and along Creeklocks Road.

Estimated Cost: $45,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: 6-12 Months

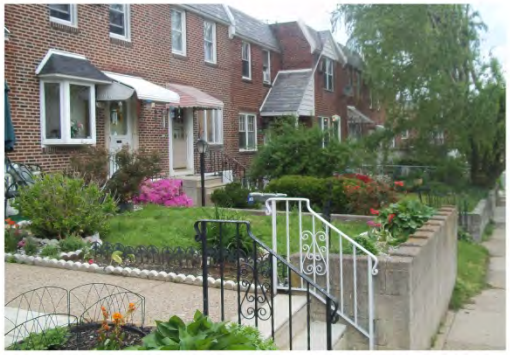
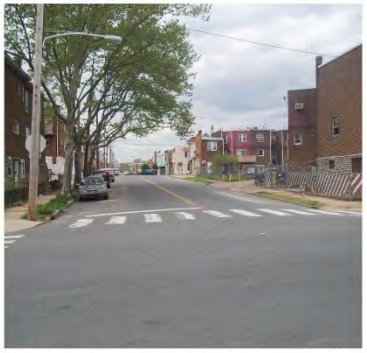
Entity with Jurisdiction: Town of Rosendale

Anticipated Risk Reduction: Improvements to increase flood protection for existing homes decreases vulnerability and reduces risk to the individual homeowners from inundation and damage during storm events and also increases resilience of the entire community by ensuring the protection of these assets and the safety of the residents. Protecting the Town's housing stock minimizes vulnerability of repeated structural damage, and property loss thereby supporting overall economic recovery following acute storm events.

Cost Benefit Summary: Implementation of this project would result in long-term sustainable benefits by reducing the risk of flooding of residential neighborhoods in the foreseeable future. The project's impacts on natural resources would require further assessment. If homes are relocated, an opportunity cost may exist because the Town would forgo the opportunity of collecting property taxes for houses in the flooded areas. Although no permanent jobs are likely to be created, relocation and/or elevation of homes in the Town is expected to result in an increase in construction activities. In addition, the reduction in flooding on roadways would result in more efficient emergency response to residential areas that would be otherwise cutoff during flooding events, increasing the Town's resiliency and ability to recover more quickly. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

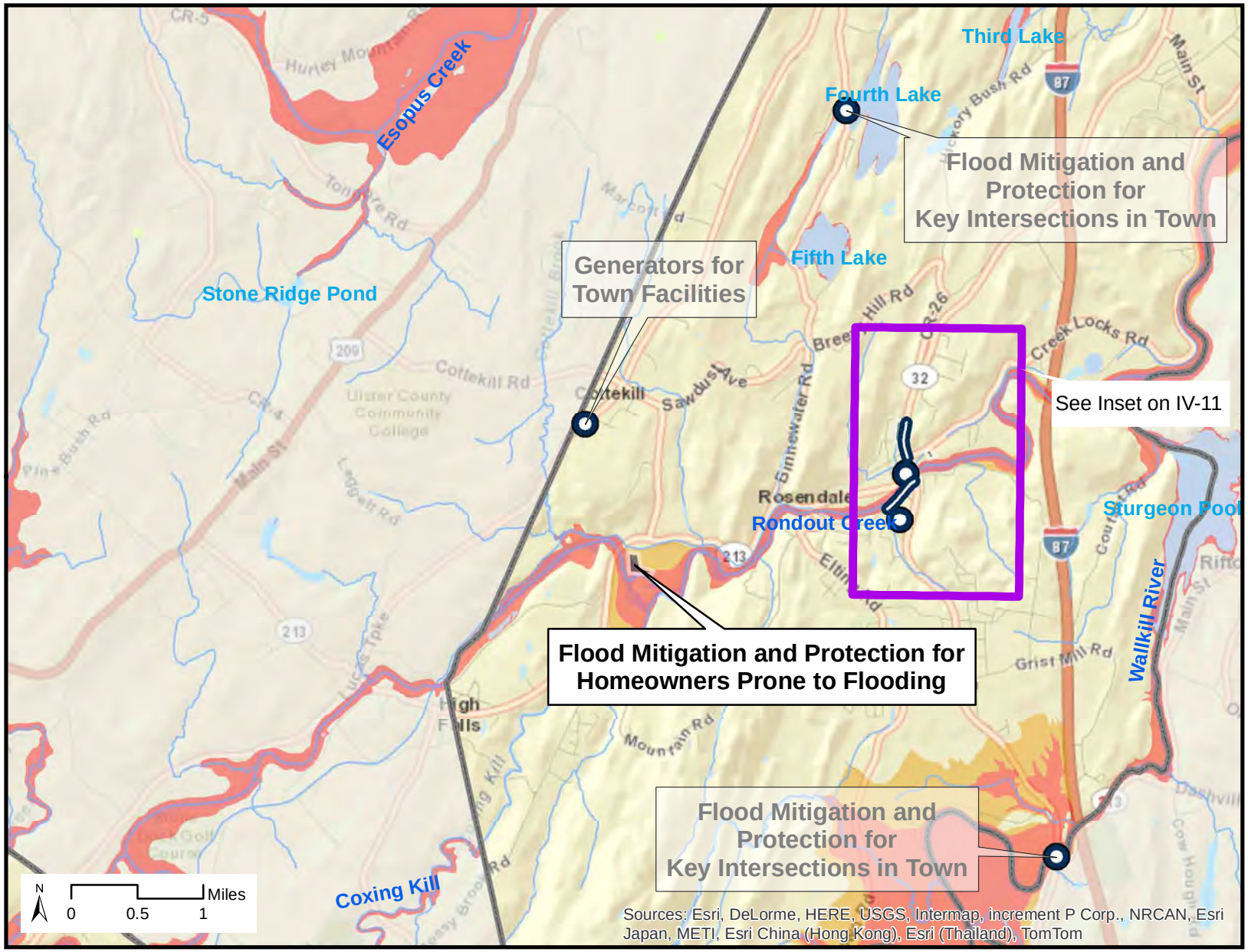
Co-Benefits of Project:

- Economic Benefits: Implementing measures to address chronic residential flooding provides permanent protection of Town assets, which is key to the communities' economic health by ensuring retention of residents and protection of the housing stock as a source of property tax revenue.
- Health and Social Service Benefits: This project would ultimately benefit targeted residential areas, but would not result in a specific Town-wide health and social service benefit.

GREEN STORMWATER INFRASTRUCTURE GATEWAYS *(AKRF, Inc.)*

Figure IV-11-b
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

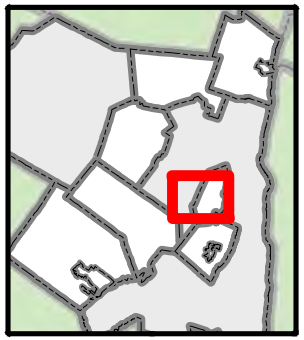
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Generators for Town Facilities

Project Description: Purchase and fixed-installation of backup power generators to keep three critical Town facilities operational during storms. These facilities are: the flood control project, Rosendale Town Hall, and the pool house, which is used for showers during power outages. Power outages during Hurricane Irene and Tropical Storm Lee led to loss of service at critical Town facilities. Provision of a permanent back-up power supply will support these critical facilities during and after acute storm events.

Estimated Cost: $30,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: Three Months

Entity with Jurisdiction: Town of Rosendale

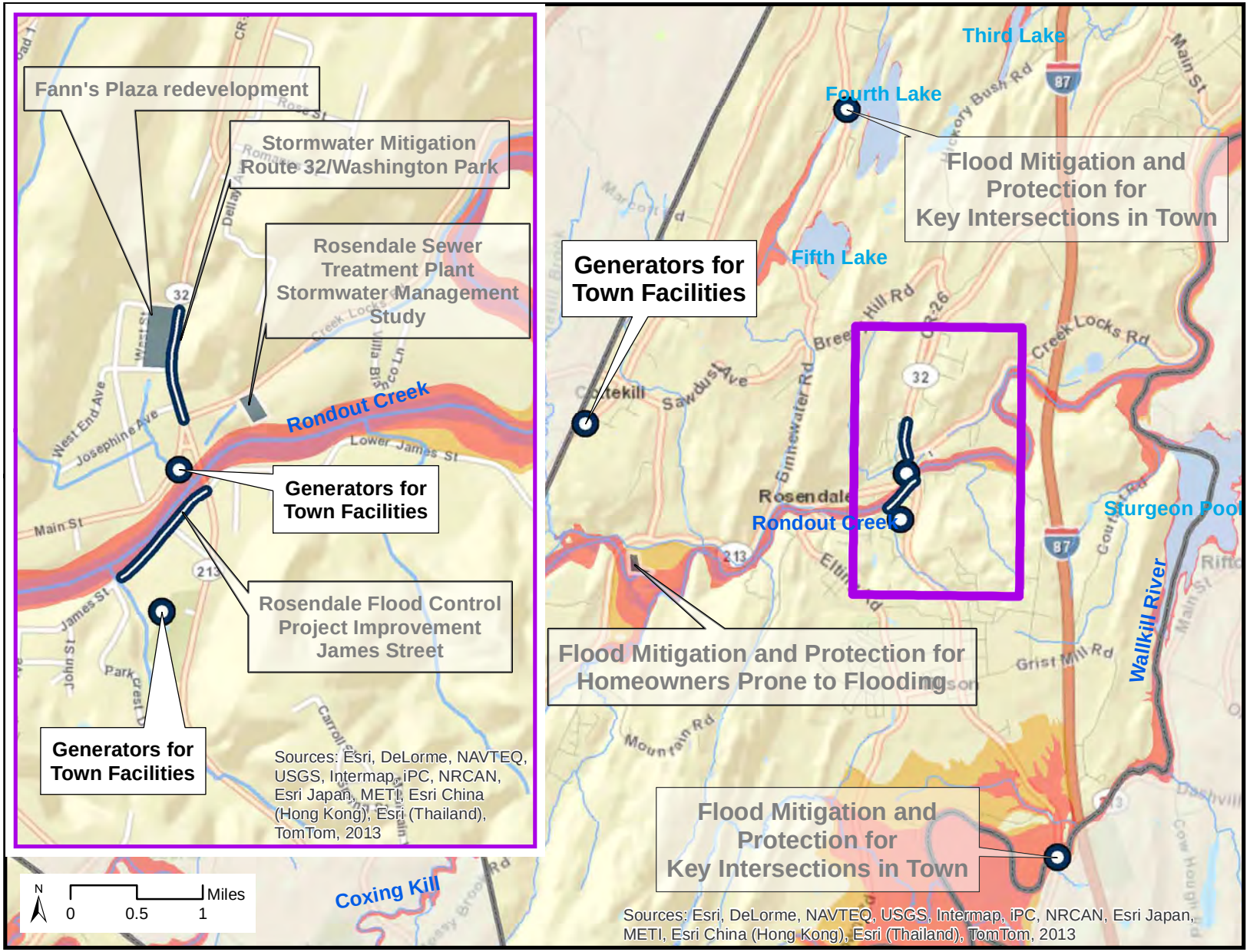
Anticipated Risk Reduction: Purchase and fixed installation of back-up power generators reduces the vulnerability of any assets that the generators may serve, as it improves the facility's ability to function by ensuring continued operation of essential utilities and services during a storm or flood event and allows the facilities to function as emergency shelters and/or command centers.

Cost Benefit Summary: The provision of back-up power generation would result in sustainable benefits and increase the resiliency of three Town facilities for the foreseeable future. Generators are expected to have a useful life of 10 to 20 years. Their use would not generate any permanent jobs, however, back-up generators allow uninterrupted operation of facilities that are critical in the Town's emergency response process. Because back-up generators will help avoid the disruption of Town services, the Town will recover more quickly and potentially experience less damage, resulting in savings in local government expenditures. The purchase and fixed installation of power generators is a low cost measure, where the benefit significantly outweighs the costs of not having this essential power source during an emergency.

Co-Benefits of Project:

- Economic Benefits: The project would increase resiliency at three facilities critical for the Town's emergency and recovery efforts. This low-cost project would greatly increase the Town's preparedness for future events. In addition, the project would strengthen emergency response capabilities by supporting the resiliency of the Town to meet the needs of its residents.
- Health and Social Service Benefits: The entire community would benefit from the fixed installation of power generators at key Town facilities, including the pool house to ensure availability of clean water for showering during and after acute storm events.

Figure IV-11
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

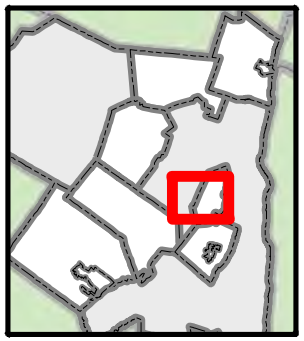
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Rosendale Flood Control Project Improvement

Project Description: Install flood control measures on the south side of the Rondout Creek along James Street from Rte. 32 toward the Keator Avenue Bridge, focusing on the lower portion of James Street, which gets washed out during high water events and collapsed during Hurricane Irene and Tropical Storm Lee. Improved flood control measures would prevent future roadway compromise or failure.

Estimated Cost: $600,000

Anticipated Regulatory Requirements:

This project may require consultation with the NYS Department of Environmental Conservation.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Rosendale

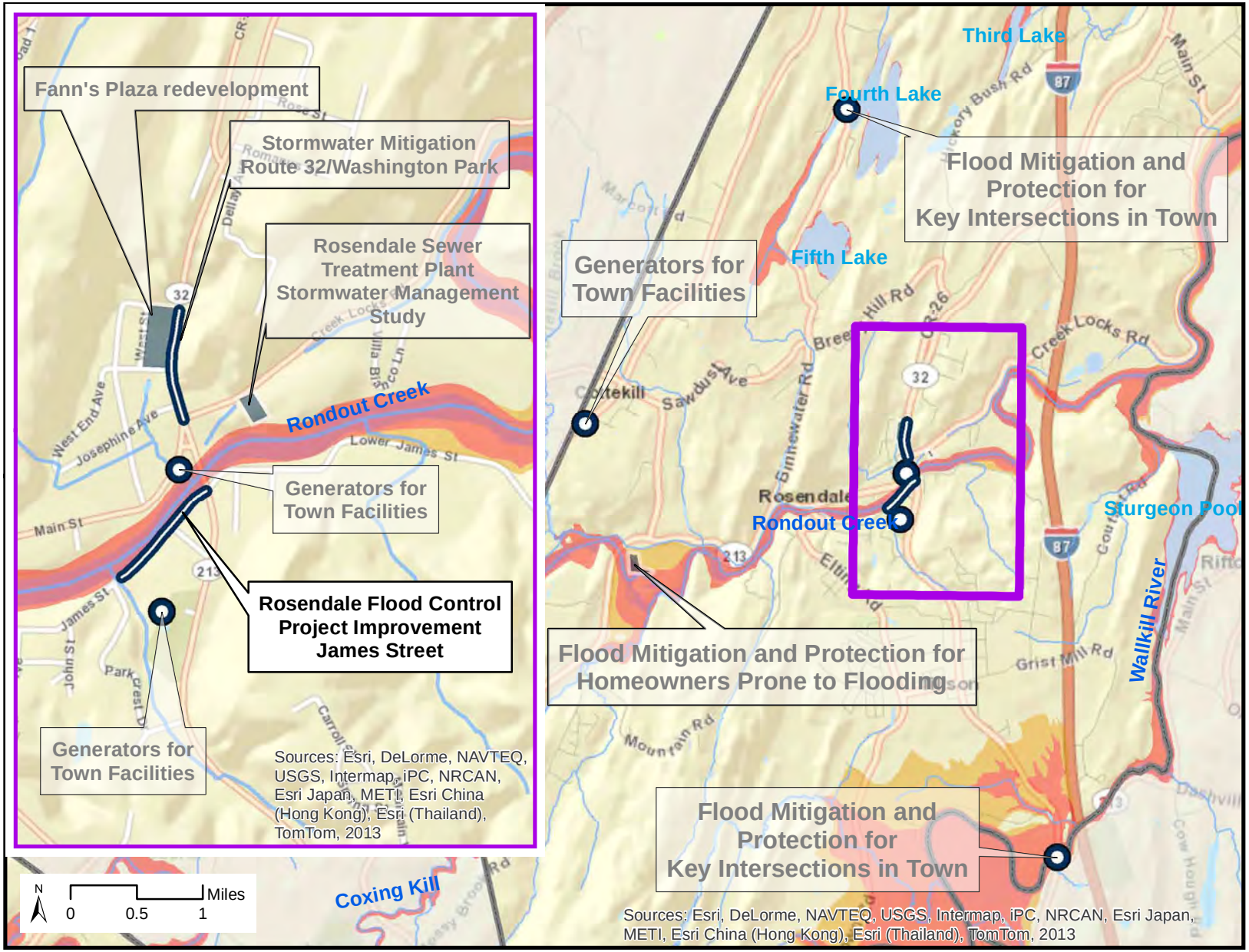
Anticipated Risk Reduction: The risk reduction benefits include a substantial decrease in in safety risks for vehicles during storm events by minimizing road inundation. Implementation of the improvement measures would reduce risk of isolation to adjacent residencesdue to road inundation, by ensuring that key intersections remain open providing uninterrupted access during and after storm events.

Cost Benefit Summary: Implementation of this project would result in long-term sustainable benefits by reducing the risk of flooding of the roadways in the target area for the foreseeable future. The project's impacts on natural resources would require further assessment. Although no permanent jobs are likely to be created, the project is expected to result in a short-term increase in construction activities. In addition, the reduction in flooding on roadways would result in more efficient emergency response to residential areas that would be otherwise cutoff during flooding events, increasing the Town's resiliency and ability to recover more quickly. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

Co-Benefits of Project:

- Economic Benefits: The project would mitigate flooding risk at James Street and Rte 32, which are likely to improve the Town's emergency response and recovery efforts.
- Environmental Benefits: Installation of additional flood control measures along key roadways requires examination of existing and future storm flows and floodway constriction characteristics in adjacent waterways so that the chosen design can withstand future storm events without damage. Improving the flow capacity of a waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property.
- Health and Social Service Benefits: The entire community will benefit from flood control measures and the protection of Town roads from inundation and collapse during acute storm events by providing continued access for EMS providers and to health and social service facilities.

Figure IV-11
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

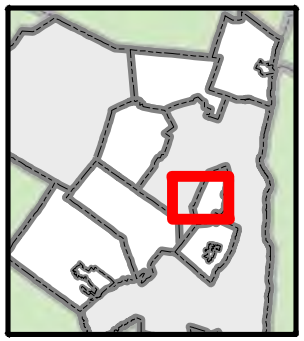
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Rosendale Sewer Treatment Plant Stormwater Management Study

Project Description: Scoping and implementation of protection measures for the vulnerable Rosendale Sewer Treatment Plant, which flooded in Hurricane Irene and Tropical Storm Lee. The Sewer Treatment Plant failed during the storm events because it was overwhelmed without sufficient capacity to accommodate the demand from stormwater inundation and Creek flooding. Sewer Treatment Plant Hardening and upgrades will prevent failure during future storm events.

Estimated Cost: $500,000

Anticipated Regulatory Requirements:

NYS Department of Environmental Conservation and NYS Department of Health review of improvements are likely.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Rosendale

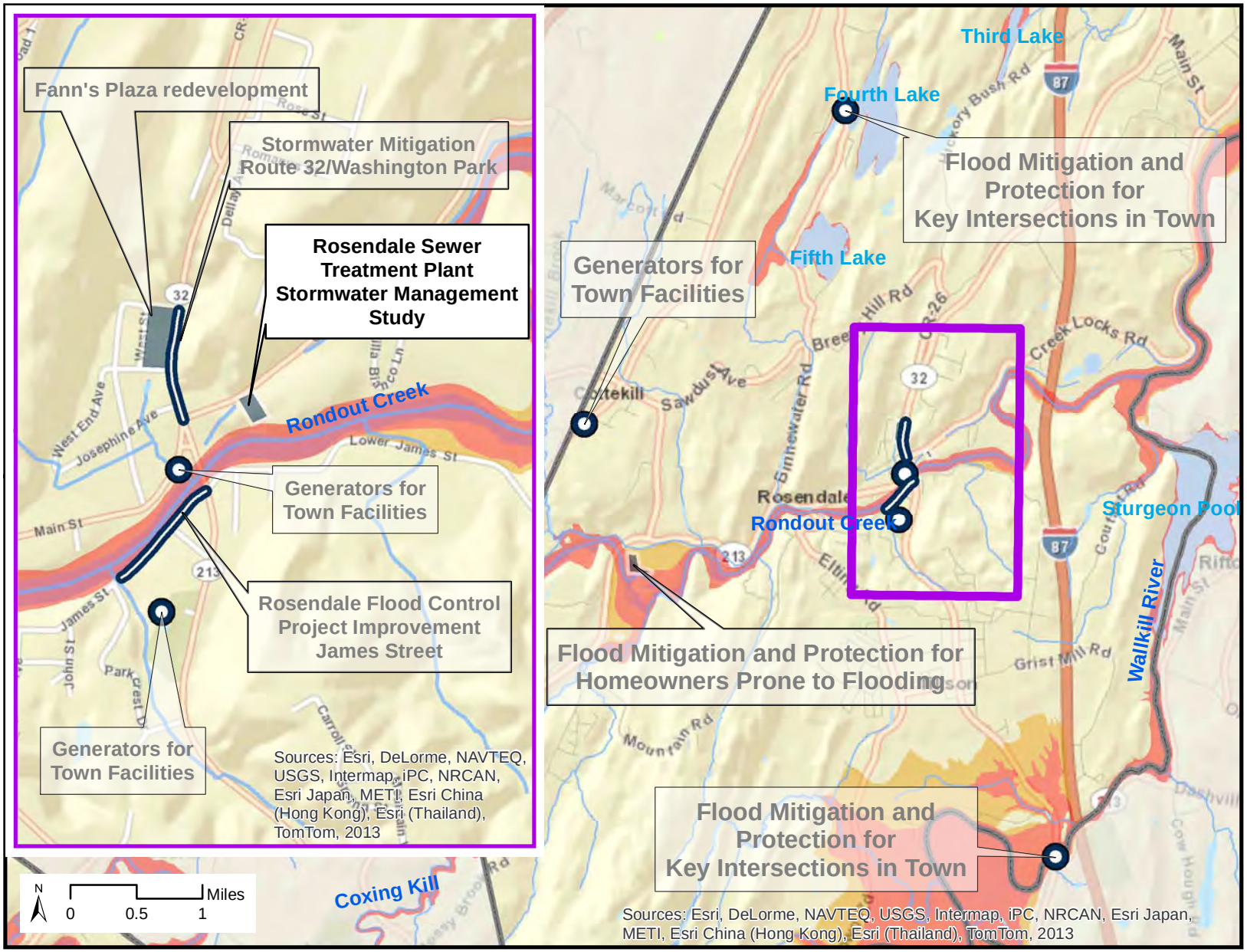
Anticipated Risk Reduction: The risk reduction benefits associated with this project include continuous provision of waste water treatment, an essential service during disasters, reduced vulnerability of residential neighborhoods to contamination of their water supply, and a reduction of risk of additional damage and future repair/maintenance to municipal systems and facilities.

Cost Benefit Summary: Implementation of this project would create long-term benefits by permanently mitigating stormwater inundation and flooding. Although no permanent jobs will be added, economic activity is likely to increase because mitigation measures will result in construction activity at the sewer treatment plant. In addition, mitigation measures are likely to result in a capacity increase and would limit the Town's exposure during a stormwater event, resulting in a saving in local government expenditure. This project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

Co-Benefits of Project:

- Economic Benefits: This long-term project would help to mitigate flooding issues throughout the Town. It would support the Mid-Hudson Valley economic development goal of promoting infrastructure investments and improve the Town's emergency and disaster recovery efforts. Because of its town-wide effect, the project would assist several vulnerable population segments.
- Environmental Benefits: This project will have environmental benefits by protecting the waste water treatment plant from inundation and preventing degradation. The installation of flood proofing measures at the waste water treatment plant, including installation of backflow valves, and repair of existing sanitary sewer lines, would reduce or eliminate the unwanted portion of incoming flows entering broken pipes from runoff or from combined storm/sanitary lines. Eliminating these flows frees up existing sewage treatment plant capacity, minimizes releases of poorly treated wastewater, and saves costly treatment plant upgrades, allowing treatment facilities to be devoted solely to wastewater treatment.
- Health and Social Service Benefits: Hardening the Sewer Treatment Plan would have indirect benefits to the entire community by protecting the treatment of the communities wastewater system.

Figure IV-11
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

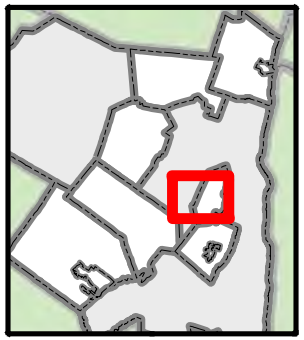
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Rosendale

Stormwater Mitigation, Route 32/Washington Park

Project Description: Improve drainage along Route 32 at Fann's Plaza and Washington Park to address storm water flooding. Roadway flooding and road closures prevent through access and obstructs access to the mobile home park, during and after acute storm events. Drainage improvements will minimize localized flooding during future storm events.

Estimated Cost: $1,137,000

Anticipated Regulatory Requirements:
This project may require consultation with the US Army Corpos of Engineers and the NYS Department of Environmental Conservation regarding potential impacts to the Flood Control Project. A NYS Department of Transportation highway work permit will also be required.

Anticipated Timeframe: One Year

Entity with Jurisdiction:
Town of Rosendale, NYSDOT

Anticipated Risk Reduction: The proposed improvements to the stormwater drainage system in the vicinity of the asset would reduce the exposure of the asset to flooding.

Cost Benefit Summary: Implementation of this project would permanently mitigate flooding issues along Route 32. The potential effect on natural resources resulting from improved drainage systems would require an assessment but the improvements would create long-term benefits by providing permanent flood mitigation. Approximately 30 to 50 permanent jobs* would be secured from implementation of this project beause continued flooding may prevent stores from operating in the current location. Once flooding conditions are improved, stores may be inclined to add additional retail space thereby increasing economic activity and possibly adding permanent jobs. Improved drainage conditions in the mobile home park may also allow for the accommodation of more mobile homes. Potential local government savings could result from more efficient emergency response to retail and residential areas that would be otherwise cut off during flooding events and would result in lower construction and rehabilitation costs following future storm events. Maintaining retail in its current location will also continue to generate taxes for the Town. Infrastructure investments resulting from this project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

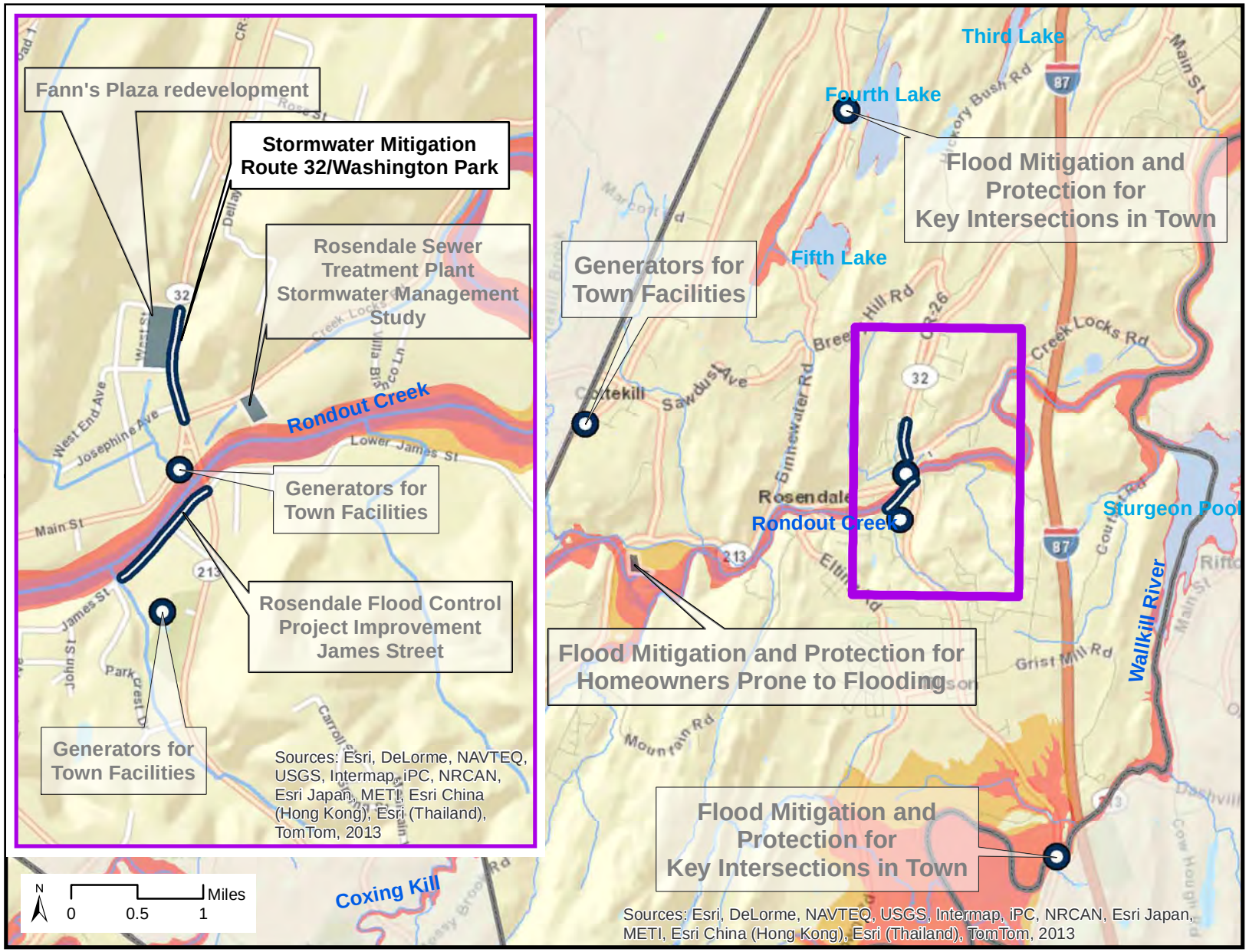
Co-Benefits of Project:

- Economic Benefits: The project would mitigate long-standing flooding issues at Fann's Plaza along Rte 32. Businesses on the Fann's Plaza site are a significant employment generator in the Town and the project would likely help to retain business and employees. Mitigating flooding issues may even result in additional business locating to the area and further add to municipal taxes generated on the site. Mitigation measures at the site will also address flooding issues in neighboring mobile home community.
- Environmental Benefits: Evaluating the stormwater management system, including runoff and storm flow characteristics of a watershed allows proper planning for future remedial actions (e.g. detention facilities, stormwater conveyances, modifications to bridge crossings), and for future land development options through zoning, master planning, and other land use controls. The project will identify various drainage improvement measures with significant flood mitigation benefits, such as natural floodplain reclamation, and creation of additional flood storage.

Health and Social Service Benefits: The Town of Rosendale and adjacent communities will benefit from roadway drainage improvements along Route 32, by minimizing flooding along this essential roadway connecting residents to emergency service and health and social service providers. In addition, this project would benefit the vulnerable population at the mobile home park by improving access to the park for Emergency Medical Service workers and for park residents to access health, social and emergency services.

A before and after rendering of green infrastructure being installed in a pedestrian plaza. (AKRF, Inc.)

Figure IV-11
Project Locations - Rosendale



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

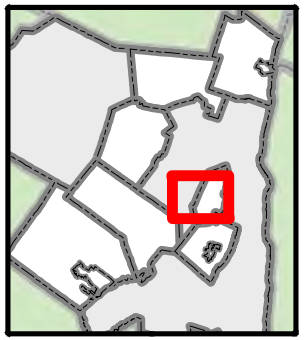
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Bridge Abutment Replacement

Project Description: Replace the abutment and bridge deck at Drummond Falls Road East, which were damaged during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee and are now at heightened risk of failure. This project would augment the capacity of the storm sewer, hence preventing similar flooding in future events.

Estimated Cost: $407,200

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Saugerties

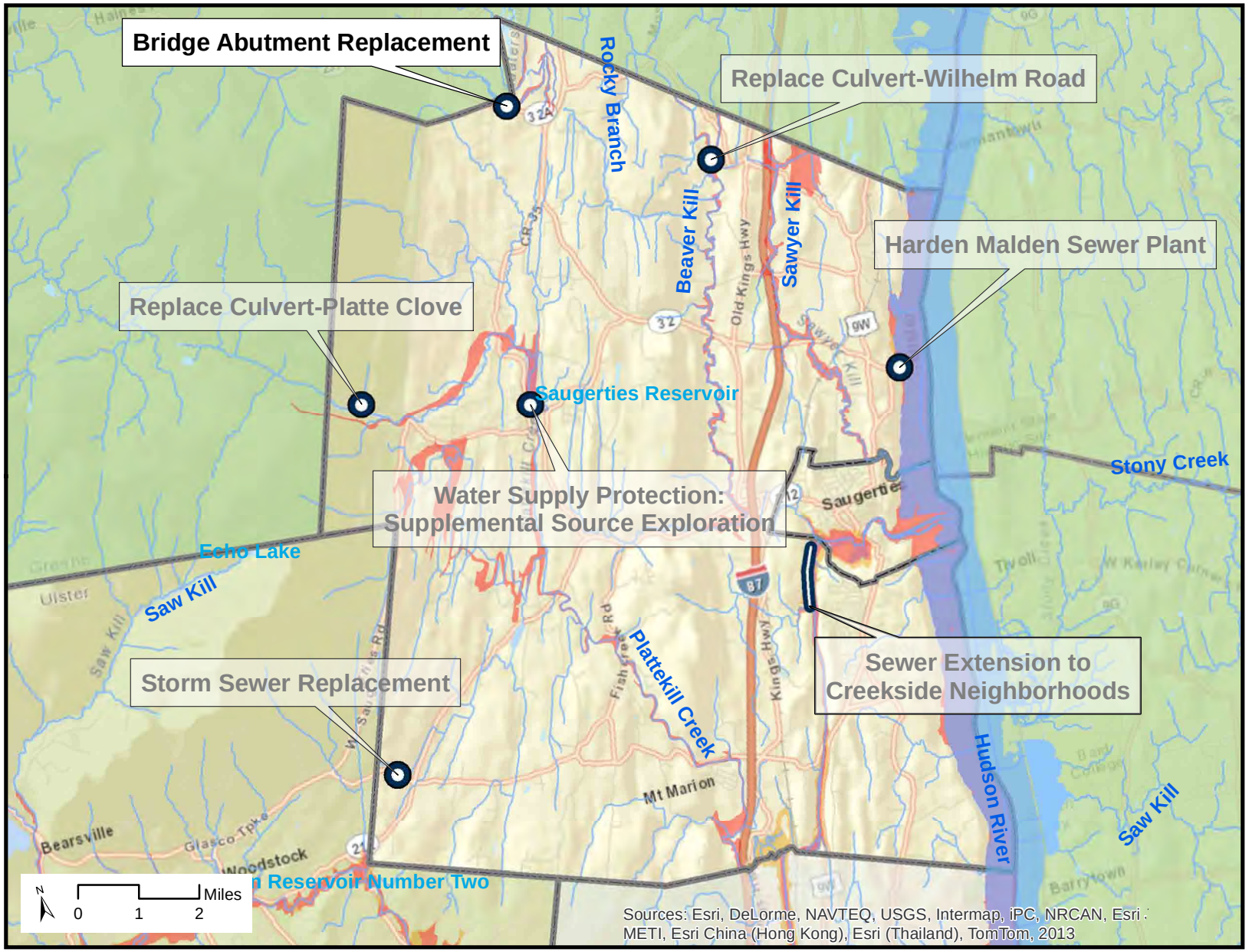
Anticipated Risk Reduction: Replacing the abutment and bridge deck at Drummond Falls Road East will reduce flood levels in the vicinity of the existing bridge, increasing flood protection and improving safety. Implementation of the improvements will reduce risk to the community, decreasing the vulnerability of this key transportation asset, and eliminating the hazard caused by frequent inundation and road closure.

Cost Benefit Summary: Strengthening the Drummond Falls Road East bridge would provide long-term benefits to the bridge and roadway because the bridge abutment and deck would likely have a useful life of 50+ years. This project would reduce the risk of bridge failure and would maintain access for emergency response to areas that may otherwise be cut off during flooding. Savings in local government expenditure are also expected because the project would limit the cost of reconstruction or replacement that may be incurred after future storm events.

Co-Benefits of Project:

- Economic Benefits: This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.
- Environmental Benefits: The redesign of bridge abutment would require examining existing and future storm flows so that the chosen design can both withstand future storm events without damage, and so that its floodway constriction characteristics can be understood in the context of regional floodplain management. Improving the flow capacity of a waterway is one of several important elements to mitigate upstream and downstream flooding and to protect public/private property. Replacing the bridge abutment would fortify the bridge to withstand future storm events without damage. Minimizing floodway constrictions improves the flow capacity of the waterway mitigating upstream and downstream flooding to make its flow, flooding behavior, and biological components more stable and sustainable.
- Health and Social Service Benefits: The Town and entire community will benefit from the continued functioning of this key roadway, securing access to and from vital health and social service facilities and providers.

Figure IV-12
Project Locations - Town of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

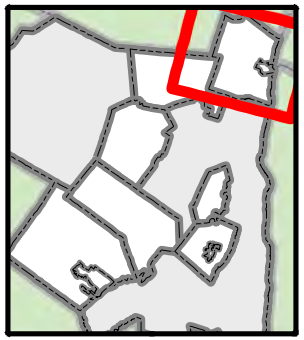
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Harden Malden Sewer Plant Against Flooding

Project Description: Install and construct various flood proofing and hardening measures at the Malden Sewer Treatment Plant, which was inundated with stormwater and required additional town resources to be brought in to keep the facility operational during Hurricane Sandy. Possible measures would include installation of backflow valves or other mitigation measures to prevent sewage contamination during major flood events.

Estimated Cost: $165,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: 12-18 Months

Entity with Jurisdiction: Town of Saugerties

Anticipated Risk Reduction: Hardening of the wastewater treatment plant reduces its vulnerability by improving its ability to function during storms and recover after storm events. The project will ensure continued waste water treatment service for the Town during and after major storm and flood events.

Cost Benefit Summary: Hardening measures would provide permanent flood mitigation but would require periodic maintenance. Although no permanent jobs are expected to be added, the project would support the Mid-Hudson Regional Economic Council development goal of investing in key infrastructure improvements, including water and sewer infrastructure. Permitting continued operation of the sewer treatment plant would reduce the need for alternative provision of potable water during a storm or flooding event. Further savings in local government expenditure would be expected because the installation of backflow valves would reduce risk of sewage contamination and limit cleanup costs.

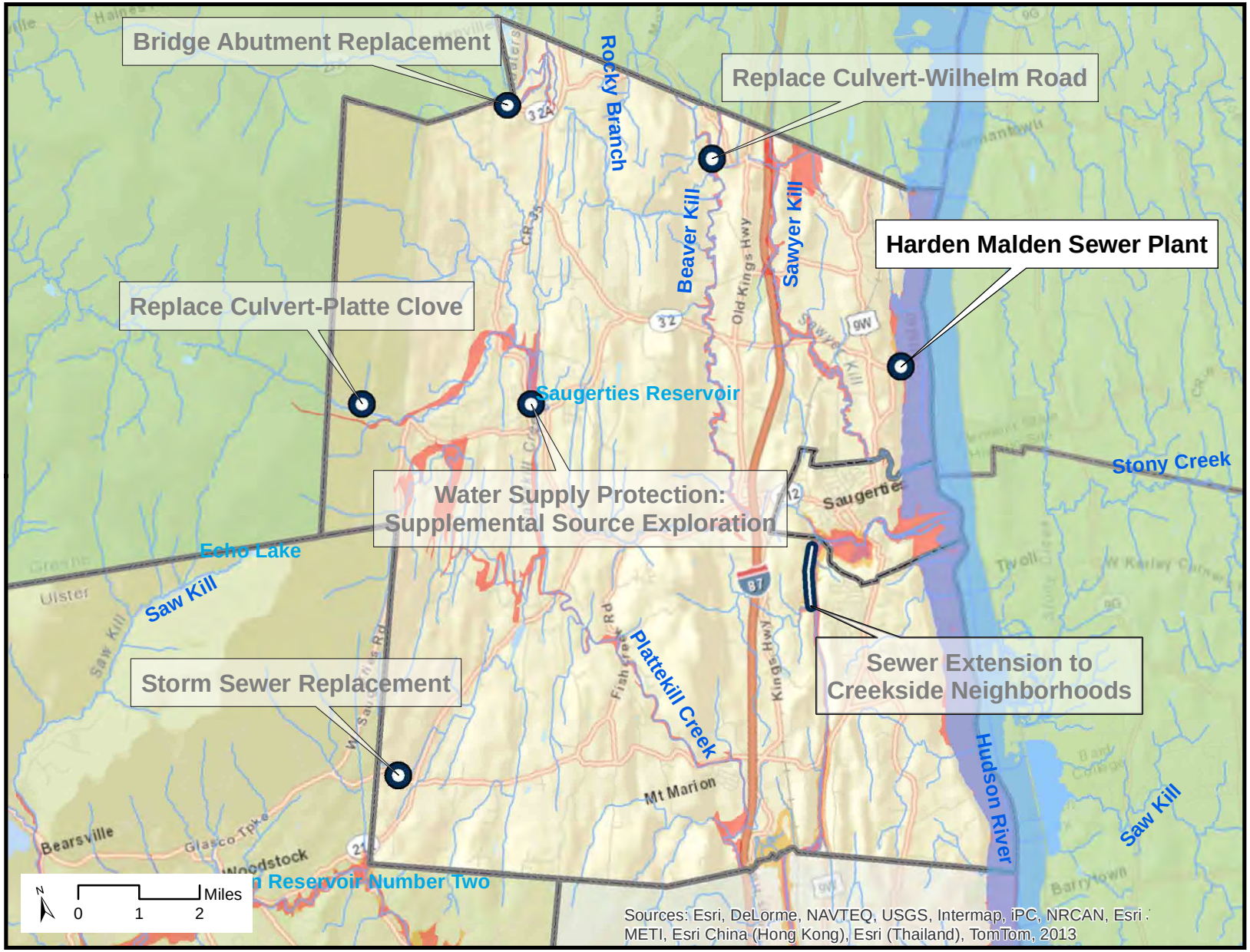
Co-Benefits of Project:

- Economic Benefits: This project would provide for continuous waste water treatment service and protect water quality during a storm or flooding event. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.

- Environmental Benefits: This project will have environmental benefits by protecting the waste water treatment plant from inundation and preventing degradation. By preventing release of untreated wastewater during storm events, this project would have direct environmental benefits to receiving waters, habitat, and wetlands. The installation of flood proofing measures at the waste water treatment plant, including installation of backflow valves, and repair of existing sanitary sewer lines, would reduce or eliminate the unwanted portion of incoming flows entering broken pipes from runoff or from combined storm/sanitary lines. Eliminating these flows frees up existing sewage treatment plant capacity, minimizes releases of poorly treated wastewater, and saves costly treatment plant upgrades, allowing treatment facilities to be devoted solely to wastewater treatment.

- Health and Social Service Benefits: Hardening the Sewer Treatment Plan would have indirect benefits to the entire community by protecting the treatment of the community's wastewater system.

Figure IV-12
Project Locations - Town of Saugerties



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

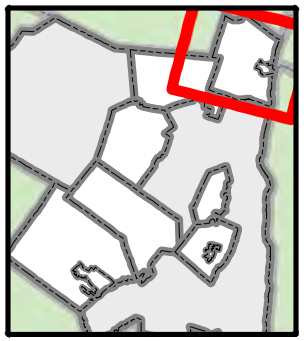
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Replace Culvert-Platte Clove

Project Description: Replacement of an inadequately sized culvert at Platte Clove Road that was overwhelmed during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee, and caused flooding, erosion, and damage to the infrastructure. Platte Clove Road is the only alternate route to Hunter Mountain when the main access from Route 23 is closed for repairs. Resizing the culvert to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms. The recent major storms caused flooding, erosion, and damage to the infrastructure.

Estimated Cost: $274,300

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Saugerties

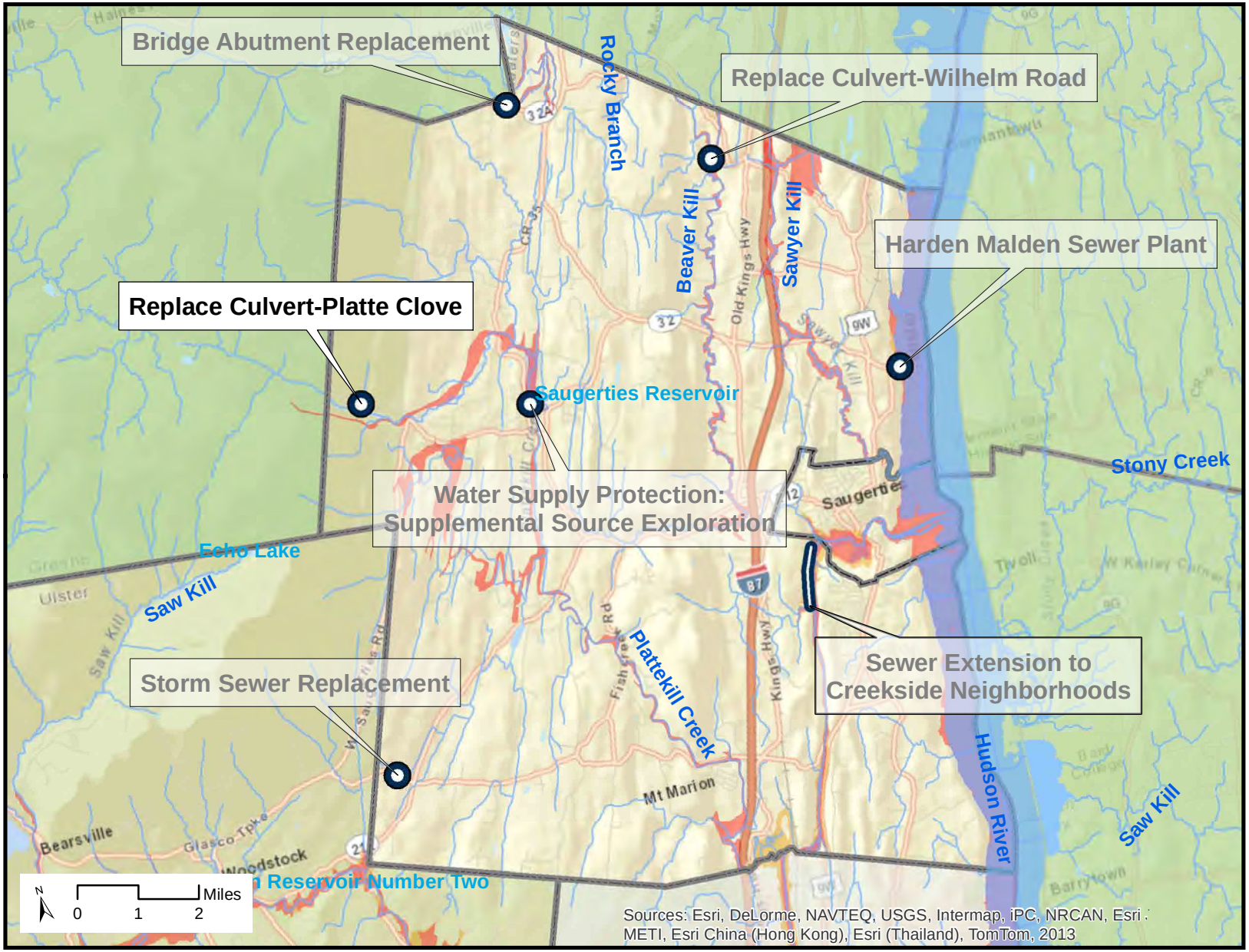
Anticipated Risk Reduction: Replacement of the existing infrastructure with an adequately sized culvert at Platte Clove Road will reduce the vulnerability of the adjacent assets by decreasing the incidence and impact of flooding on their roadways.

Cost Benefit Summary: This project would provide long-term benefits through permanent flood mitigation on Platt Cove Road. Potential effects of the new culvert on natural resources would require an assessment. By mitigating flooding, this will provide for improved emergency response to areas that may otherwise be cut off during storm events. Reduced damage to roadways from flooding would limit the rehabilitation and reconstruction costs, resulting in major savings in local government expenditure.

Co-Benefits of Project:

- Economic Benefits: This project would provide flood mitigation to a previously damaged roadway, ensuring continued protected access to vital commercial areas. Construction and support jobs from labor, materials and equipment sales, sales for suppliers and support industries would be created. The project would have a financial benefit by increasing the resiliency of the infrastructure, thereby potentially reducing future maintenance, repair and capital expenditures for replacement.
- Environmental Benefit: Undersized culverts can impede storm flows and consequently exacerbate upstream flooding. Resizing culverts, in the context of an overall assessment of storm flow routing, is an important component of reducing flood damage. Replacing an undersized culvert with appropriately sized infrastructure improves stream function by increasing capacity in the channel to accommodate additional demand created by storm water. Maintaining the natural channel will improve water quality and also prevent detrimental impact to habitat for flora and fauna.
- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-12
Project Locations - Town of Saugerties



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

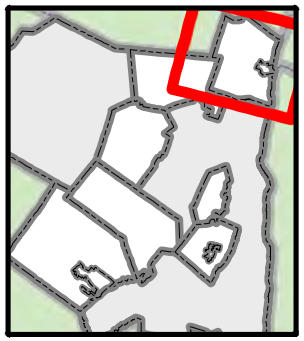
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Replace Culvert-Wilhelm Road

Project Description: Replace an inadequately sized culvert at Wilhelm Road, which was overwhelmed during Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy and caused flooding, erosion, and damage to the infrastructure. Widespread flooding due to insufficient culvert capacity led to roadway inundation. Resizing the culvert to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms.

Estimated Cost: $200,450

Anticipated Regulatory Requirements:

NYS Department of Environmental Conservation review of stream disturbance.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Saugerties

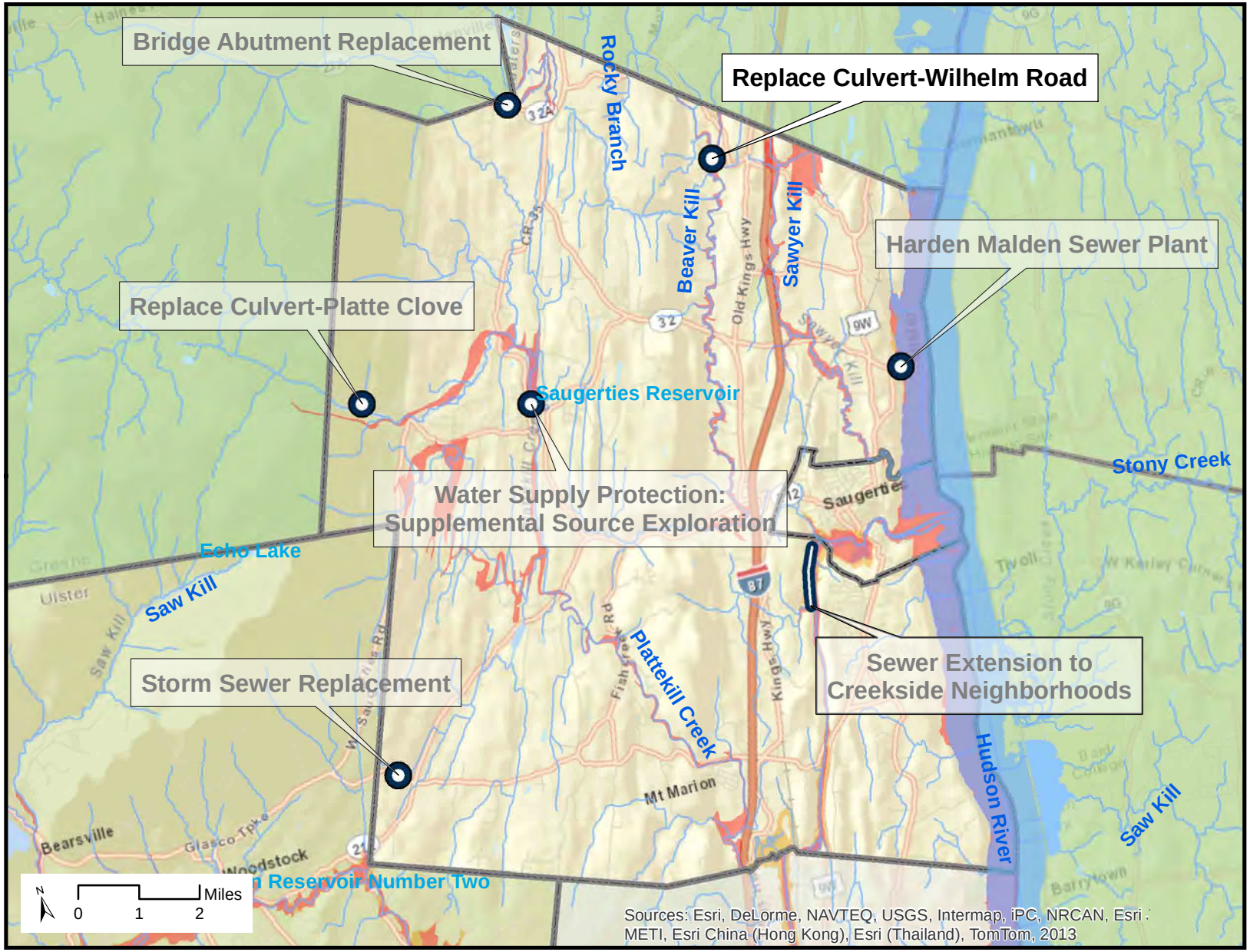
Anticipated Risk Reduction: Resizing the culvert at Wilhelm Road will reduce the vulnerability of the asset by decreasing the incidence and impact of flooding on the roadways.

Cost Benefit Summary: This project would provide long-term benefits through permanent flood mitigation on Wilhelm Road. Potential effects of the new culvert on natural resources would require an assessment. By mitigating flooding, this will provide for improved emergency response to areas that may otherwise be cut off during storm events. Reduced damage to roadways from flooding would limit the rehabilitation and reconstruction costs, resulting in major savings in local government expenditure.

Co-Benefits of Project:

- Economic Benefits: This project would provide flood mitigation to a previously damaged roadway. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.
- Environmental Benefit: Undersized culverts can impede storm flows and consequently exacerbate upstream flooding. Resizing culverts, in the context of an overall assessment of storm flow routing, is an important component of reducing flood damage. Replacing an undersized culvert with appropriately sized infrastructure improves stream function by increasing capacity in the channel to accommodate additional demand created by storm water. Maintaining the natural channel will improve water quality and also prevent detrimental impact to habitat for flora and fauna.
- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-12
Project Locations - Town of Saugerties



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

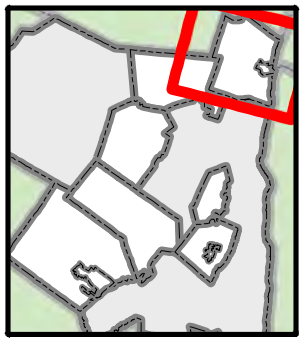
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Sewer Extension to Creekside Neighborhoods

Project Description: Extend the municipal sewer system to residential properties along the Esopus Creek that currently rely on septic systems. During storm events, these septic systems release pathogens to the Esopus, endangering public health and reducing water quality. Extend municipal sewer service to these residences would mitigate compromises to water quality caused by contamination.

Estimated Cost: $1,500,000

Anticipated Regulatory Requirements:

The NYS Department of Health and the NYS Department of Environmental Conservation will likely review sewer extension.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Saugerties

This project would be coordinated between the Town and Village of Saugerties.

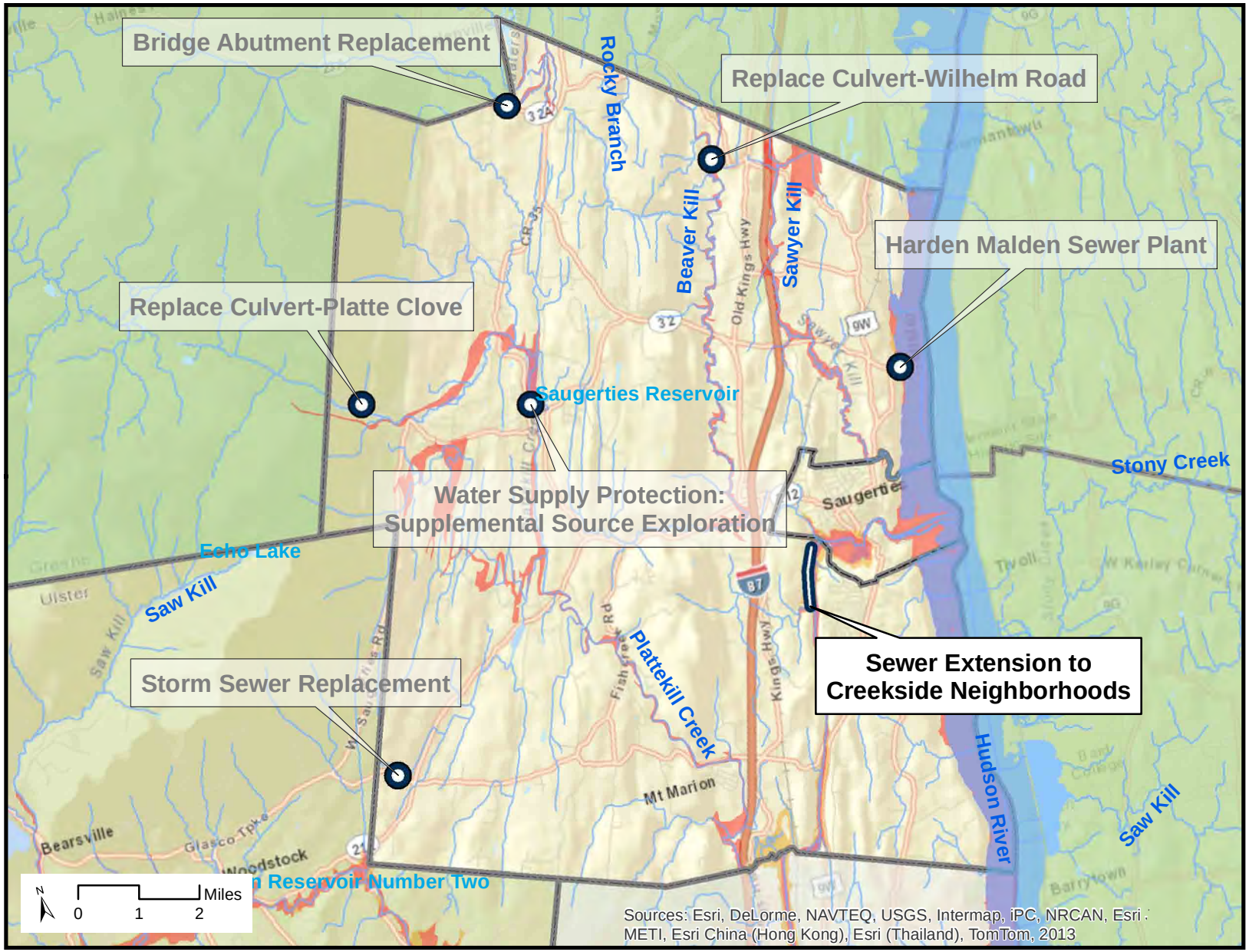
Anticipated Risk Reduction: The risk reduction benefits associated with this project include continuous provision of waste water treatment, an essential service during disasters, reduced vulnerability of residential neighborhoods to contamination of their water supply, and a reduction of risk of additional damage and future repair/maintenance to municipal systems and facilities.

Cost Benefit Summary: This project would provide flood mitigation for the foreseeable future because a new sewer system would have a useful life of 50+ years. Potential effects of the new sewer system on natural resources would require an assessment. Although no permanent jobs are expected to be added, the project would support the Mid-Hudson Regional Economic Development Council's goal of investing in key infrastructure improvements, including water and sewer infrastructure. Savings in local government expenditure are expected because the project would reduce the risk of pathogen release to residential areas along the Esopus Creek.

Co-Benefits of Project:

- Economic Benefits: The extension of the sewer system would improve the water system's resiliency. Sewer extension provides permanent protection of Town residential assets, which is key to the communities' economic health by ensuring retention of residents and protection of the housing stock as a source of property tax revenue.
- Environmental Benefits: This project would extend municipal sewer lines to properties along the Esopus Creek reducing reliance on septic systems, and potentially leading to great water quality improvements and public health benefits.
- Health and Social Service Benefits: This project does not specifically secure a health and social service facility. However, protecting the public from storm-related water quality impacts is critically important to the health and safety of the entire community.

Figure IV-12
Project Locations - Town of Saugerties



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

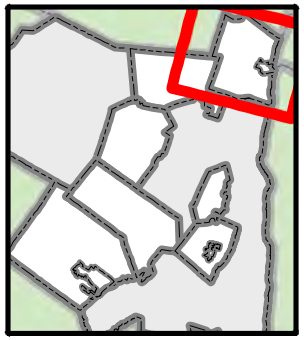
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Storm Sewer Replacement

Project Description: Replace storm sewers at Cotton Tail Lane, which were inadequately sized to accommodate the demand generated during 100 year storm events and were severely compromised during Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy causing flooding and property damage.

Estimated Cost: $100,550

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: Three Months

Entity with Jurisdiction: Town of Saugerties

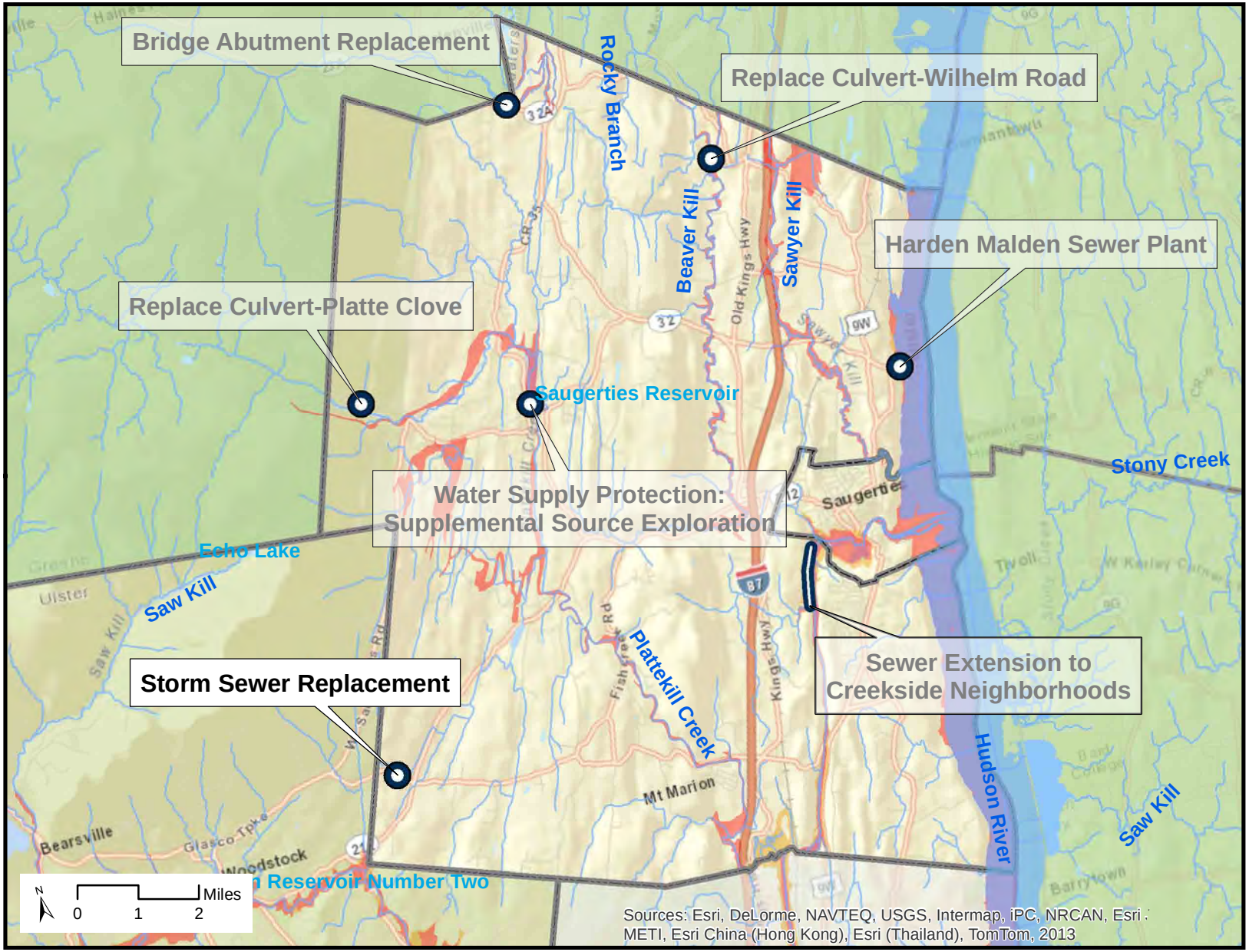
Anticipated Risk Reduction: The risk reduction benefits associated with this project include continuous protection of the stormwater management infrastructure, an essential service during disasters and a reduction of risk of additional damage and future repair/maintenance to municipal systems and facilities.

Cost Benefit Summary: Implementation of this project would have long-term benefits by providing flood mitigation to adjacent roadways and properties for the foreseeable future. Savings in local government expenditure are expected because the project would mitigate flooding on Cotton Tail Lane, allowing for an improved emergency response, and limit the cost of rehabilitation and reconstruction.

Co-Benefits of Project:

- Economic Benefits: This project would provide flood mitigation to areas with high flooding risk. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.
- Environmental Benefits: Repairing existing sanitary sewer lines reduces or eliminates the unwanted portion of incoming flows entering broken pipes from runoff or from combined storm/sanitary lines. Eliminating these flows frees up existing sewage treatment plant capacity, minimizes releases of poorly treated wastewater, and saves costly treatment plant upgrades, allowing treatment facilities to be devoted solely to wastewater treatment.
- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-12
Project Locations - Town of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

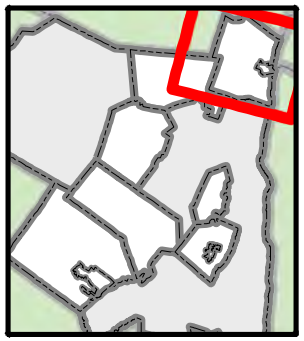
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Saugerties

Stream and Stream Bank Rehabilitation

Project Description: Provide a local match to support funding for a recent stream rehabilitation assessment commissioned by the NYS DEC, and allocate funds to implement stream bank restoration recommendations identified in the assessment. The streams being assessed and rehabilitated were damaged during Hurricane Irene and Tropical Storm Lee.

Estimated Cost: $525,000

Anticipated Regulatory Requirements:

The NYS Department of Environmental Conservation would need to review any potential stream disturbance.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Saugerties

This project would be coordinated between the municipalities along the affected streams.

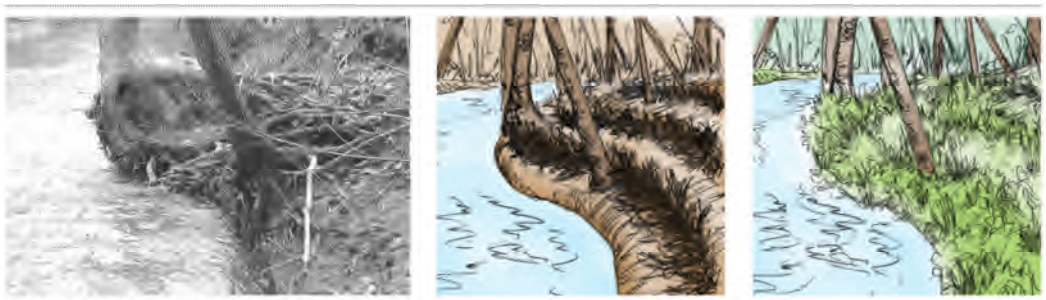
Anticipated Risk Reduction: This project will identify the necessary measures to improve and potentially reconstruct streams and stream banks along various waterways in the Town of Saugerties. Implementation of the proposed measures in a logical, phased, approach will increase the channel's ability to handle water flow, therefore reducing hazard exposure of nearby assets. Assets serving socially vulnerable populations will be less exposed to flooding and therefore at reduced risk.

Cost Benefit Summary: Implementation of this project would permanently mitigate flooding along stream corridors, resulting in sustainable benefits. The useful life of the flood mitigation would be over a period of 10 to 20 years. The potential effect on natural resources of stream restoration would require an assessment. While implementation of the project would not in inherently create new economic activity (retail, industrial, new construction, or permanent jobs), the project supports the Mid-Hudson Regional Economic Development Council's goal of improving and leveraging natural resources as drivers to tourism in the area. Other benefits include savings of local government expenditures from reduced flooding of the roadways, for improved emergency vehicle access and lower reconstruction and rehabilitation costs for roadways.

Co-Benefits of Project:

- Economic Benefits: Stream bank and stream bed restoration would provide flood mitigation along the stream corridors and would potentially increase their attractiveness as a recreational and tourist attraction. Long-term protection of Town assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: This project would fund a stream rehabilitation assessment but also the improvements themselves. Therefore, this project would have direct environmental benefits to stream ecology and flooding prevention. Stream restoration involves the modification of a stressed/disturbed stream via morphological changes to its bed and banks, in order to make its flow, flooding behavior, and biological components more stable and sustainable. Streams that have had changes to their watersheds due to development and storm damage, and therefore generally suffer from increased rates of erosion, loss of adjacent wetlands and in-stream flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Such highly "stressed" streams which suffer from these problems typically have poor quality and biological diversity and therefore would benefit significantly from stream restoration.



STRATEGIC BANK STABILIZATION *(AKRF, Inc.)*

Health and Social Service Benefits: Regional stream restoration projects would not directly secure or provide better access to health and social service facilities or providers although the resulting reduction in roadway inundation will benefit the entire community and improve local and regional access to/from emergency, health and social service providers and facilities.

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Proposed Project

Village of Saugerties

Dredging Assistance

Project Description: The Village proposes to assist property owners by coordinating dredging along impacted properties. Superstorm Sandy, Hurricane Irene and Tropical Storm Lee contributed to silting of the harbor, which impairs waterfront access. The project would include public-private cost sharing: property owners would cover the dredging contractor cost while the Village would assist by handling the engineering, permit process, environmental review costs, work oversight, and contingencies. Organizing a single project to serve multiple properties will help make dredging more affordable for individuals.

Estimated Cost: $45,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Village of Saugerties

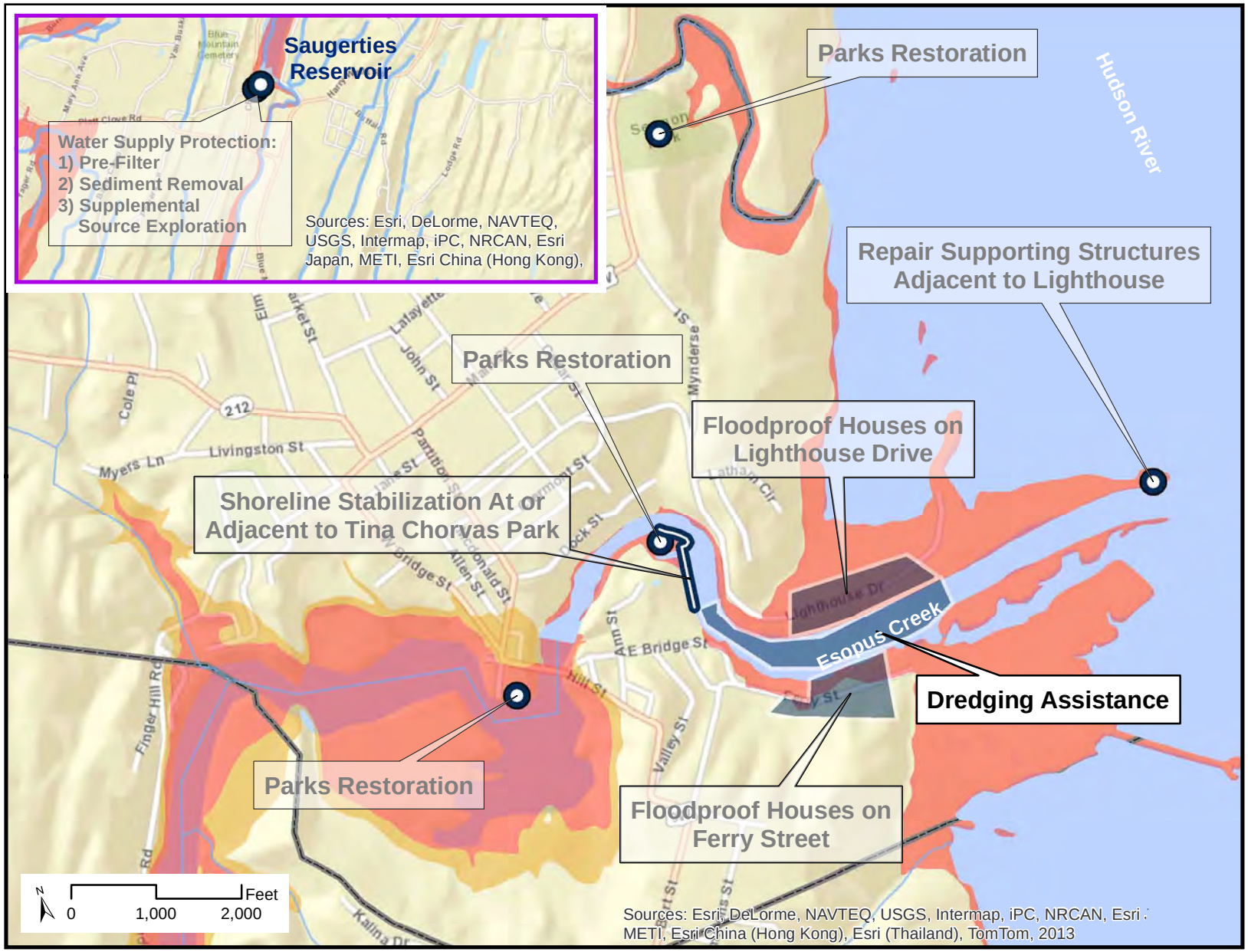
Anticipated Risk Reduction: This project will increase the harbor's ability to handle waterflow, tidal surge, and boating traffic, therefore reducing hazard exposure of nearby assets.

Cost Benefit Summary: Dredging would provide flood mitigation to waterfront residences for the foreseeable future. However, to ensure continued flood mitigation, periodic future dredging would be required. Potential effects of the dredging on natural resources would require an assessment. Although no permanent jobs are expected to be added, this project has the potential to allow for a more pleasant waterfront, attracting additional tourists and recreational boaters that will help promote the local tourism economy. This is in line with the Mid-Hudson Regional Economic Development Council's goal of promoting tourism through natural resource attractions. Dredging would improve the waterfront area's resiliency and reduce the cost of rehabilitation and reconstruction, which could result in major savings in local government expenditure.

Co-Benefits of Project:

- Economic Benefits: This project would improve conditions along the waterfront area, which is an important public resource. Implementing measures to address chronic residential flooding provides permanent protection of Village assets, which is key to the communities' economic health by ensuring retention of residents and protection of the housing stock as a source of property tax revenue.
- Environmental Benefits: This project will entail dredging silt deposition. Accumulation of in-stream debris, which can increase stream constrictions at bridges and culverts, may have detrimental effects on upstream flooding. Removal of this debris is intended to increase the flow capacity of a given stream, culvert, or other conveyance.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

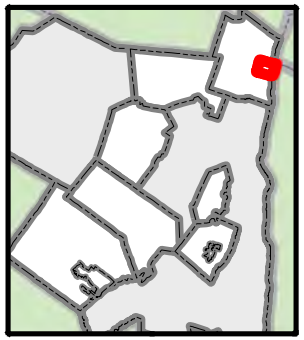
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Village of Saugerties

Housing Flood-Proofing Assistance

Project Description: Assess alternatives (including flood proofing, elevation, and relocation) for protecting houses along Lighthouse Drive and Ferry Street from flooding. Storm activity, during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee flooded homes along Lighthouse Drive and Ferry Street. The project would include flood proofing audits for homes along Lighthouse Drive and Ferry Street, to educate residents regarding various options.

Estimated Cost: $120,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Village of Saugerties

Anticipated Risk Reduction: Improvements to increase flood protection for existing homes decreases vulnerability, reduces risk to the individual homeowners from inundation and damage during storm events, and increases resilience of the entire community by ensuring the protection of these assets and the safety of the residents. Protecting the Town's housing stock minimizes vulnerability of repeated structural damage, and property loss thereby supporting overall economic recovery following acute storm events.

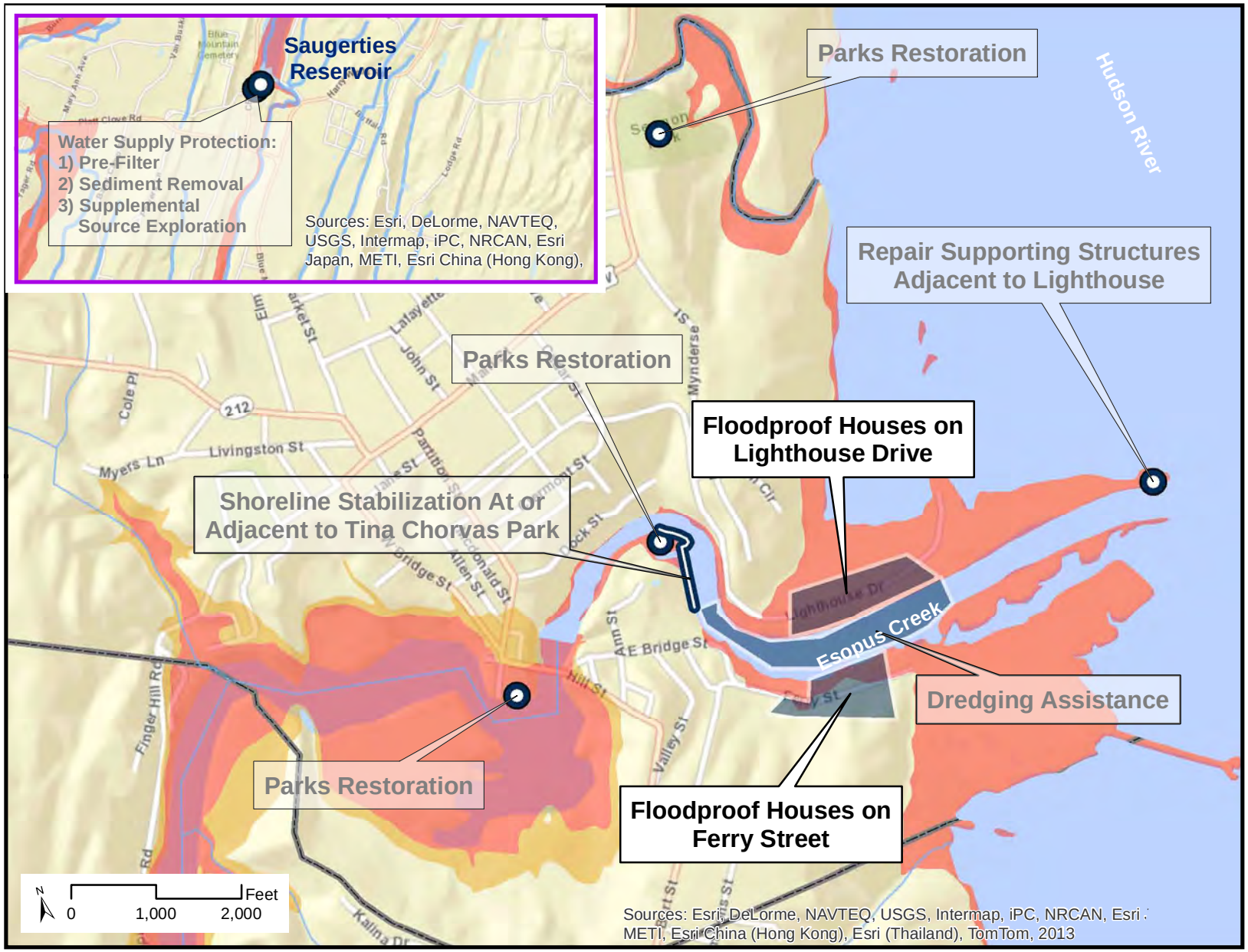
Cost Benefit Summary: The recommendations from the audits could provide enhanced flood mitigation to residences. This would lead to savings in local government expenditures by reducing the risk of flooding to residences and the level of needed emergency response during storm and flood events.

Co-Benefits of Project:

- Economic Benefits: A cost-sharing program for flood proofing would provide flood mitigation to residences with limited public expense. This project would improve conditions along waterfront area, an important public resource. Implementing measures to address chronic residential flooding provides permanent protection of Village assets, which is key to the communities' economic health by ensuring retention of residents and protection of the housing stock as a source of property tax revenue.

- Environmental Benefits: Flood proofing prevents potential health and safety impacts associated with damaged structures and helps reduce or eliminate future flooding hazards.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

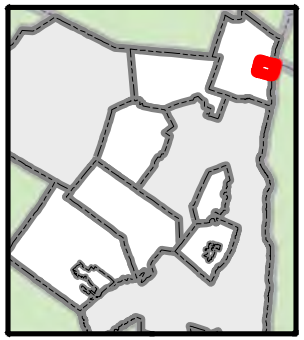
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Village of Saugerties

Parks Restoration

Project Description: Repair several parks throughout the Village, including Village Beach, Tina Chorvas Waterfront Park, and Seamon Park that suffered damage from all three recent major storms (Hurricane Irene, Tropical Storm Lee and Superstorm Sandy). Repairs would include the replacement of damaged docks and repair to eroded boat ramps to maintain public access to Esopus Creek. In addition, repairs would be made to the retaining wall in Seamon Park along Sawyer Kill. Landscaping and plantings would also be installed to arrest further erosion.

Estimated Cost: $200,000

Anticipated Regulatory Requirements:

This project will may require an Article 15 and/or Article 24 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Village of Saugerties

Anticipated Risk Reduction: Stabilizing the shoreline and repairing damaged docks and boat ramps to maintain public access to the Village parks provides defensive flood protection measures decreasing the exposure of nearby assets to flooding.

Cost Benefit Summary: Erosion control is expected to provide flood mitigation to the parks for the foreseeable future, with repairs at the Village's parks expected to have a useful life of 10 to 20 years. Although no permanent jobs are expected to be added, this project has the potential to allow for a more pleasant waterfront, attracting additional tourists to the various parks that will help promote the local tourism economy. This is in line with the Mid-Hudson Regional Economic Development Council's goal of promoting natural resources as drivers of tourism and quality-of-life attributes. Flood mitigation would improve the parks' resiliency and reduce the cost of rehabilitation and reconstruction, which could result in major savings in local government expenditure.

Co-Benefits of Project:

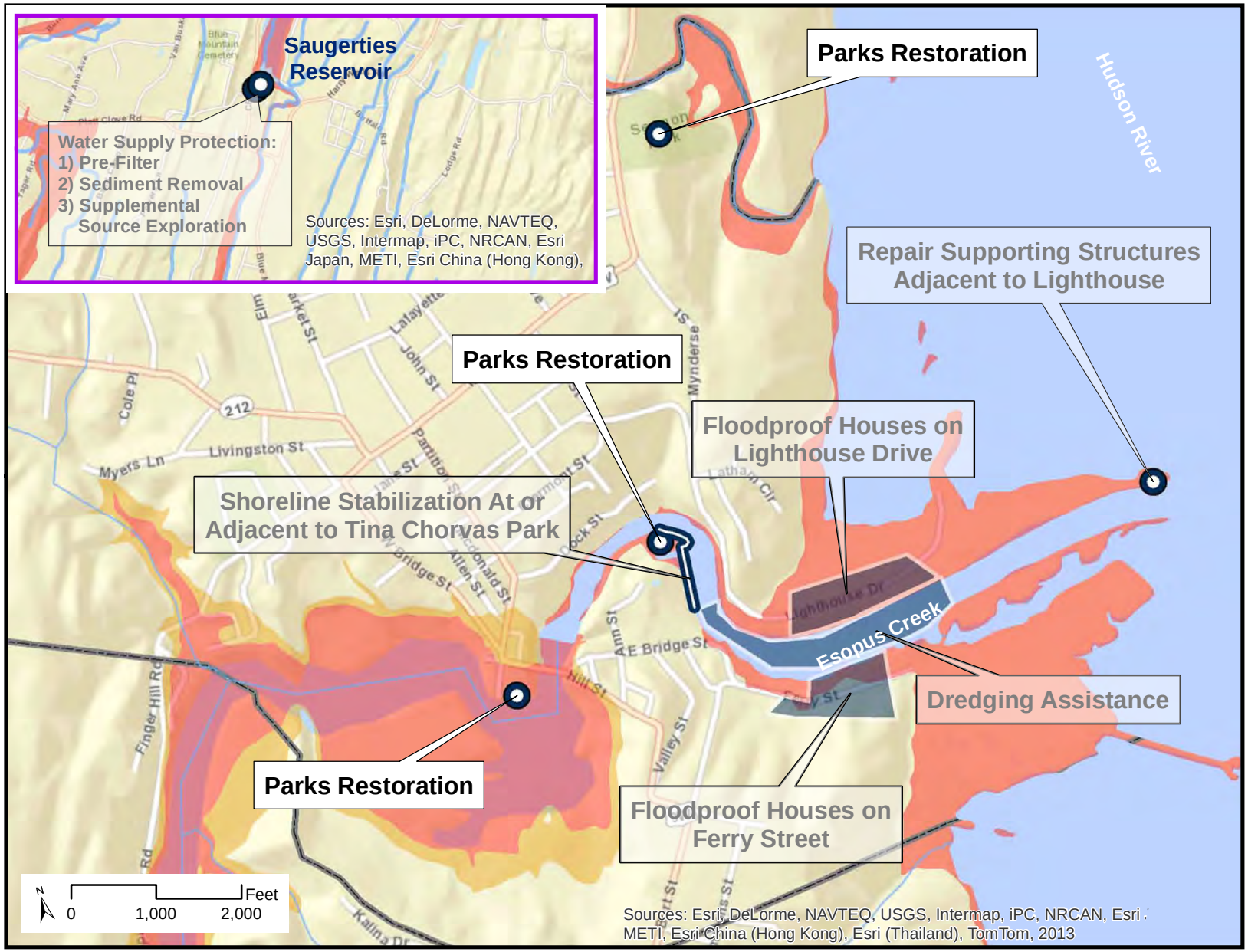
- Economic Benefits: This project would improve conditions in waterfront parks that are important public recreational and tourist attractions, restoring and protecting natural resource assets. The project would generate short term financial benefit during the construction phase, from labor, materials, services and equipment expenditures and long-term benefit through increased tourism expenditures.

- Environmental Benefits: Restoration of existing parkland can eliminate the release of sediment from poorly maintained land and the input of floatable debris (plastic or otherwise) that may accumulate in public open spaces. By restoring, and reclaiming existing parkland, the long-term appreciation and preservation of such lands can be reinforced. Such lands are a net "sink" for precipitation, through infiltration and transpiration by forests, fields, and shrub lands and are a vital component of the landscape for watershed protection and flood damage prevention.

- Health and Social Service Benefits: Improvements to community parks and recreation areas will have indirect health benefits to the entire community by securing open space and recreational amenities to the Town and the Village.

Floodplain Management, Culvert Replacement and Vehicular Bridge Re-Design (AKRF, Inc.)

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

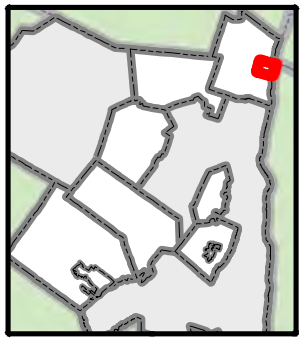
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Village of Saugerties

Repair Supporting Structures Adjacent to Lighthouse

Project Description: Repair a large gap in the dike that protects the harbor channel and make bulkhead, pier, and dock repairs in and around the Lighthouse. Damage to the dike occurred during Hurricane Irene and Tropical Storm Lee. This project is a partnership between the Village and the Saugerties Lighthouse Conservancy. While the dike is important for preventing siltation of the harbor channel, the bulkhead and pier protect the lighthouse, which is a community asset and historic building. The pier and dike are also popular as public fishing sites.

Estimated Cost: $306,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Two Years

Entity with Jurisdiction: Village of Saugerties

Anticipated Risk Reduction: The bulkhead and pier repairs provide defensive flood protection measures and reduce the exposure of the lighthouse.

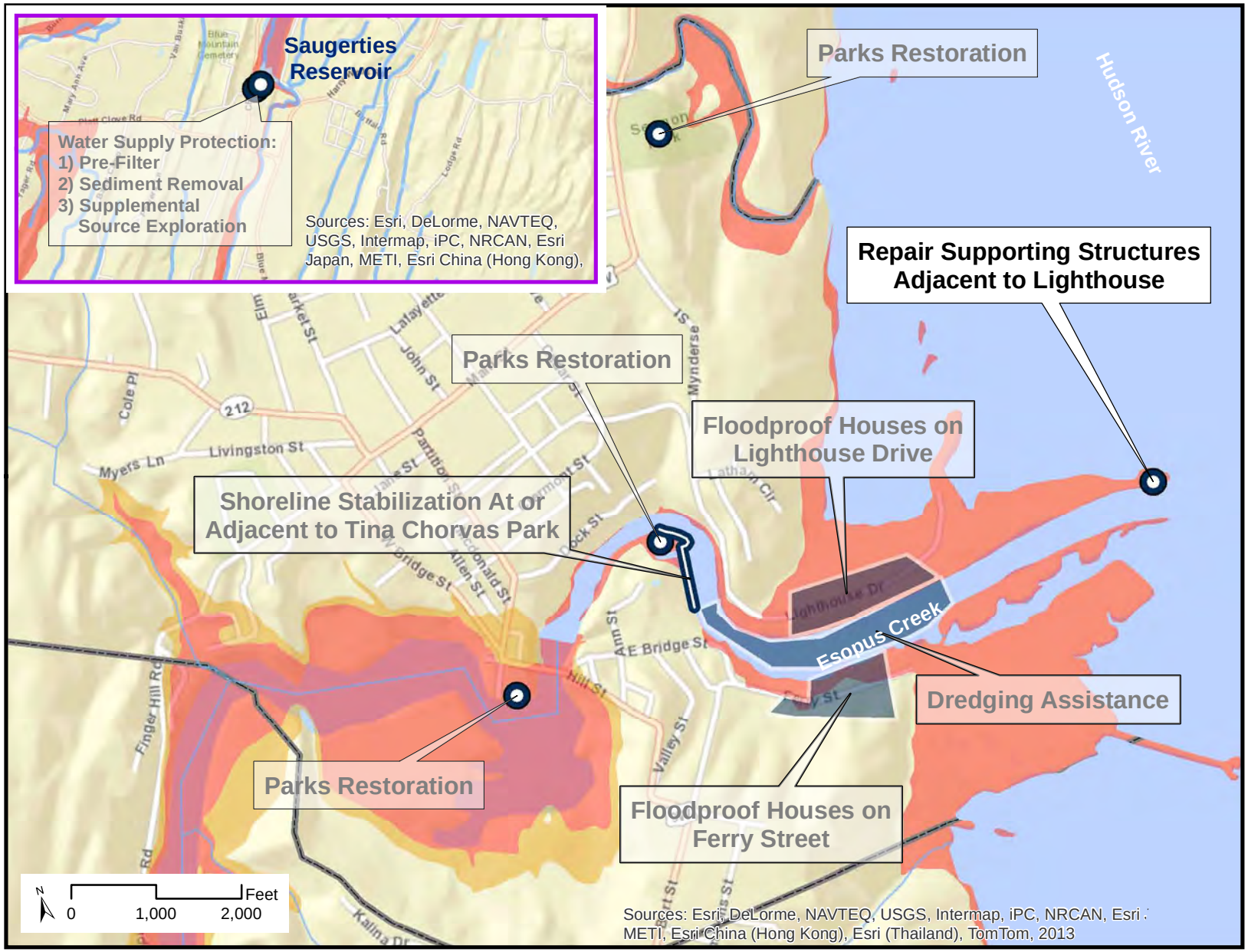
Cost Benefit Summary: Repairs to the supporting structures adjacent to the lighthouse would provide flood mitigation to the lighthouse and harbor channel for the foreseeable future. The dock, bulkhead, pier and dike repairs are expected to have a useful life of 10 to 20 years. Although no permanent jobs are expected to be added, this project has the potential to increase economic activity because improved conditions at the lighthouse and fishing spots may attract additional tourists. In addition, the project would support the Mid-Hudson Regional Economic Development Council's goal of promoting tourism through natural resource attractions. Savings in local government expenditures are expected because the project would increase flood protection of the lighthouse, thereby reducing the cost of rehabilitation and reconstruction of a public resource.

Co-Benefits of Project:

- Economic Benefits: This infrastructure improvement project protects important historic, cultural and recreational resources, which are public recreational and tourist attractions. Short term economic benefit would result in capital expenditures for labor, materials, equipment and services. Longer term benefits include reduction in future allocation for emergency repairs.

- Environmental Benefits: Repairing the gap in the dike would protect the aquatic species and habitat in the harbor channel during periods of high velocity flooding.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014

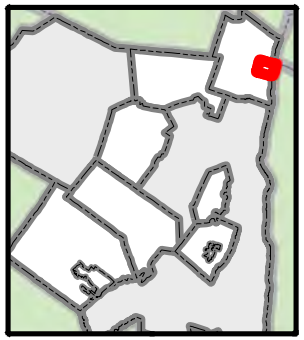


Figure IV-14
Project Detail - Repair Supporting Structures Adjacent to Lighthouse

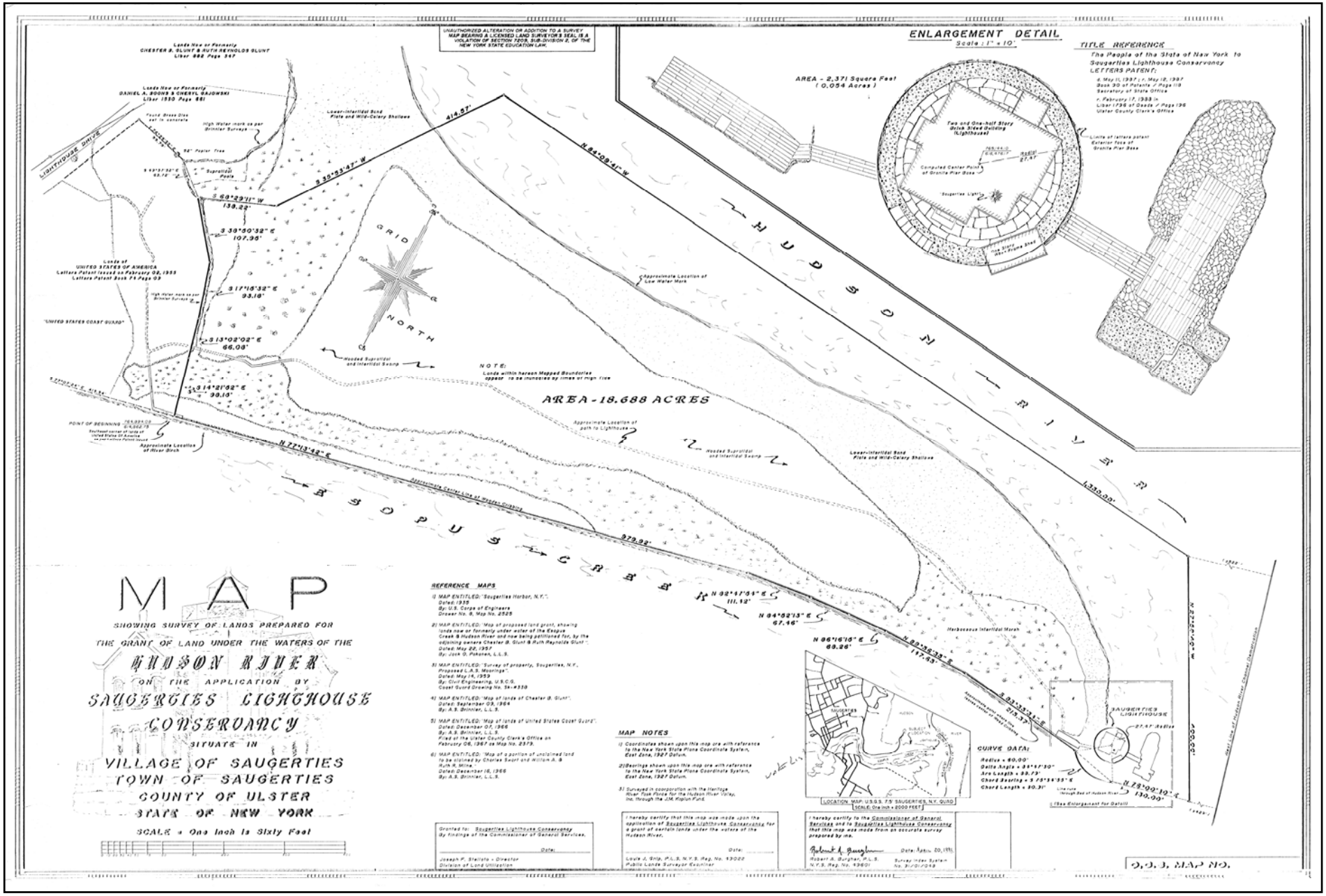


Figure IV-14-a
Project Detail - Photos of Saugerties Lighthouse and Surrounding Area

Damaged Dock at Lighthouse (Patrick Landewe)

Damage Along South Side of Pier (Patrick Landewe)

Deteriorated Bulkhead (Patrick Landewe)

East Elevation of Lighthouse (Patrick Landewe)

Proposed Project

Village of Saugerties

Shoreline Stabilization at and Adjacent to Tina Chorvas Park

Project Description: Stabilize the shoreline and repair existing bulkheads at and adjacent to Tina Chorvas Park. Hurricane Irene, Tropical Storm Lee and Superstorm Sandy caused general flooding, which destabilized and damaged the bulkheads and shoreline near Tina Chorvas Park. This initiative is a public-private partnership with the non-profit cultural resource organization, 'Arm of the Sea'.

Estimated Cost: $300,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Design Documents: Complete

Agency Coordination: Initiated

Bid Documents and Review: Initiated

Entity with Jurisdiction: Village of Saugerties

Anticipated Risk Reduction: Stabilizing the shoreline and repairing existing bulkheads will provide defensive flood protection measures to both the Arm of the Sea Theater and Tina Chorvas Park, thereby decreasing the exposure of nearby assets to flooding.

Cost Benefit Summary: Shoreline stabilization would provide flood mitigation for the foreseeable future, with the bulkhead improvements having a useful life of 10 to 20 years. Although no permanent jobs are expected to be added, this project has the potential to increase economic activity because improved conditions at the park may attract additional tourists. This would support the Mid-Hudson Regional Economic Development Council's goal of promoting natural resources as drivers of tourism and quality-of-life attributes. Other benefits include flood mitigation at a Village and Town recreational facility, support of a well used not-for-profit cultural institution, reduction of flooding risk to residences near Tina Chorvas Park and reduced need for emergency services. Savings in local government expenditure are also expected because a reduction is likely to improve access for emergency vehicles and limit the cost of reconstruction and rehabilitation to the park and other public facilities and roadways.

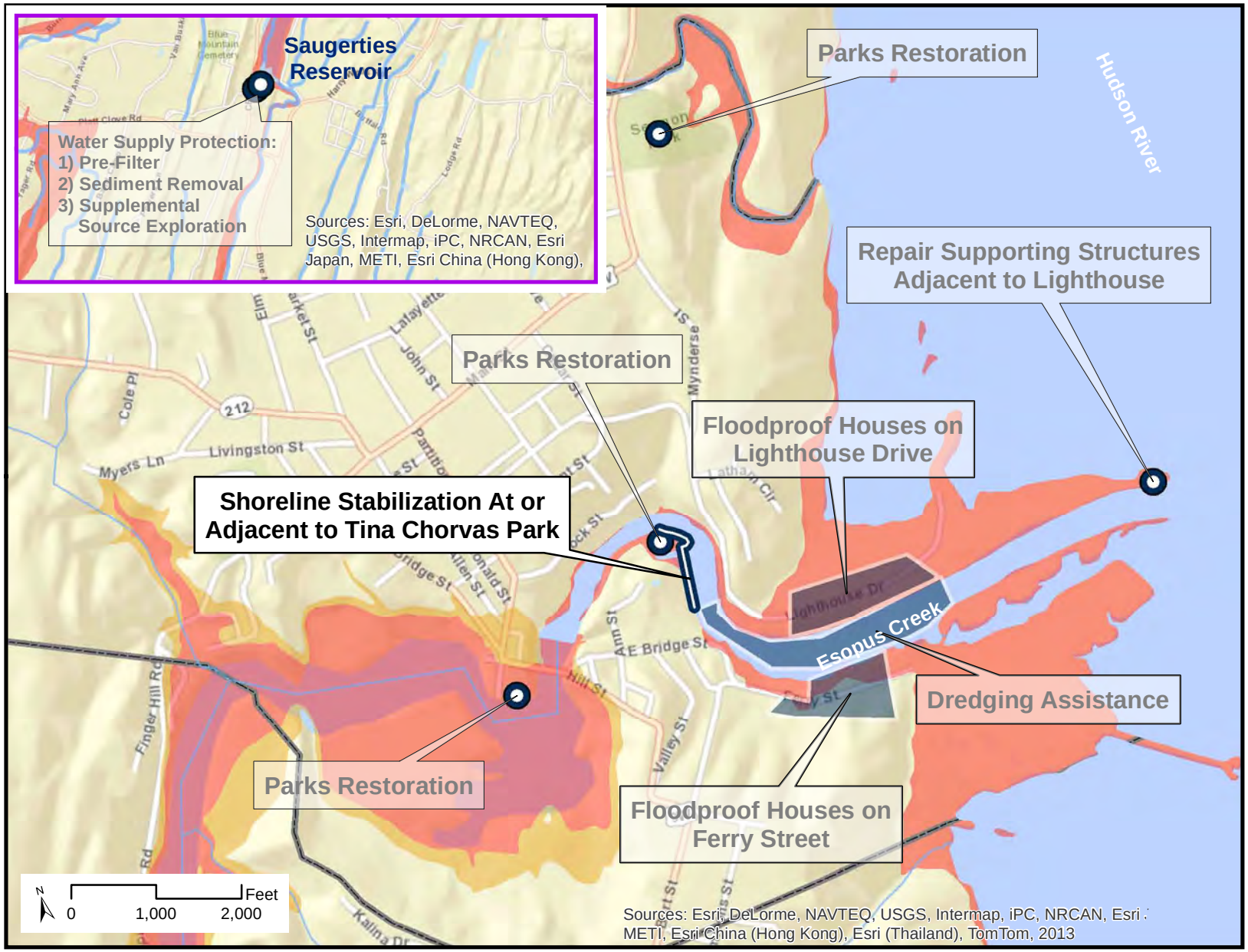
Co-Benefits of Project:

- Economic Benefits: Shoreline stabilization and repair of the bulkhead would improve conditions at a recreational attraction securing the long-term use and enjoyment of the open space resource as well as the Arm-of-the-Sea theater, an important cultural resource and tourist attraction.

- Environmental Benefits: This project would stabilize the shoreline preventing further degradation. Stabilization of shorelines is necessary in highly erodible areas subject to fast flowing water or wave action. Measures to provide stabilization can be "hard", such as armoring or rip-rap, or where possible "soft" such as vegetative measures and near-shore wetland restoration. The net result of such measures will be reduced loss of shoreline, reduced rates of stream-bank and shoreline erosion, and improved water quality through reduction in sedimentation. Restoring, and reclaiming existing parkland, the long-term appreciation and preservation of such lands can be reinforced. Such lands are a net "sink" for precipitation, through infiltration and transpiration by forests, fields, and shrub lands and are a vital component of the landscape for watershed protection and flood damage prevention.

- Health and Social Service Benefits: Improvements to Tina Chorvas Park will have indirect health benefits to the entire community by securing open space and recreational amenities to the Town and the Village. Restoration of existing parkland can eliminate the release of sediment from poorly maintained land and the input of floatable debris (plastic or otherwise) that may accumulate in public open spaces.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014

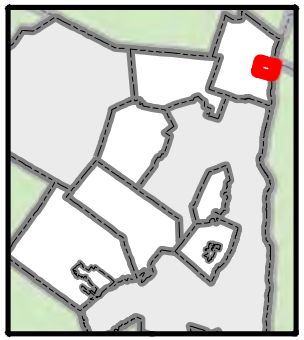


Figure IV-14-b
Project Detail - Photos of Shoreline Stabilization

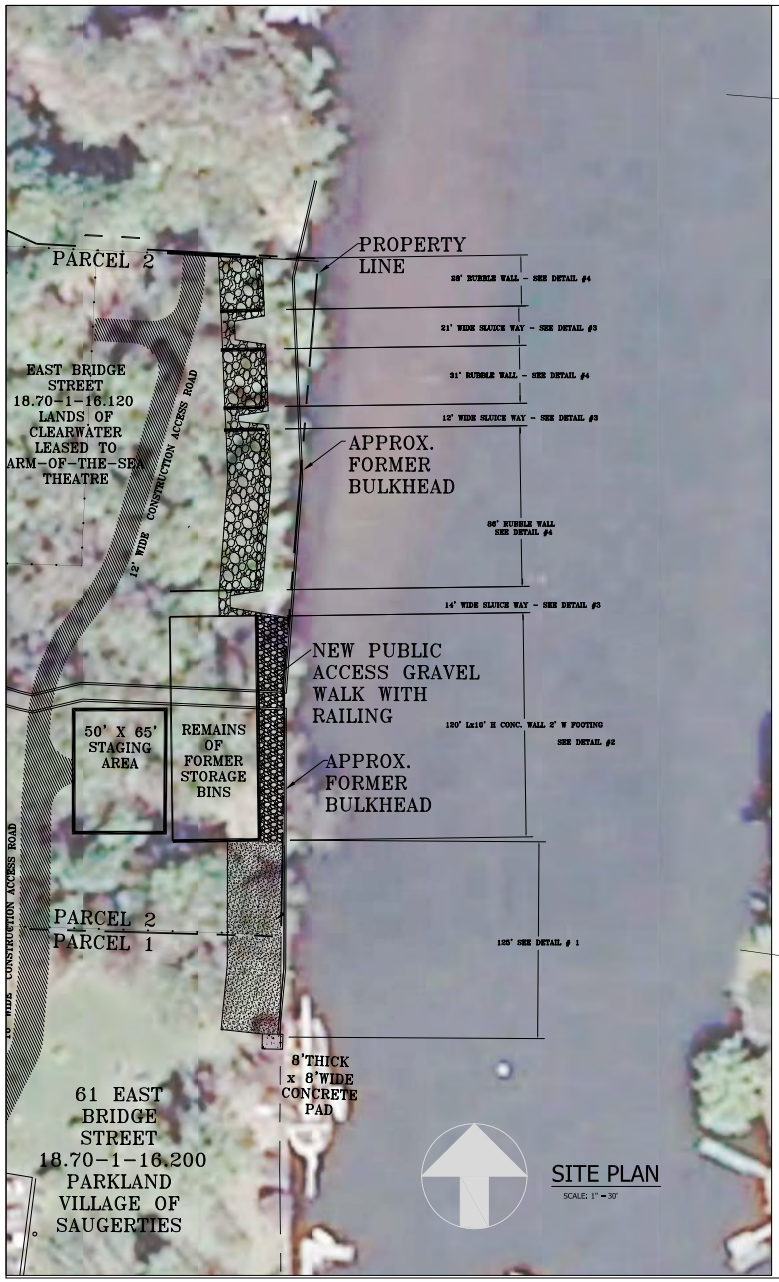
Debris Near Shoreline (Patrick Wadden)

Trees Growing out of Shoreline (Patrick Wadden)

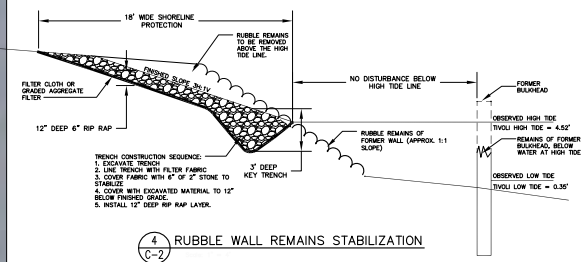
Failed Bulkead (Patrick Wadden)

Current Bulkhead to be Replaced. New Bulkhead Will Incorporate a Boardwalk for Improved River Access (Patrick Wadden)

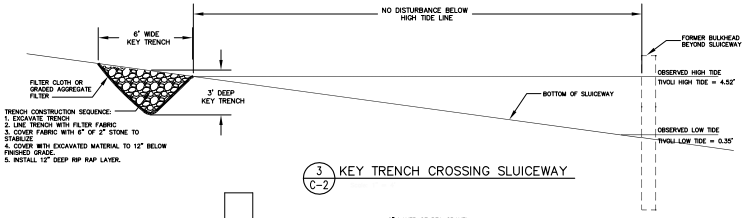
Figure IV-15
Project Detail - Shoreline Stabilization



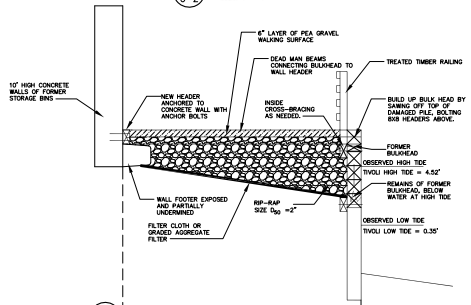
1. 2010 AERIAL PHOTOGRAPH
2. BOUNDARY FROM ULSTER COUNTY PARCEL MAPPING



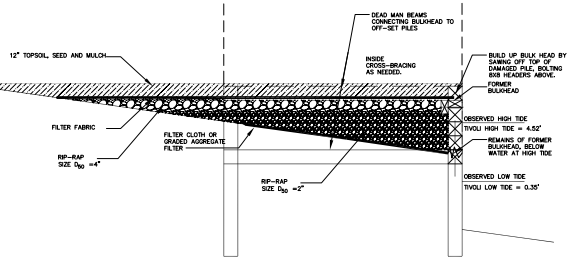
4 C-2 RUBBLE WALL REMAINS STABILIZATION



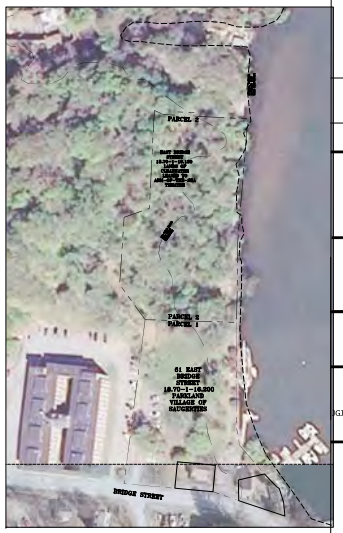
3 C-2 KEY TRENCH CROSSING SLUICEWAY



2 C-2 STORAGE BIN WALL STABILIZATION



1 C-2 SLOPING SHORE LINE STABILIZATION



AREA MAP
SCALE; 1" = 100'

GREENWAY ENVIRONMENTAL SERVICES
P.O. BOX 294 BEACON, NY 12508

PROJECT TITLE:	ESOPUS CREEK SHORELINE RESTORATION
LOCATION:	61 EAST BRIDGE STREET, SAUGERTIES
OWNER:	PARCEL 1 = VILLAGE OF SAUGERTIES PARCEL 2 = ARM OF THE SEA (OPTION TO PURCHASE FROM CLEARWATER)
NOTES:	SHORELINE RESTORATION DESIGN BY SHABAZZ JACKSON, OCTOBER 17, 2013

NO.	DATE	REVISIONS	DRN	APPR
2.	13 FEB '14	PEA GRAVEL INSTEAD OF BOARD WALK PER VILLAGE REQUEST	JGJ	JGJ
1.	14 JAN '14	BULKHEAD REPAIR ON VILLAGE PROPERTY PER VILLAGE REQUEST		

GREENWAY ENVIRONMENTAL SERVICES
P.O. BOX 294
BEACON, NY 12508

ESOPUS CREEK SHORELINE RESTORATION

SITE PLAN
C-2

JANSEN ENGINEERING, PLLC
72 COLBURN DRIVE
POUGHKEEPSIE, NY 12603
OFFICE (845) 505-0324
JGJANSEN@JANSEN-ENGINEERING.COM

DATE: OCTOBER 17, 2013

JOLANDA G. JANSEN, P.E.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

Proposed Project

Village of Saugerties

Water Supply Protection: Pre-Filter

Project Description: Install a pre-filter at the Village of Saugerties Potable Water Treatment Plant allowing the treatment plant to continue operating during storm events. Currently, the water supply is not protected from inflow of turbid water during storms and therefore the treatment plant must be taken off-line during turbid events. Excessively high turbidity experienced during Hurricane Irene, Superstorm Sandy and Tropical Storm Lee forced the shutdown of the Village of Saugerties Potable Water Treatment Plant. This will permanently increase the resiliency of the existing drinking water system in Saugerties.

Estimated Cost: $1,600,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation. NYS Department of Health review of treatment modifications is likely.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Village of Saugerties

This project would be coordinated between the Town and Village of Saugerties.

Anticipated Risk Reduction: The risk reduction benefits associated with this project include continuous protection of the water treatment infrastructure, an essential service during disasters and a reduction of risk of additional damage and future repair/maintenance to municipal systems and facilities.

Cost Benefit Summary: The installation of a pre-filter would increase resiliency of the water treatment system for the foreseeable future. Its benefits would be long-term, although it would require periodic maintenance. Savings in local government expenditures would occur because the continued operation of the water treatment plant would reduce the need for alternative provision of potable water during a storm event. The project would support the Mid-Hudson Regional Economic Development Council's goal of investing in key infrastructure improvements, including water and sewer infrastructure.

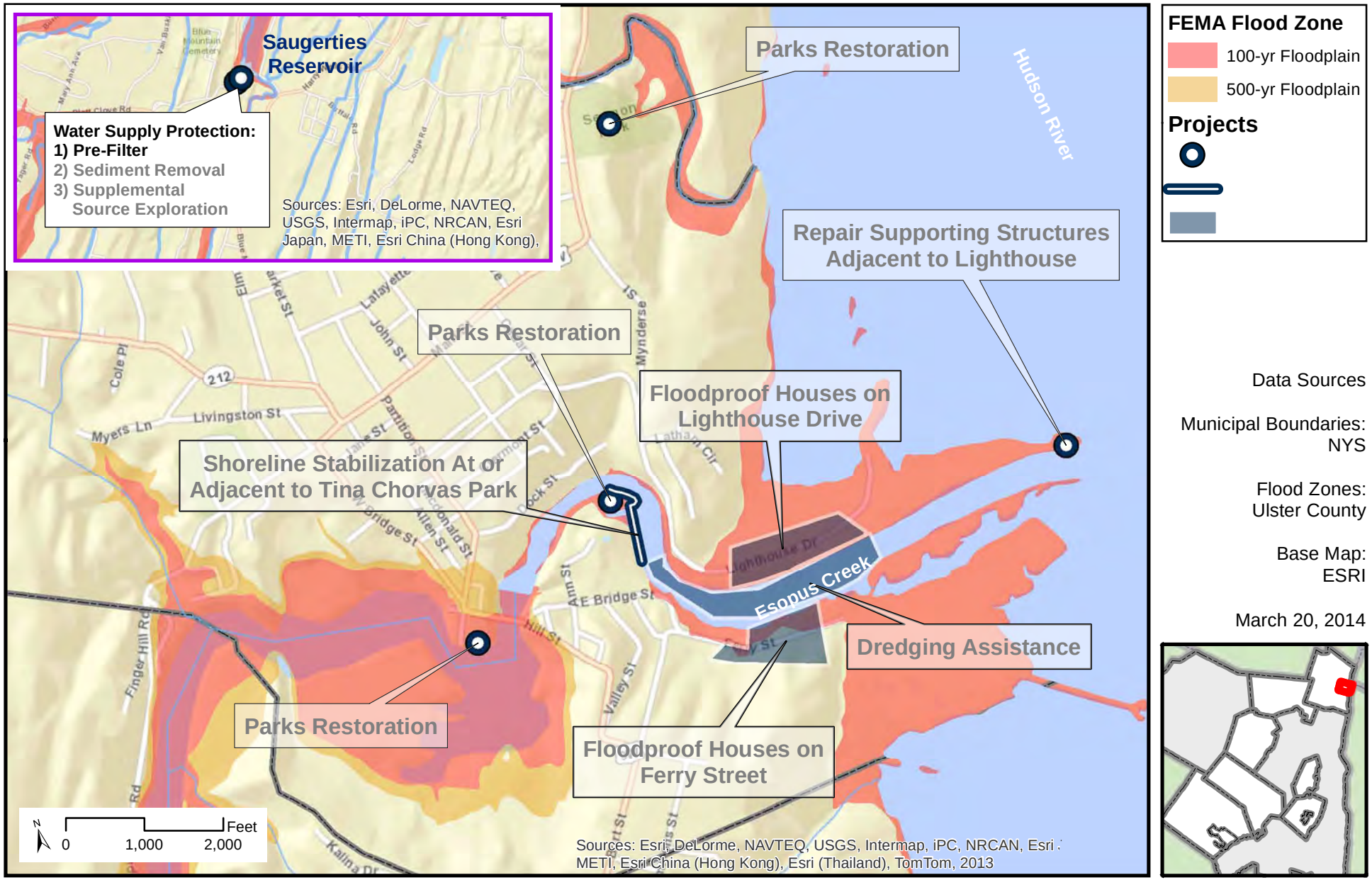
Co-Benefits of Project:

- Economic Benefits: Installation of a pre-filter to the water treatment plant would provide a secure potable drinking water supply to Village residents during storm events. Availability of potable water would allow the Village to rebound faster and eliminate the need for purchase of bottled water. Longer term economic benefit would result in potential for residential and commercial growth with the increased availability of potable water. Continued provision of potable water and would improve the drinking water system's resiliency.

- Environmental Benefits: When drinking water reservoirs are turbid, the water treatment plant usually filters the water before disinfecting it. However, prolonged turbidity diffuses sunlight, slowing photosynthesis resulting in accelerated plant death, reducing the amount of dissolved oxygen and increasing the acidity (which lowers the pH level). Both of these effects harm aquatic animals. Turbidity also raises water temperature because the suspended particles absorb the sun's heat. Warmer water holds less oxygen, thus increasing, the effects of reduced photosynthesis. In addition, some aquatic animals may not adjust well to the warmer water, particularly during the egg and larval stages. Highly turbid water can clog the gills of fish, stunt their growth, and decrease their resistance to diseases. The organic materials that may cause turbidity can also serve as breeding grounds for pathogenic bacteria. Installation of the pre-filter would screen out large sediment that is created in conditions of extreme turbidity, allowing the secondary filter to function more efficiently in screening out the smaller suspended particles. The net environmental benefit is cleaner potable water and a better environment for aquatic plants and animals.

- Health and Social Service Benefits: This project does not specifically secure a health and social service facility, however, protecting the public water supply during storm events is critically important to the health and safety of the entire community.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014

Proposed Project

Village of Saugerties

Water Supply Protection: Silt & Debris Removal

Project Description: Remove accumulated silt and debris from the Village reservoir that was deposited as a direct result of stormwater from Hurricane Irene and Tropical Storm Lee. This project would restore reservoir capacity and protect water quality.

Estimated Cost: $365,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Village of Saugerties

This project would be coordinated between the Town and Village of Saugerties.

Anticipated Risk Reduction: Excessive sediment and debris in a reservoir diminishes the health and water storage capacity of the waterbody. This project will increase the reservoir's ability to handle increased volume of flood water, therefore reducing hazard exposure of nearby assets.

Cost Benefit Summary: Implementation of the project would allow for removal of accumulated silt and debris, improving the drinking water system in the foreseeable future. The benefits are medium to long-term, because the project may require additional dredging to remove accumulation from future storm events. The Town would also benefit since the Village provides water to the Town for a fee. The project would increase resiliency and reduce the need for investment in other water quality or capacity improvements, thereby reducing local government expenditures.

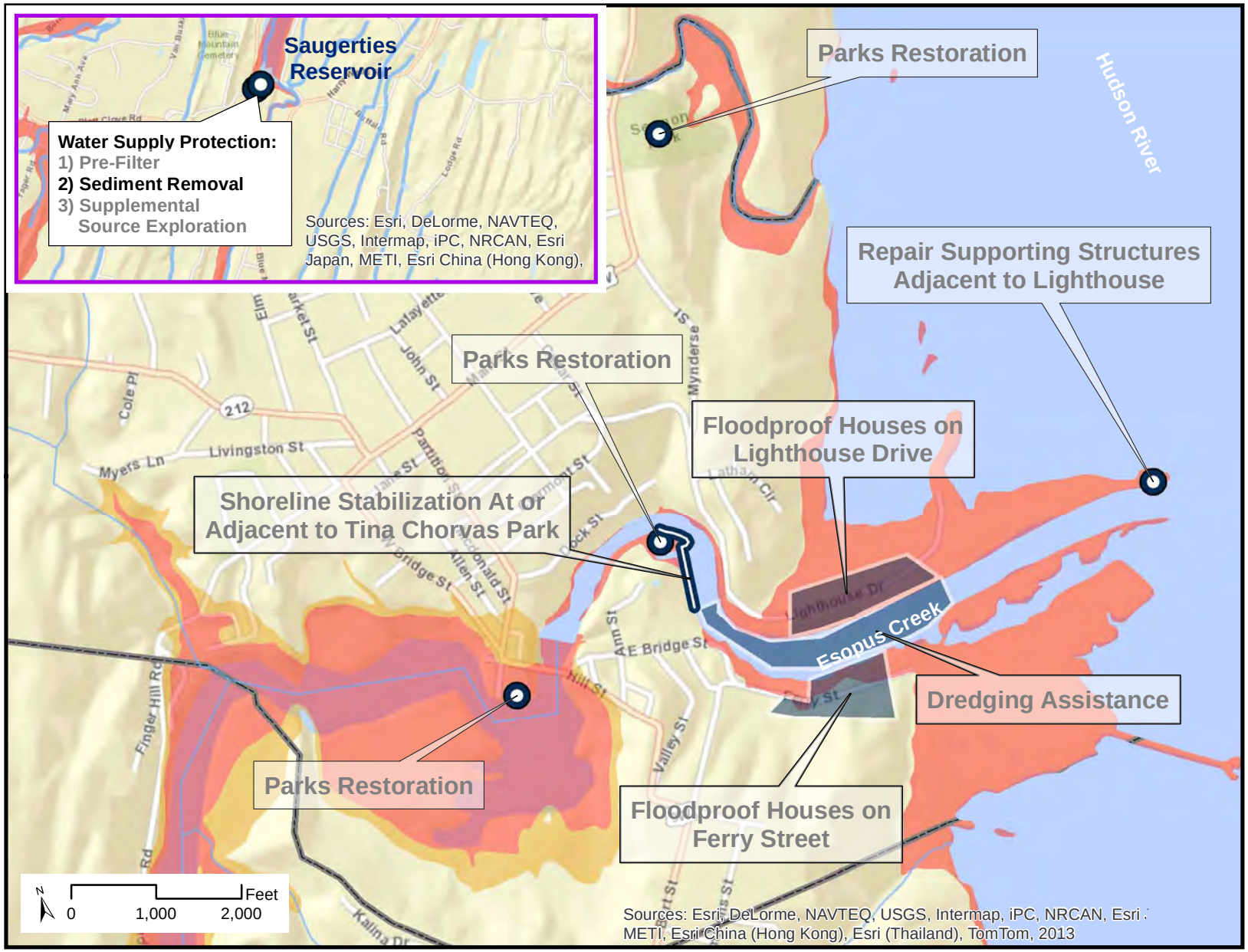
Co-Benefits of Project:

- Economic Benefits: Removal of accumulated silt and debris would improve the drinking water system's resilience. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.

- Environmental Benefits: This project would remove silt and debris from the reservoir. Accumulation of in-stream debris, which can increase stream constrictions at bridges and culverts, has detrimental effects on upstream flooding. Removal of this debris is intended to increase the flow capacity of a given stream, culvert, or other conveyance.

- Health and Social Service Benefits: The project does not specifically secure a health and social service facility. However, the entire community and adjacent municipalities will benefit from improved water quality.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

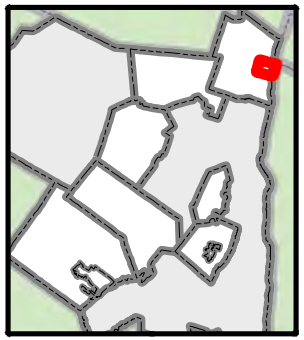
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Village of Saugerties

Water Supply Protection: Supplemental Source Exploration

Project Description: Scoping of required improvements to identify a secondary water source for the Village. Storm activity (during Hurricane Irene, Superstorm Sandy and Tropical Storm Lee) demonstrated a threat to the water supply during prolonged turbid events. Locating and developing a secondary source to supplement the reservoir would provide an alternative water supply during prolonged turbid events. Areas for ground water exploration have already been identified. The next phase of the study would include test drilling and additional ground water modeling. This project would be implemented in phases.

Estimated Cost: $385,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: One Year

Entities with Jurisdiction: Village of Saugerties

Anticipated Risk Reduction: The risk reduction benefits associated with this project include continuous protection of the water supply infrastructure, an essential service during disasters and a reduction of risk of additional damage and future repair/maintenance to municipal systems and facilities.

Cost Benefit Summary: Implementation of this project would provide a permanent secondary water source. Potential effects of the exploration and extraction activities on natural resources would require an assessment. This project supports the Mid-Hudson Regional Economic Development Council's goal of investing in key infrastructure improvements, including water and sewer infrastructure. In addition, development of a secondary water system would reduce the need for alternative provision of potable water during a prolonged storm or flooding event, which could result in major savings in local government expenditure.

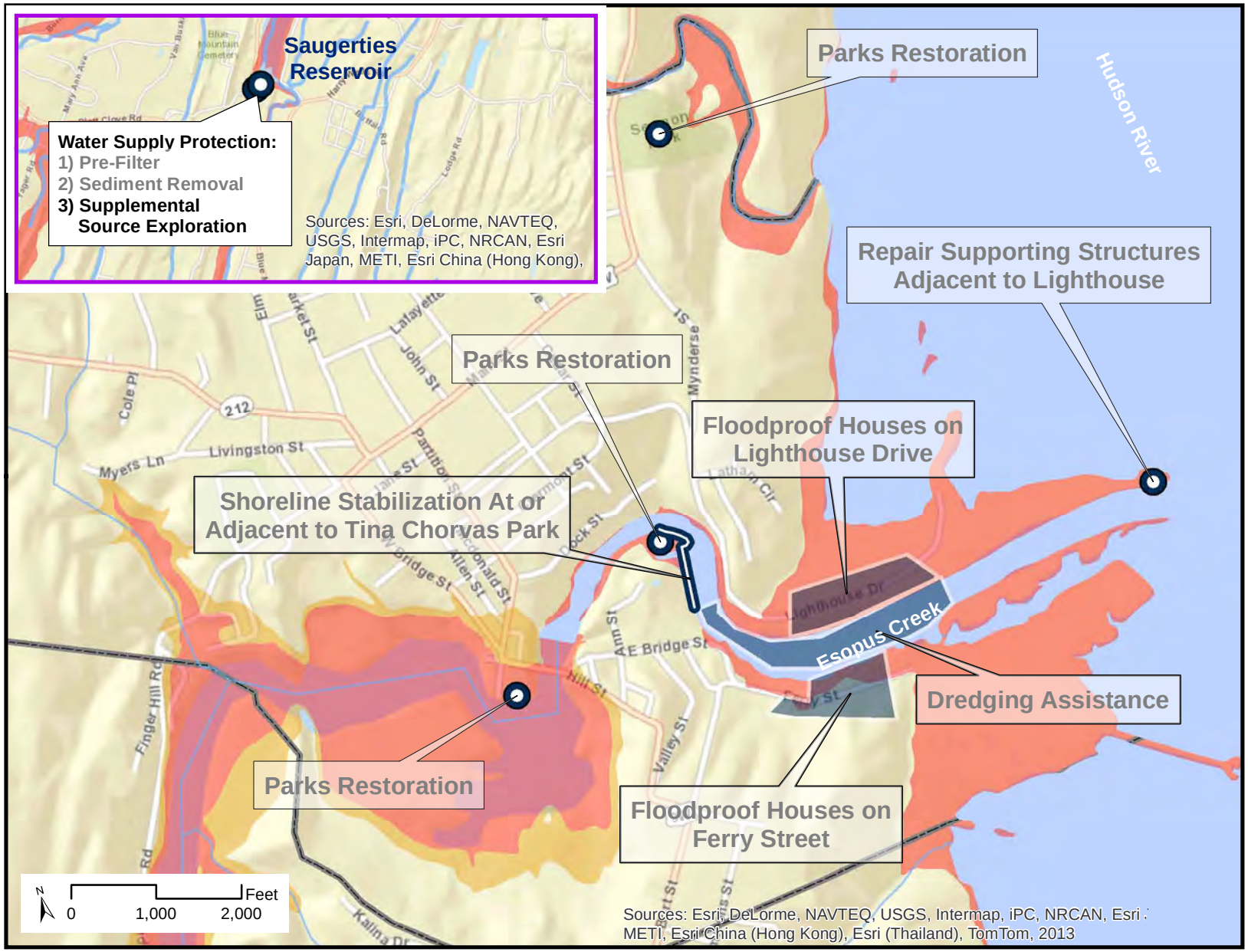
Co-Benefits of Project:

- Economic Benefits: Development of secondary water source would provide a secure potable drinking water supply to Village residents during and after storm events. Short term economic benefit during construction could include labor, materials, services and equipment expenditure. Availability of potable water would allow the Village to rebound faster and eliminate the need for purchase of bottled water. Longer term economic benefit would result in potential for residential and commercial growth with the increased availability of potable water.

- Environmental Benefit: When drinking water reservoirs are turbid, the water treatment plant usually filters the water before disinfecting it. However, prolonged turbidity diffuses sunlight, slowing photosynthesis resulting in accelerated plant death, reducing the amount of dissolved oxygen and increasing the acidity (which lowers the pH level). Both of these effects harm aquatic animals. Turbidity also raises water temperature because the suspended particles absorb the sun's heat. Warmer water holds less oxygen, thus increasing, the effects of reduced photosynthesis. In addition, some aquatic animals may not adjust well to the warmer water, particularly during the egg and larval stages. Highly turbid water can clog the gills of fish, stunt their growth, and decrease their resistance to diseases. The organic materials that may cause turbidity can also serve as breeding grounds for pathogenic bacteria. Installation of the pre-filter would screen out large sediment that is created in conditions of extreme turbidity, allowing the secondary filter to function more efficiently in screening out the smaller suspended particles. The net environmental benefit is cleaner potable water and a better environment for aquatic plants and animals.

- Health and Social Service Benefits: Protecting the public water supply during storm events is critically important to the health and safety of the entire community. Identifying and securing a secondary water supply source for potable water during periods of prolonged turbidity provides a secure potable drinking water supply to the entire Village.

Figure IV-13
Project Locations - Village of Saugerties



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

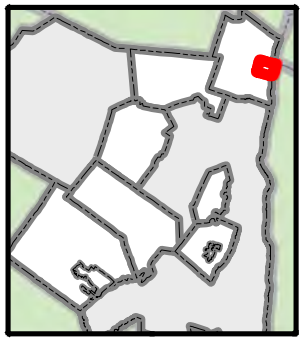
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Wawarsing

Oak Ridge Road Flood Mitigation

Project Description: Conduct an alternatives analysis for improvements to reduce flooding along Oak Ridge Road in and around the intersection of US Route 209. Both storm events caused general flooding and various stream restrictions led to localized flooding of Oak Ridge Road and surrounding properties. The analysis will determine the best method for improving flow and drainage in the area to prevent future flooding.

Estimated Cost: $76,300

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Wawarsing, NYS Department of Transportation

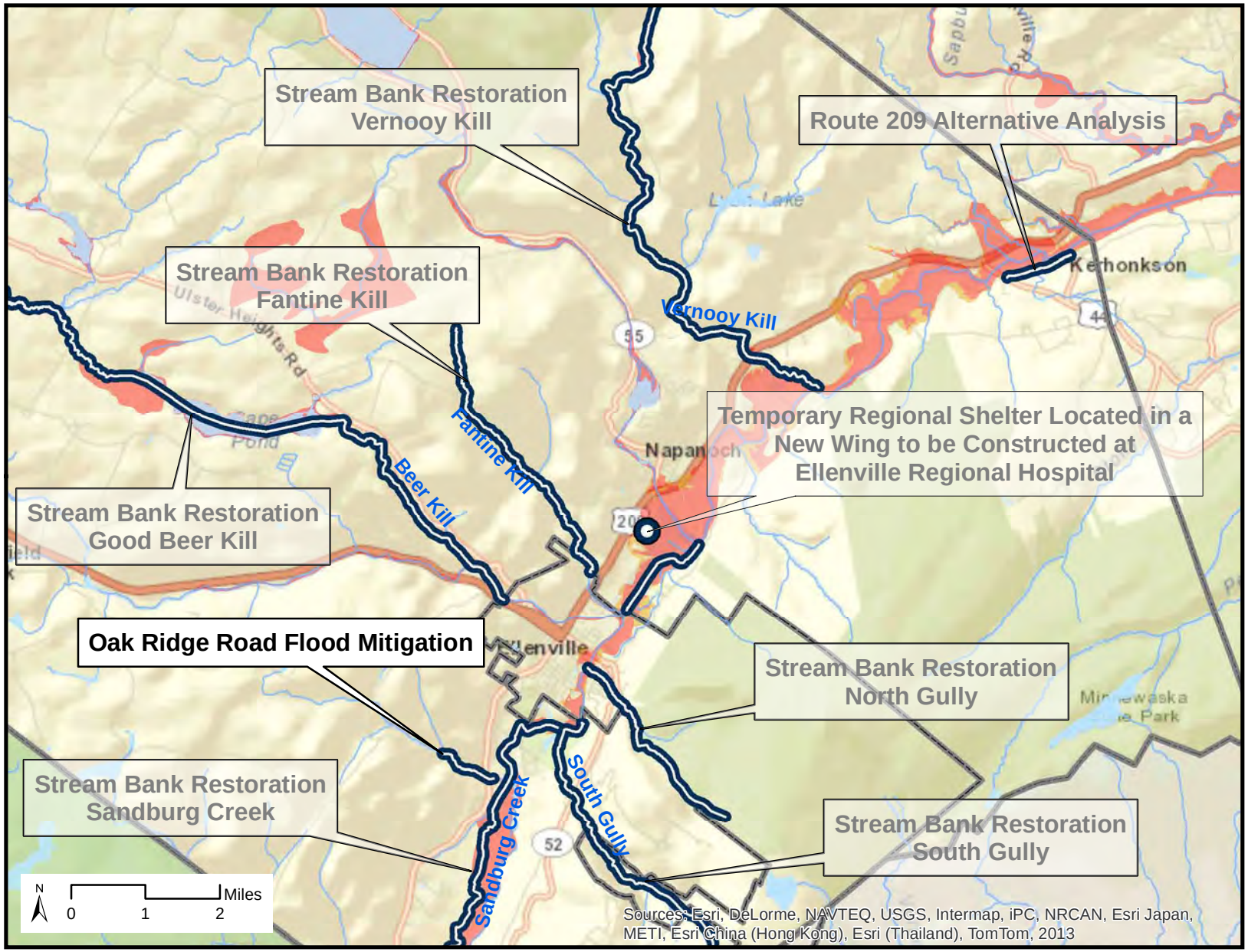
Anticipated Risk Reduction: The risk reduction benefits include a substantial decrease in safety risks for vehicles during storm events by minimizing road inundation. Implementation of the improvement measures would reduce risk of isolating adjacent residences due to road inundation, by ensuring that key intersections remain open providing uninterrupted access during and after storm events.

Cost Benefit Summary: Implementation of this project would result in sustainable benefits by reducing the risk of flooding of the roadway and nearby properties for the foreseeable future. There are no opportunity costs associated with implementation. The project's potential effect on natural resources from reduced flow would require additional assessment but the net benefit would create long term (potentially permanent) mitigation of flooding conditions. While implementation of the project would not inherently create new economic activity (retail, industrial, new construction, or permanent jobs), the project would improve access to the Nevele Resort and would support the Mid-Hudson Regional Economic Development Council's economic development goal of supporting the tourism industry by promoting destination hotels. Other benefits include savings of local government expenditures from reduced flooding of the roadways for improved emergency vehicle access and lower reconstruction and rehabilitation costs for roadways.

Co-Benefits of Project:

- Economic Benefits: Improvements would provide flood mitigation at a key intersection of US Route 209 that would protect the roadway and adjacent properties and maintain access to the Nevele Resort.
- Environmental Benefits: Roadway improvement projects require examination of existing and future storm flows and floodway constriction characteristics of adjacent waterways so that the chosen design can withstand future storm events without damage. Improving the flow capacity of a waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property.
- Health and Social Service Benefits: The project does not specifically secure a health and social service facility. However, the entire community and adjacent municipalities will benefit from reduced roadway flooding and uninterrupted access to and along Route 209, a regional through route connecting various communities to vital health and social service facilities and providers. This will significantly improve access for emergency service providers.

Figure IV-16
Project Locations - Wawarsing



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

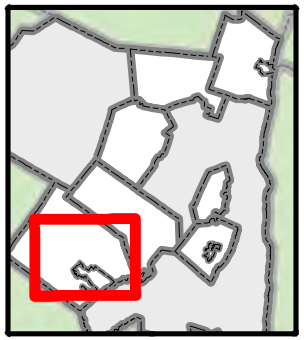
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Proposed Project

Town of Wawarsing

Route 209 Alternative Analysis

Project Description: In both Hurricane Irene and Tropical Storm Lee, Route 209 in Kerhonkson flooded, which prohibited through access for residents and emergency service providers. The alternatives analysis would identify an alternative route for 2-way traffic flow, thereby providing a viable secondary access route when 209 is closed.

Estimated Cost: $75,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Wawarsing, NYS Department of Transportation

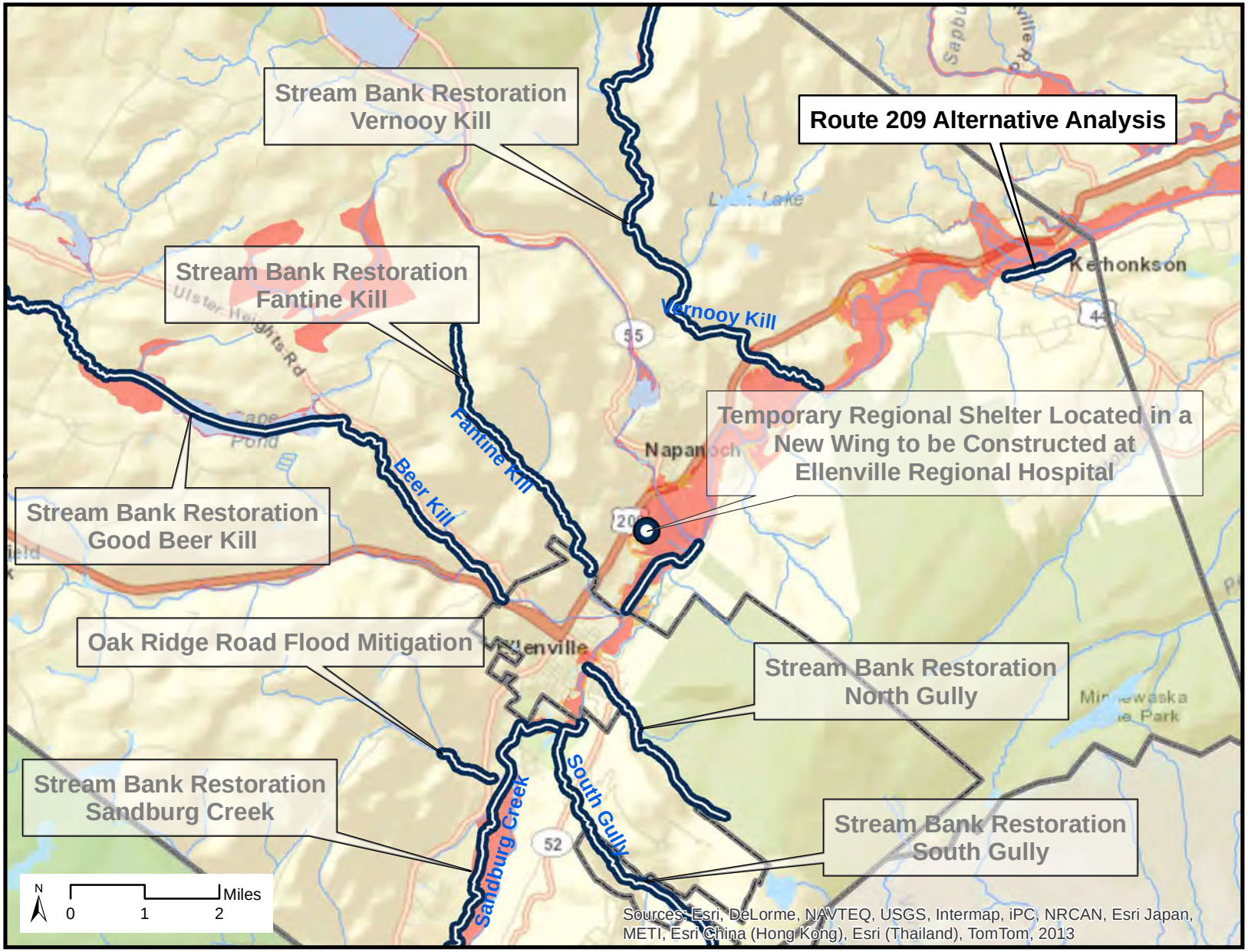
Anticipated Risk Reduction: The risk reduction benefits include a substantial decrease in safety risks for vehicles during storm events by minimizing road inundation. Implementation of the improvement measures would reduce risk of isolation of adjacent residences due to road inundation, by ensuring that key intersections remain open, providing uninterrupted access during and after storm events.

Cost Benefit Summary: Implementation of the project would provide a permanent alternative transportation route, with a long-term useful life. Potential traffic congestion and resulting air quality impacts from re-routed traffic would require additional assessment. Although the project would not create any permanent jobs or result in primary economic impacts, providing alternative transportation routes would support more efficient emergency response in the event of the Route 209 road closure with resulting savings in local government expenditures.

Co-Benefits of Project:

- Economic Benefits: The project would provide alternative access routes allowing for improved access, including emergency access, during flooding of Route 209.
- Environmental Benefits: Roadway improvement projects require examination of existing and future storm flows and floodway constriction characteristics of adjacent waterways so that the chosen design can withstand future storm events without damage. Improving the flow capacity of a waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property.
- Health and Social Service Benefits: The project does not specifically secure a health and social service facility. However, the entire community and adjacent municipalities will benefit from reduced roadway flooding and uninterrupted access to and along Route 209, a regional through route connecting various communities to vital health and social service facilities and providers. This will also significantly improve access for emergency service providers.

Figure IV-16
Project Locations - Wawarsing



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

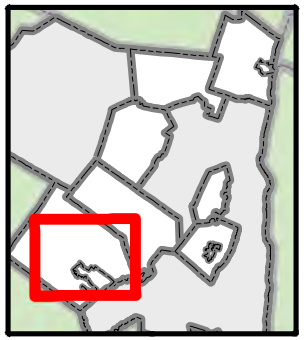
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Woodstock

John Joy Road Improvements

Project Description: Raising approximately 400 feet of John Joy Road and installing two culverts will prevent the road from being inundated during future storm events. Low elevation and poor drainage led to roadway inundation of John Joy Road overwhelming the storm drain system. Resized culverts and elevating the road will minimize localized flooding of the road in during and after future storm events.

Estimated Cost: $75,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Woodstock

Anticipated Risk Reduction: The roadway will be raised above the base flood elevation. This would reduce the vulnerability of the asset while minimizing its exposure to hazards. Initial evaluation of the potential road raising based on a review of the existing Flood Insurance Study and Flood Insurance Rate Map (FIRM) indicate that raising the road alone could limit conveyance capacity and have an upstream impact. This project is therefore proposed to be evaluated and implemented in conjunction with proposed culvert resizing and bridge modification.

Cost Benefit Summary: Implementation of this project would result in sustainable benefits by reducing the risk of flooding of roadway and the surrounding area (including school, park, and residential neighborhood) for the foreseeable future. The project's potential effect on natural resources from the installation of culverts would require additional assessment but the net benefit would create long term (potentially permanent) mitigation of flooding conditions. While implementation of the project would not generate any permanent jobs, reduced flooding and improved access to residential area would result in more efficient emergency response efforts. In addition, reduced flooding of roadway and park would result in lower reconstruction and rehabilitation costs following future storm events.

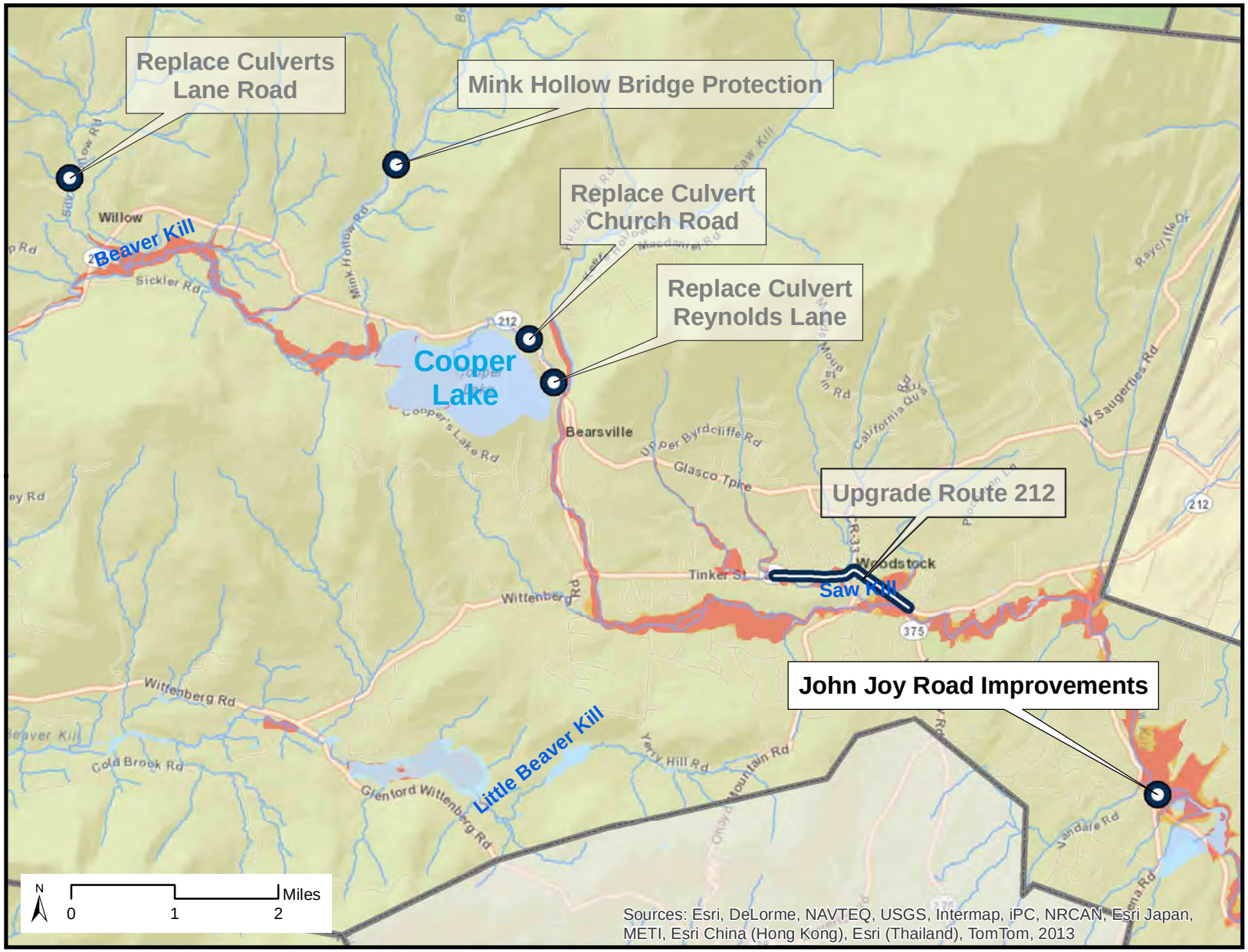
Co-Benefits of Project:

- Economic Benefits: The raising of the roadway and installation of culverts would provide permanent flood mitigation for roadway and nearby residences, park, and school. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.

- Environmental Benefits: Roadway improvement projects require examination of existing and future storm flows and floodway constriction characteristics in adjacent waterways so that the chosen design can withstand future storm events without damage. Improving the flow capacity of a waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property. Undersized culverts can impede storm flows and consequently exacerbate upstream flooding. Resizing culverts, in the context of an overall assessment of storm flow routing, is an important component of reducing flood damage. Replacing an undersized culvert with appropriately sized infrastructure improves function by increasing capacity in the channel to accommodate additional demand created by storm water. Maintaining the natural channel will improve water quality and also prevent detrimental impact to habitat for flora and fauna.

- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage conditions along its roadways. The resulting reduction in roadway flooding will provide more direct service from fire suppression and medical emergency providers to residents. Currently, when the road floods, the closest firehouse is inaccessible and the next closest firehouse is in Saugerties. Improvements to John Joy Road will allow for uninterrupted access to vital health and social service facilities and providers.

Figure IV-17
Project Locations - Woodstock



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

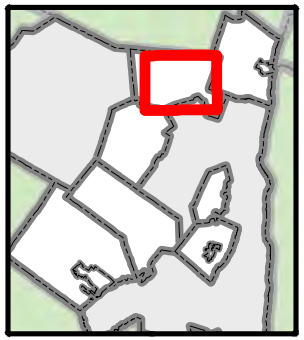
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Woodstock

Mink Hollow Bridge Protection

Project Description: Install stacked rock wall sheet piling to protect Mink Hollow Bridge, which was damaged by Hurricane Irene and Tropical Storm Lee. Bridge fortification would protect the travel way, prevent future erosion and potential bridge failure both during and after future flood events.

Estimated Cost: $190,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Woodstock

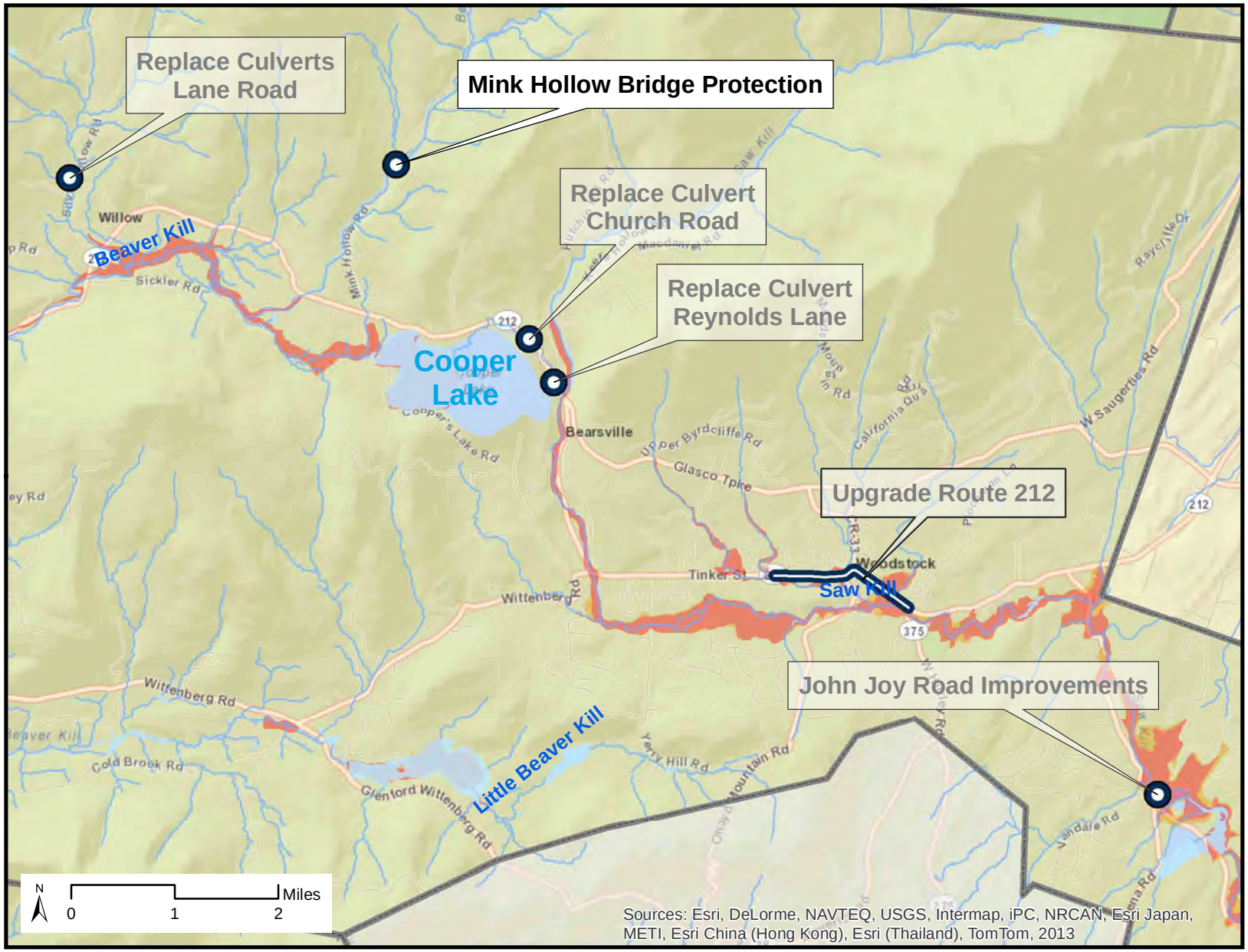
Anticipated Risk Reduction: This project constitutes a defensive flood protection for Mink Hollow Road Bridge which will reduce the exposure of the asset.

Cost Benefit Summary: Implementation of this project would result in sustainable benefits by reducing the risk of flooding of the Mink Hollow Bridge for the foreseeable future. The infrastructure improvements resulting from this project would create long-term benefits by providing permanent flood mitigation. While implementation of the project would not generate any permanent jobs, reduced flooding near the bridge would result in more efficient emergency response efforts along Mink Hollow Road and nearby residences. In addition, long-term bridge strengthening and reduced flooding and erosion damage would result in lower reconstruction and rehabilitation costs following future storm events.

Co-Benefits of Project:

- Economic Benefits: Installation of culverts would reduce damage to the Mink Hollow Bridge and would limit repair and reconstruction costs. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.
- Environmental Benefits: The bridge improvement project would fortify the bridge to withstand future storm events without damage. Minimizing floodway constrictions improves the flow capacity of a stream mitigating upstream and downstream flooding to make its flow, flooding behavior, and biological components more stable and sustainable.
- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-17
Project Locations - Woodstock



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

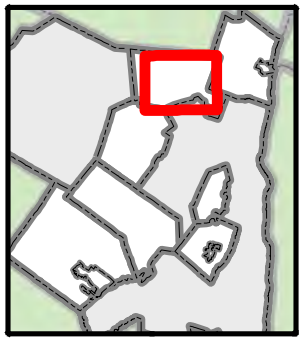
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Woodstock

Replace Culverts-Reynolds Lane and Church Road

Project Description: Replace existing undersized metal culverts under the bridge at the intersection of Rte 212 and Reynolds Lane and at intersection of Church Rd and Rte 212 with appropriately sized concrete box culverts. During Hurricane Irene and Tropical Storm Lee, insufficient culvert capacity around Reynolds Lane and Church Road caused roadway flooding overwhelming the storm drainage system. Appropriately sized culverts will minimize localized flooding of the road in future storm events. Governor Andrew M. Cuomo announced in January 2014 that the bridge that carries NY Rt. 212 over the Beaverkill will be replaced and funded by New York State.

Estimated Cost: $125,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Woodstock, NYS Department of Transportation

Anticipated Risk Reduction: Right-sizing the culverts under the Reynolds Lane and Church Road bridges should reduce the vulnerability of the assets by decreasing the incidence and impact of flooding on their roadways.

Cost Benefit Summary: Implementation of this project would result in sustainable benefits by reducing the risk of flooding of roadways for the foreseeable future. The potential effect on natural resources resulting from installation of the culverts would require an assessment but the improvements would create long-term benefits by providing permanent flood mitigation. Although implementation of the project would not generate any permanent jobs, reducing flooding on roadways would result in more efficient emergency response along Route 212, the main transportation corridor in the community. In addition, reduced flooding would result in lower reconstruction and rehabilitation costs following future storm events (a savings in local government expenditure).

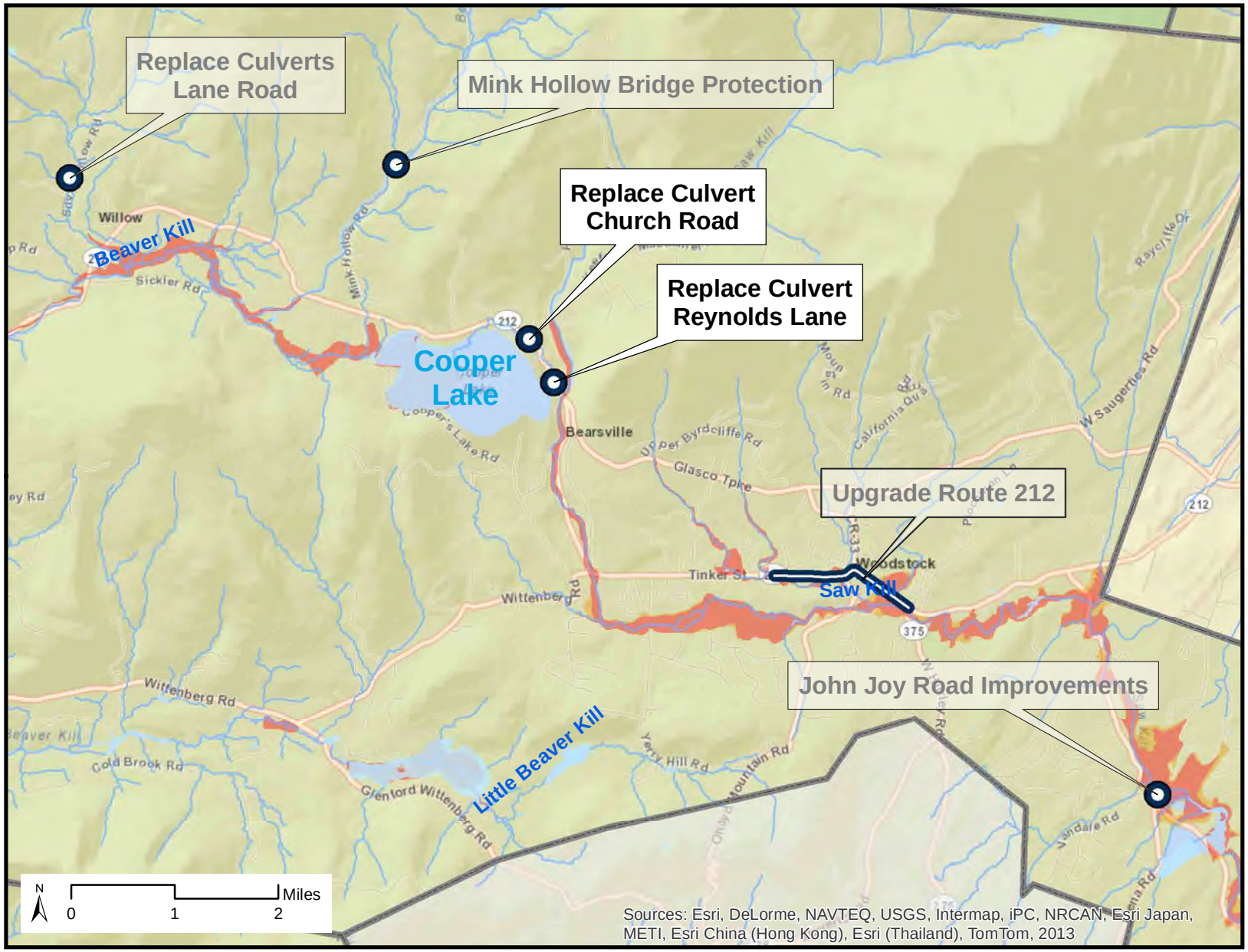
Co-Benefits of Project:

- Economic Benefits: Installation of adequately sized culverts would provide permanent flood mitigation to roadways and nearby residences. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.

- Environmental Benefits: Undersized culverts can impede storm flows and consequently exacerbate upstream flooding. Resizing culverts, in the context of an overall assessment of storm flow routing, is an important component of reducing flood damage. Replacing an undersized culvert with appropriately sized infrastructure improves stream function by increasing capacity in the channel to accommodate additional demand created by storm water. Maintaining the natural channel will improve water quality and also prevent detrimental impact to habitat for flora and fauna.

- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-17
Project Locations - Woodstock



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

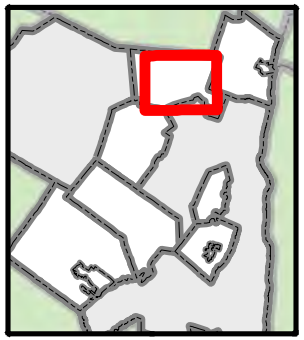
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Woodstock

Replace Culverts-Lane Road

Project Description: Replace an inadequately sized culvert at intersection of Lane Road and Silver Hollow Road with appropriately sized concrete box culvert. During Hurricane Irene and Tropical Storm Lee, roadways were inundated and overwhelmed the storm drainage system. Widespread flooding due to insufficient culvert capacity led to roadway inundation around Lane Road and Silver Hollow Road. Resizing culverts to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms.

Estimated Cost: $450,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: Six Months

Entity with Jurisdiction: Town of Woodstock

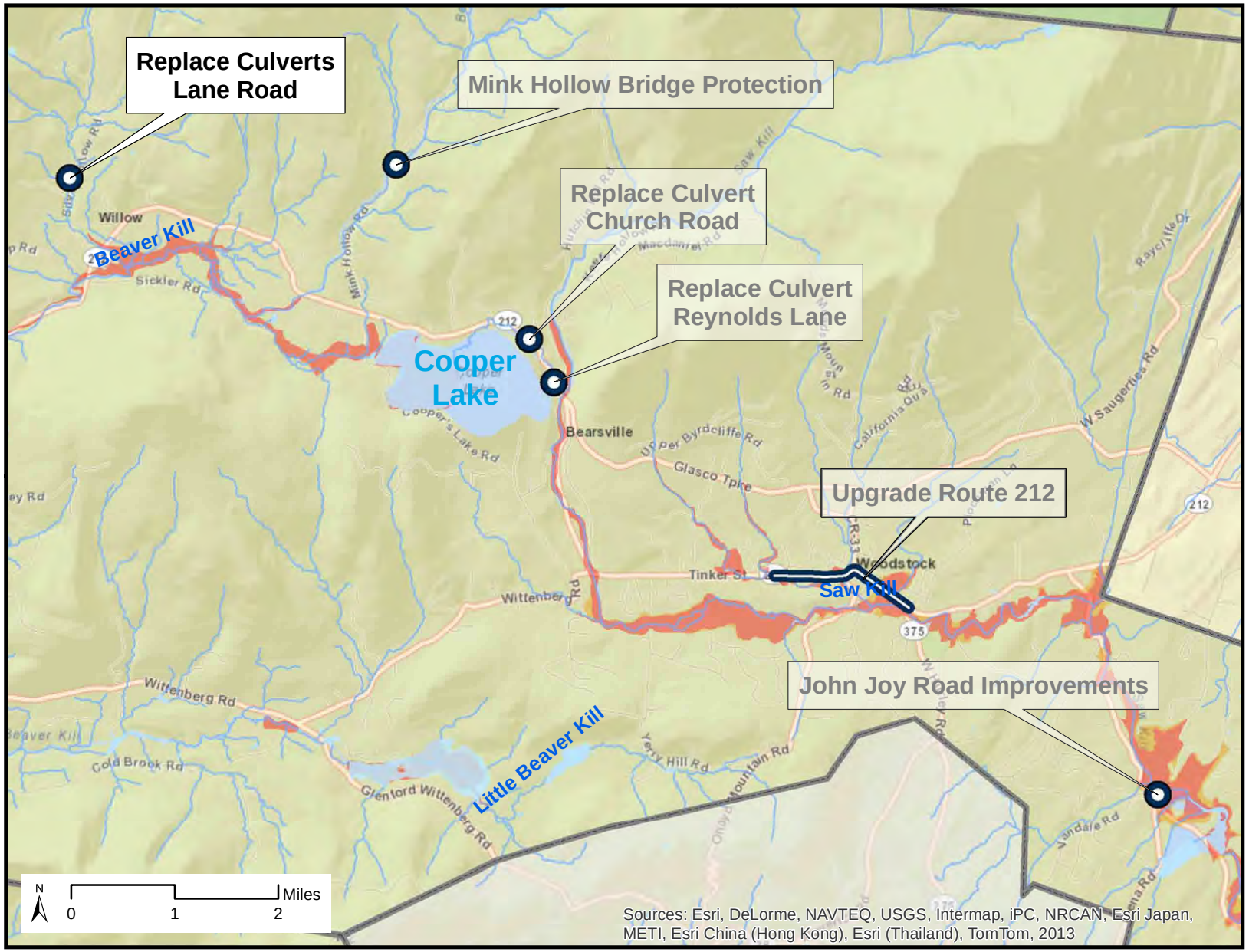
Anticipated Risk Reduction: Right-sizing the culvert under Lane Road should reduce the vulnerability of the asset by decreasing the incidence and impact of flooding on the roadway.

Cost Benefit Summary: Implementation of this project would result in sustainable benefits by reducing the risk of flooding of roadways for the foreseeable future. The potential effect on natural resources resulting from installation of the culverts would require an assessment but the improvements would create long-term benefits by providing permanent flood mitigation. Although implementation of the project would not generate any permanent jobs, reducing flooding on roadways would result in more efficient emergency response to residential areas that would otherwise be cut off during flooding events. In addition, reduced flooding would result in lower reconstruction and rehabilitation costs following future storm events (a savings in local government expenditure).

Co-Benefits of Project:

- Economic Benefits: Installation of an adequately sized culvert would provide permanent flood mitigation to roadway and nearby residences. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.
- Environmental Benefits: Undersized culverts can impede storm flows and consequently exacerbate upstream flooding. Resizing culverts, in the context of an overall assessment of storm flow routing, is an important component of reducing flood damage. Replacing an undersized culvert with appropriately sized infrastructure improves stream function by increasing capacity in the channel to accommodate additional demand created by storm water. Maintaining the natural channel will improve water quality and also prevent detrimental impact to habitat for flora and fauna.
- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-17
Project Locations - Woodstock



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

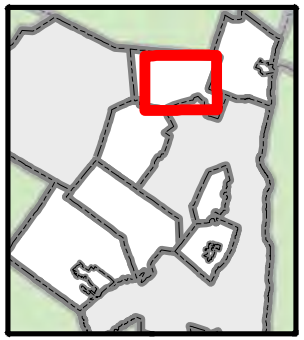
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Proposed Project

Town of Woodstock

Upgrade Route 212

Project Description: Upgrade the drainage system along an approximately one mile stretch of Route 212 from Route 375 to the Post Office using green infrastructure features for stormwater management. Currently, poor drainage leads to roadway inundation because storm drains become overwhelmed. Roadway inundation during Hurricane Irene and Tropical Storm Lee, resulted in road closures cutting off access to Woodstock's Central Business District (CBD), impacting business owners, and preventing residents from accessing much needed supplies. Upgrading the stormwater management system utilizing sustainable infrastructure would improve drainage along this one mile stretch of road protecting access during and after future storm events.

Estimated Cost: $2,500,000

Anticipated Regulatory Requirements:

None, unless Storm Water Pollution Prevention Plan is required.

Anticipated Timeframe: 6-12 Months

Entity with Jurisdiction: Town of Woodstock

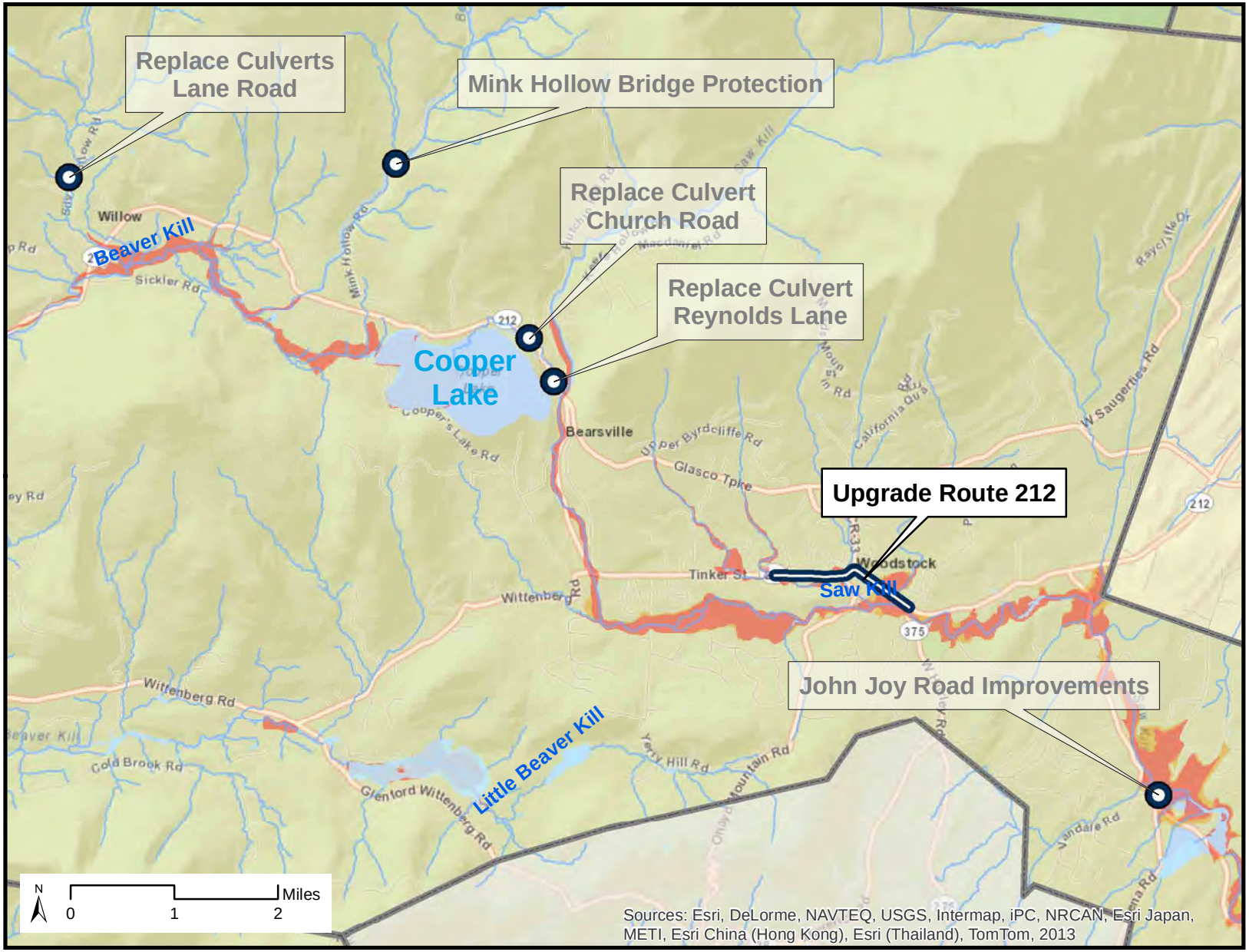
Anticipated Risk Reduction: Improved drainage on Route 212 will minimize reduce roadway inundation reducing the vulnerability of the assets along or adjacent to Route 212.

Cost Benefit Summary: Implementation of the project, depending on the scale of the infrastructure improvements, would reduce the risk of flooding in the CBD and provide permanent, sustainable flood mitigation. The potential effect on natural resources would require an assessment. It is anticipated that improved conditions in the CBD would increase retail activity and patronage following flooding events and may result in improved business and job creation of up to ten permanent jobs* secured and created. The project would support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established Town centers, thereby supporting tourism. Reduced flooding and improved access in the CBD would result in more efficient emergency vehicle response efforts and reduce vulnerability to public facilities and infrastructure, thereby reducing reconstruction and rehabilitation costs following future storm events (reducing local government expenditures).

Co-Benefits of Project:

- Economic Benefits: Drainage improvements along Route 212 would provide the CBD with flood mitigation and would allow the road to remain operational during storm or flooding events. Upgrades to the stormwater management and drainage system would provide permanent flood mitigation to roadways and nearby residences. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.
- Environmental Benefits: Roadway improvement projects require examination of existing and future storm flows in adjacent waterways and floodway constriction characteristics so that the chosen design can withstand future storm events without damage. Improving the flow capacity of a waterway minimizes rates of erosion, decreases surface water elevations, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Mitigated upstream and downstream flooding protects roadways from inundation protecting public and private property.
- Health and Social Service Benefits: The Town and entire community will benefit from improved drainage and the resulting reduction in roadway flooding will provide uninterrupted access to vital health and social service facilities and providers.

Figure IV-17
Project Locations - Woodstock



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

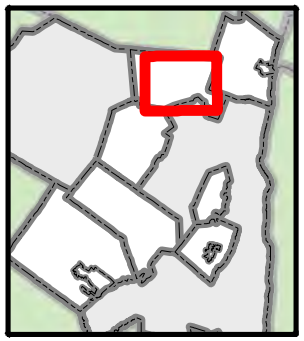
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Featured Project

Village of Ellenville

Mobile Water Pumps

Project Description: Purchase of mobile water pumps to be used by the Fire companies to expedite removal of flood water from critical facilities. Facilities were damaged by inundation forcing closure and resulting in long term damage to properties, both during the storm events and after from water damage and mold. Mobile water pumps would serve the immediate needs and also prevent long term damage by removing standing water. Availability of these pumps would mitigate or prevent damage in future events.

Estimated Cost: $60,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: Three Months

Entity with Jurisdiction: Village of Ellenville

Anticipated Risk Reduction: The provision of mobile water pumps reduces the vulnerability of any assets that the pump may serve, as it allows those facilities to recover more quickly after a flood event. This reduces the vulnerability of critical facilities, which may serve socially vulnerable populations within the Town.

Cost Benefit Summary: The purchase of mobile water pumps is a low cost measure, where the benefit outweighs the costs of not having the capability to quickly and efficiently pump water from select critical facilities during an emergency. Bringing key Village facilities back on line during and after storm events increases the resiliency of the community. The use of mobile water pumps would require a noise and air quality assessment. While their use is not generally considered "sustainable", they have a useful life of 10 to 20 years. Their use would not generate any permanent jobs, however, expedited floodwater removal would reduce labor costs during emergency response and would limit damage to public facilities and infrastructure resulting in lower reconstruction and rehabilitation costs following future storm events (a savings in local government expenditure).

Co-Benefits of Project:

- Economic Benefits: Mobile water pumps would improve recovery efforts following a storm or flooding event by providing the Village with proper equipment that could be dispatched to the areas where it is most needed. This low-cost project would greatly increase the Village's preparedness for future events and ability to bring facilities back on line quickly. In addition, the project would strengthen emergency response capabilities by supporting the resiliency of the Village to meet the needs of its residents. Finally, expedited removal of flood waters would minimize the potential for significant structural damage that could result from prolonged water exposure.
- Environmental Benefit: Expedited removal of standing water minimizes the risk of bacterial and mold growth and contamination that results from prolonged standing water.
- Health and Social Service Benefits: The entire community would benefit from expedited flood water removal from critical facilities during storm. Provision of portable water pumps would allow expedited flood water removal from critical facilities during storms.

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Featured Project

Town of Olive

Relocate Town Offices & Highway Complex out of Flood Plain

Project Description: Conduct a space allocation and needs analysis to determine requirements for the Town and Highway offices and equipment, so that they would be relocated out of the floodplain. Once needs have been identified, draft building plans would be prepared and property for relocation would be acquired. The new facility would be constructed using green technology and infrastructure. The new location outside the floodplain would enable the Town and Highway offices to serve as a Command Center during disasters to meet the FEMA'S National Incident Command System requirements.

Estimated Cost: $6,000,000

Anticipated Regulatory Requirements:

None

Anticipated Timeframe: Two Years

Entity with Jurisdiction: Town of Olive

Anticipated Risk Reduction: Relocating vital Town facilities out of the floodplain will eliminate the vulnerability of this asset from storm damage due to inundation. The risk reduction benefit of combining key emergency service and municipal operations into one fortified structure increases emergency service capabilities, reduces response times, and reduces risk to resident safety by ensuring continuity of essential services during and after storm events.

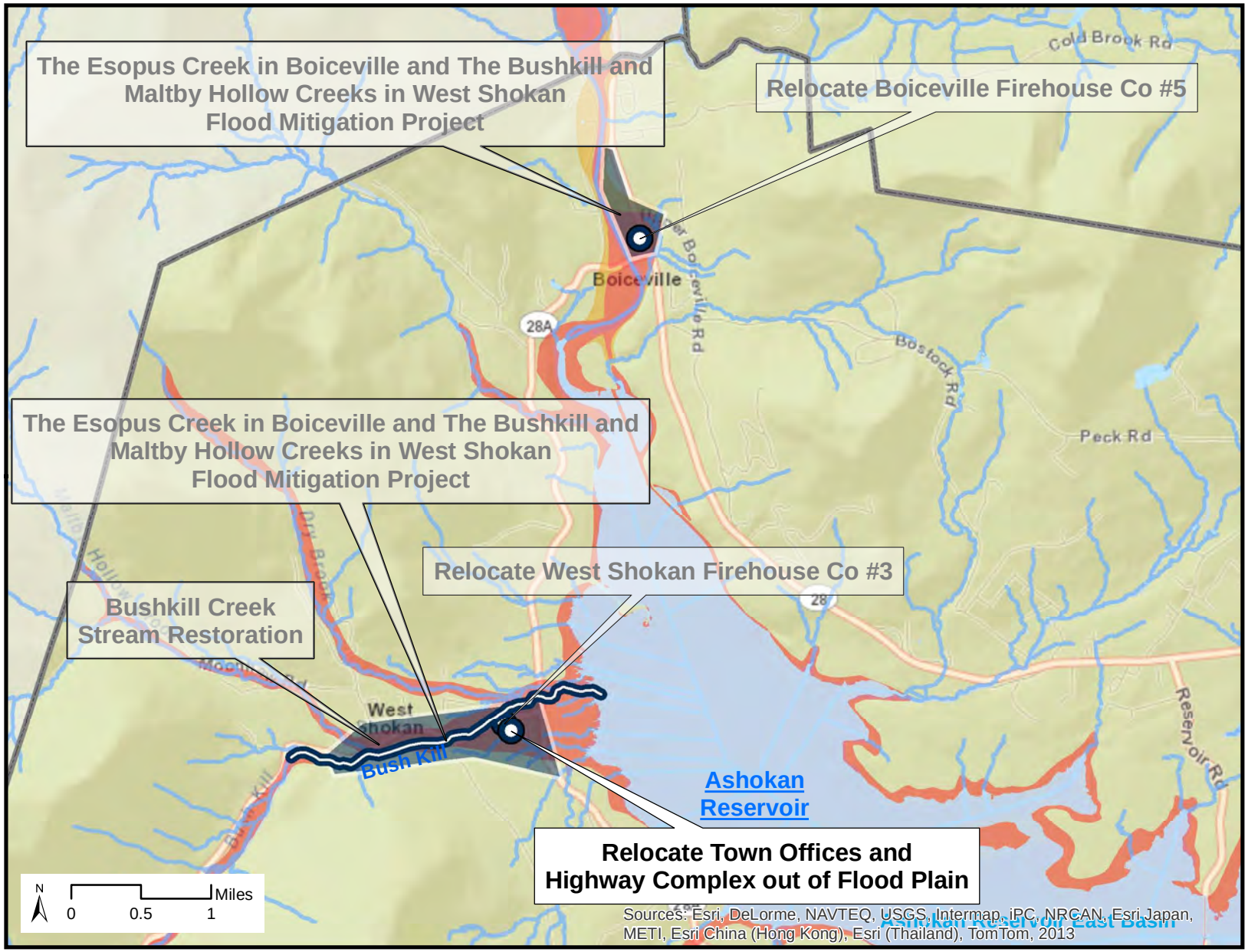
Cost Benefit Summary: This project would provide long-term benefits to the community because the relocation of the public facilities would provide permanent flood mitigation for the foreseeable future. Potential effects of relocation (including construction impacts and traffic impacts) would require an assessment. Opportunity costs may exist because the siting of new public facilities may displace other uses providing public benefits and/or tax revenue. Savings in local government expenditures are expected because the permanent relocation of public facilities outside the floodplain would improve emergency response, and would limit the cost of rehabilitation, reconstruction, and replacement of damaged equipment.

Co-Benefits of Project:

- Economic Benefits: Relocation of the Town and Highway offices and equipment outside of the floodplain would significantly reduce repetitive risk of damage to the facilities and equipment and would improve emergency response services with the establishment of the permanent Command Center. During the construction phase, short term economic benefit is realized in the form of local expenditures of goods, services, labor, materials and equipment. Longer term financial benefit is generated by the consolidation of municipal and highway services reducing infrastructure operating and maintenance costs. Use of the facility as a permanent Command Center would also enable emergency service personnel to allocate limited resources more efficiently.

- Health and Social Service Benefits: In an emergent situation, the provision of consolidated key municipal and emergency services would provide significant health and social service benefits to the community by efficiently securing the right personnel to assist residents in recovery efforts. Municipal officials are able to dispatch their emergency service personnel most efficiently and also coordinate with adjacent communities to make sure residents are secure and protected. Crisis counseling for rescuers and patients following a disaster can be dispatched from a central location. These individuals may need to interact with departmental personnel from several divisions as well as with personnel from adjacent communities. Some disasters may require that certain key department personnel gather periodically to be informed of disaster related developments and to make decisions about how best to fulfill the mission of the department. This is most easily achieved when key personnel are aggregated.

Figure IV-7
Project Locations - Olive



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

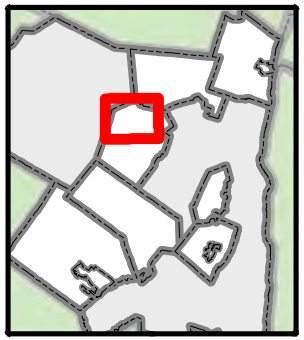
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



Featured Project

Town of Rochester

Rochester Creek Bridge

Project Description: Redesign and reconstruct the Rochester Creek Bridge to improve flow, and minimize damage from future flooding. The Rochester Creek Bridge suffered damage during Hurricane Irene, Superstorm Sandy and Tropical Storm Lee contributing to flooding of adjacent areas. Governor Andrew M. Cuomo announced in January 2014 that the bridge that carries US Route 209 over the Rochester Creek will be replaced and funded by New York State. NY Rising funds would be allocated to determine the optimal design for complimentary creek side repair.

Estimated Cost: $300,000

Anticipated Regulatory Requirements:

NYS Department of Environmental Conservation review of stream disturbance and NYS Department of Transportation (NYSDOT) coordination and collaboration as the road is under NYSDOT jurisdiction.

Anticipated Timeframe: 18-24 Months

Entity with Jurisdiction: NYSDOT

This project would be coordinated between the NYS DOT and the Town of Rochester.

Anticipated Risk Reduction: Design and reconstruction of the Rochester Creek Bridge will reduce flood levels in the vicinity of the existing bridge, increasing flood protection and improving safety. Implementation of the improvements will reduce risk to the community, decreasing the vulnerability of this key transportation asset, and eliminating the hazard caused by frequent inundation and road closure.

Cost Benefit Summary: Implementation of this project would have long-term benefits because the construction of a new bridge is expected to have a useful life of 50+ years. Although no permanent jobs are likely to be created, the project is expected to result in a short-term increase in construction activities. In addition to securing access, the project is expected to mitigate flooding events by redesigning the bridge abutments, and support structures to better accommodate storm water flow. Increasing the throughout would support the Town's resiliency and ability to recover more quickly after a storm event, resulting in savings in local government expenditure. The project would also support the Mid-Hudson Regional Economic Development Council's goal of promoting infrastructure investments in established city or village centers.

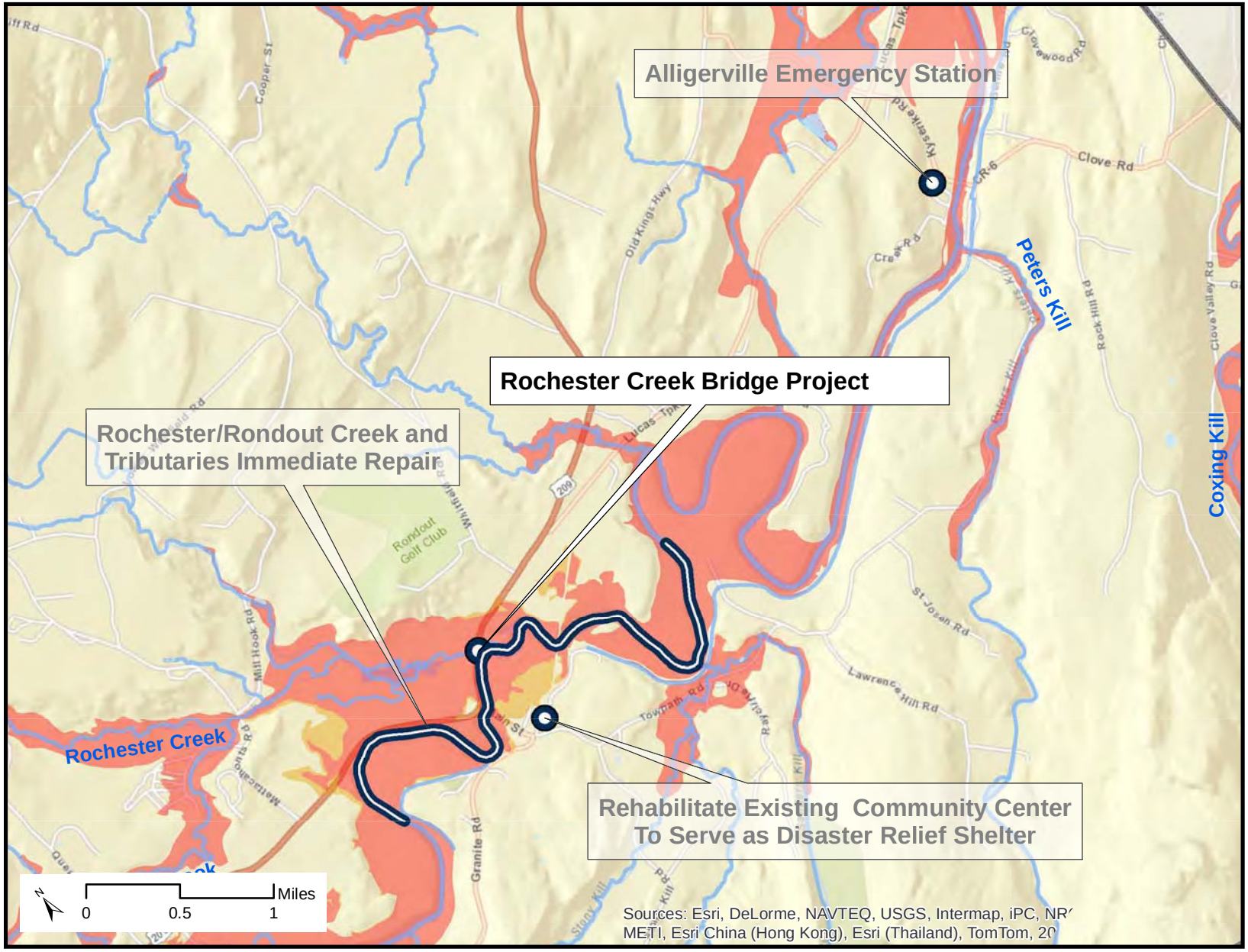
Co-Benefits of Project:

- Economic Benefits: By rebuilding the bridge with a more resilient design that accounts for stormwater flow, a critical access point in the community is restored securing access by emergency responders in a disaster event. This project would improve the resiliency of key infrastructure, thereby reducing future repair and maintenance costs associated with flood damage. In addition, construction and support jobs would be created during the building phase, and economic stimulus would be expected from purchase of goods, services, materials and equipment.

- Environmental Benefits: The redesign of bridges must examine existing and future stream storm flows so that the chosen design can both withstand future storm events without damage, and so that its floodway constriction characteristics can be understood in the context of region floodplain management. Improving the flow capacity of a stream is one of several important elements to mitigate upstream and downstream flooding by making its flow, flooding behavior, and biological components more stable and sustainable.

- Health and Social Service Benefits: The Town and entire community will benefit from the improved functioning of this key bridge, securing access to and from vital health and social services facilities and providers.

Figure IV-10
Project Locations - Rochester



FEMA Flood Zone

- 100-yr Floodplain
- 500-yr Floodplain

Projects

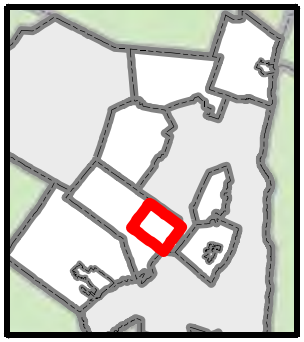
Data Sources

Municipal Boundaries:
NYS

Flood Zones:
Ulster County

Base Map:
ESRI

March 20, 2014



Featured Project

Town of Wawarsing

Mobile Water Pumps on Trailer

Project Description: Purchase of mobile water pumps to be used by the DPW and Highway Department to expedite removal of flood water from critical facilities. Facilities were damaged by inundation forcing closure and resulting in long term damage to properties, both during the storm events and after from water damage and mold. Mobile water pumps would serve immediate needs and also prevent long term damage by removing standing water. Availability of these pumps would mitigate or prevent damage in future events.

Estimated Cost: $60,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: Three Months

Entity with Jurisdiction: Town of Wawarsing

Anticipated Risk Reduction: The provision of mobile water pumps reduces the vulnerability of any assets that the pump may serve, as it allows those facilities to recover more quickly after a flood event. This reduces the vulnerability of critical facilities that will have access to the mobile water pumps. Many of the assets impacted by this project serve socially vulnerable populations within the Town.

Cost Benefit Summary: The purchase of mobile water pumps is a low cost measure, where the benefit outweighs the costs of not having the capability to quickly and efficiently pump water from select critical facilities during an emergency. Bringing key Town facilities back on line during and after storm events increases the resiliency of the community. The use of mobile water pumps would require a noise and air quality assessment. While their use is not generally considered "sustainable", they have a useful life of 10 to 20 years. Their use would not generate any permanent jobs, however, expedited floodwater removal would reduce labor costs during emergency response and would limit damage to public facilities and infrastructure resulting in lower reconstruction and rehabilitation costs following future storm events (a savings in local government expenditure).

Co-Benefits of Project:

- Economic Benefits: Mobile water pumps would improve recovery efforts following a storm or flooding event by providing the Town with proper equipment that could be dispatched to the areas where it is most needed. This low-cost project would greatly increase the Town's preparedness for future events and ability to bring facilities back on line quickly. In addition, the project would strengthen emergency response capabilities by supporting the resiliency of the Town to meet the needs of its residents. Finally, expedited removal of flood waters would minimize the potential for significant structural damage that could result from prolonged water exposure.
- Environmental Benefit: Expedited removal of standing water minimizes the risk of bacterial and mold growth and contamination that results from prolonged standing water.
- Health and Social Service Benefits: The entire community would benefit from the use of critical facilities during storm events. Provision of portable water pumps would allow expedited flood water removal from critical facilities during storms.

Featured Project

Town of Wawarsing

Portable Generators & Transfer Switches

Project Description: During Hurricane Irene and Tropical Storm Lee, key municipal and emergency service facilities lost power for extended periods. Portable generators would allow for an emergency source of power where needed. Purchase and distribution of portable generators to be transported where needed, i.e., gas stations, banks, food stores etc. to assist in getting vital services up and running until a more permanent solution could be arranged.

Estimated Cost: $50,000

Anticipated Regulatory Requirements:

None.

Anticipated Timeframe: Three Months

Entity with Jurisdiction: Town of Wawarsing

Anticipated Risk Reduction: Provision of mobile generators reduces the vulnerability of any assets that the generators may serve, as it allows those facilities to recover more quickly after a flood event, Many of the assets impacted by this project serve socially vulnerable populations within the Town.

Cost Benefit Summary: Back-up power generation is critical to ensure uninterrupted service and response. The potential benefits of the purchase of back-up generators are believed to outweigh the costs of not having this essential power source in an emergency. The project provides public benefits for the Town and the Village of Ellenville, because back-up power could be provided where it is most needed. Use of portable generators would require an air quality impact assessment. While their use is not generally considered "sustainable", they have a useful life of 10 to 20 years. Their use would not generate any permanent jobs; however, improved emergency power services would prevent closure of retail businesses, and provide the key benefit of maintaining emergency power to vital services thereby reducing reliance on public provision of these resources during emergencies (a savings in local government expenditure).

Co-Benefits of Project:

- Economic Benefits: Portable generators would help maintain the provision of services and would improve recovery efforts following a storm or flooding event. This low-cost project would greatly increase the Town's preparedness for future events. In addition, the project would strengthen emergency response capabilities by supporting the resiliency of the Town to meet the needs of its residents.

- Health and Social Service Benefits: The entire community would benefit from the use of critical facilities during power outages. Provision of portable generators would allow power to be brought back on line at key Town facilities, some of which could be used for emergency sheltering if needed.

Featured Project

Town of Wawarsing

Stream Bank Restoration

Project Description: Additional implementation of various stream bank restoration measures identified in the Proposed Rondout Watershed Management Study (Proposed Project) and the Stream Bank Restoration Project (Proposed). The Town has allocated additional funding for phased implementation to improve the health of the following streams and stream corridors: the Good Beer Kill-east and west branch, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully, and the Fantine Kill.

Estimated Cost: $12,500,000

Anticipated Regulatory Requirements:

This project will likely require an Article 15 permit from the NYS Department of Environmental Conservation.

Anticipated Timeframe: One Year

Entity with Jurisdiction: Town of Wawarsing

The project will be coordinated between the Town of Wawarsing and the Village of Ellenville.

Anticipated Risk Reduction: Excessive sediment and debris in stream beds result in constrictions and reduced capacity of waterways.

This project will increase the channel's ability to handle waterflow, therefore reducing hazard exposure of nearby assets. Critical assets in the Town of Wawarsing such as wastewater treatment plants, schools, emergency services and the Ellenville Regional Hospital (many of which serve socially vulnerable populations) are located near waterways and will be less exposed to flooding.

Cost Benefit Summary: Implementation of this project would permanently mitigate flooding along stream corridors, resulting in sustainable benefits. The useful life of the flood mitigation would be over a period of 10 to 20 years. The potential effect on natural resources throughout the area from changes to streams' flow and restoration of stream banks and beds would require an assessment. While implementation of the project would not inherently create new economic activity (retail, industrial, new construction, or permanent jobs), the project supports the Mid-Hudson Regional Economic Development Council's goal of improving and leveraging natural resources as drivers to tourism in the area. Other benefits include savings of local government expenditures from reduced flooding of the roadways, for improved emergency vehicle access and lower reconstruction and rehabilitation costs for roadways.

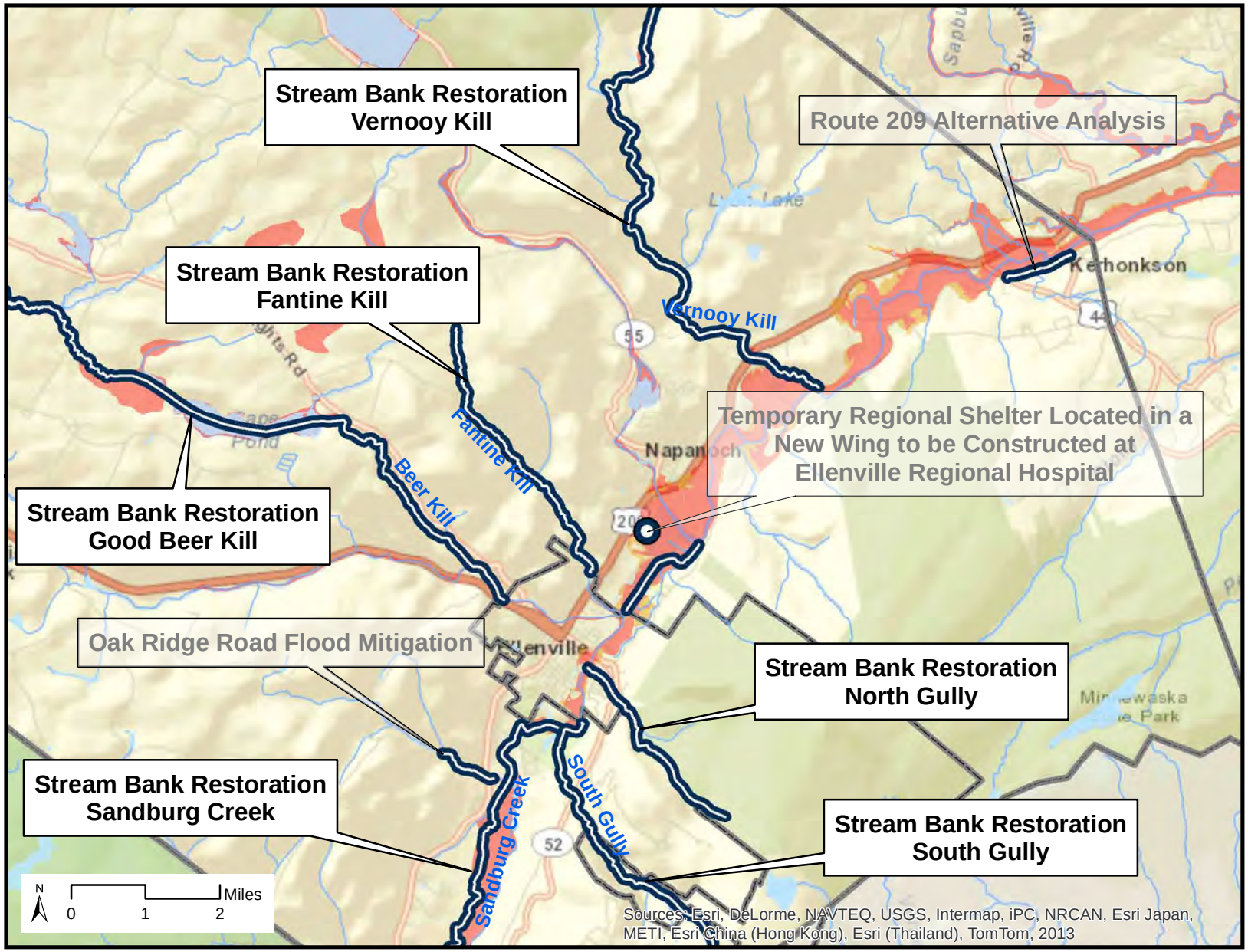
Co-Benefits of Project:

- Economic Benefits: Stream bank and stream bed restoration would provide flood mitigation along the stream corridors and would potentially increase their attractiveness as a recreational and tourist attraction. Long-term protection of Town and Village assets including homes and businesses is key to the communities' economic health by ensuring retention of residents, and the commercial tax base.
- Environmental Benefits: This project will have significant environmental benefits including restoring the health, resiliency and capacity of the Good Beer Kill, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully and the Fantine Kill. Stream restoration involves the modification of a stressed/disturbed stream via morphological changes to its bed and banks, to make its flow, flooding behavior, and biological components more stable and sustainable. Waterways such as the Good Beer Kill, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully and the Fantine Kill, have had changes to their watersheds due to development and storm damage, and therefore generally suffer from increased rates of erosion, loss of adjacent wetlands and in-stream flora/fauna, undercut/eroded banks, and an imbalance in their erosion/deposition budget. Such highly "stressed" waterways, which suffer from these problems typically have poor quality and biological diversity and therefore would benefit significantly from stream restoration.

STRATEGIC BANK STABILIZATION *(AKRF, Inc.)*

Health and Social Service Benefits: Regional watershed restoration projects would not directly secure or provide better access to health and social service facilities or providers although the resulting reduction in roadway inundation will benefit the entire community and improve local and regional access to/from emergency, health and social service providers and facilities. Further, improved emergency response time during and after storm events reduces risk of injury to residents.

Figure IV-16
Project Locations - Wawarsing



FEMA Flood Zone

100-yr Floodplain

500-yr Floodplain

Projects

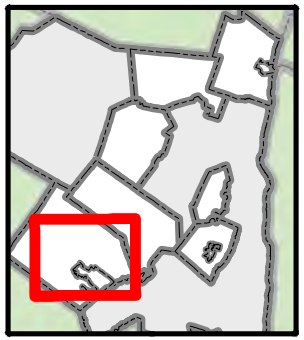
Data Sources

Municipal Boundaries: NYS

Flood Zones: Ulster County

Base Map: ESRI

March 20, 2014



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2014
NY RISING COMMUNITY RECONSTRUCTION PLAN

NYRCR ULSTER COMMUNITIES

Section V
Additional Materials

MOBILE LIFE
SUPPORT
MOBILE LIFE
SUPPORT
MARBLETOWN

V Additional Materials

A. Additional Resiliency Recommendations

Throughout the NYRCR Planning process, the Ulster NYRCR Planning Committee developed the Additional Resiliency Recommendations listed in Table V-1. These recommendations were developed as projects or actions that the Planning Committee would like to highlight and that are not categorized as Proposed or Featured Projects.

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Strategy 1: Regional Communication and Coordination				
Town & Village of New Paltz	Emergency Plan	Prepare an emergency response and reaction plan - especially for vulnerable and underserved population. Once plan is in place, focus on public education- get churches, service organizations and schools involved.	< $500K	Yes
Town & Village of New Paltz	Policy/Code Revisions	Create new standard/policy for new construction, requiring all critical systems to be above the flood line. Revise policy/code to require flood prevention strategies.	< $500K	Yes
Town of Rosendale	Backup Water Supply	Identify the required improvements needed to create a secondary water source for the Town.	< $500K	No
Town of Rosendale	Coordination of Emergency Services	Prepare an emergency service plan for coordinating with Federal, State and County agencies including the local jurisdiction to implement a readiness plan to address the various hazards, support local highway department with training, equipment and technical information. Offering of public education and materials. Set up an information page on Town website for the public to access and monitor. Equip emergency shelters (cots, water, etc.). Develop resilient communications technology.	< $500K	No
Town of Rosendale	Educate Community in Disaster Planning	Alerts to seniors with particularly important information regarding emergency preparedness.	< $500K	No
Village of Saugerties	Pathogen Pollution Mitigation	Conduct water quality testing to identify sources and improve septic tank maintenance standards to reduce pathogen pollution in streams during wet weather. Recent water quality testing by Riverkeeper volunteers shows evidence of pathogen pollution with storm events, which is a public health risk. Regional project with Ulster County Department of Health and other watershed municipalities	< $500K	No
Village of Saugerties	Stream Rehabilitation Study and Rehabilitation	Local match for next phase of Army Corps (USACE) Reconnaissance Study of Esopus Creek & Plattekill Creek Watershed. Regional project with other watershed municipalities: Woodstock and Olive. This could be a collaborative effort between the Town and Village.	< $500K	Yes

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Strategy 2: Implement measures to fortify and increase the resiliency of existing and future commercial development				
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Initiate a marketing campaign to expand and promote our area as a destination for Agri-tourism, including wineries, hand crafted beers made from local hops, local cheeses, hard cider and other apple products, etc. This will increase tourism and improve revenue for local farms and agriculture, making them more resilient during loses due to storms.	< $500K	Yes
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Encourage local "Day Trip" tour operators in our area, including hiking tours, historical tours, mountain and road bike tours, kayak tours, agricultural tours, etc. Given our exit off the thruway and centralized location with easy access to other communities in Ulster County, New Paltz is the perfect location as a base for Day Trips.	< $500K	Yes
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Comprehensive Planning & Development to encourage economic development that will connect the Downtown Business District, Gateway District, Historic District, B1 and B3 Districts, and Rail Trail. These districts are currently disjointed, but by encouraging the proper businesses, residential housing & services, and tourist related facilities and businesses, this would be a huge economic boost to our area and would promote a more walkable, bike-able community, which is also important during storms when roads are closed. The B3 District in particular would be the perfect location for hotels, senior communities, and more affordable units. These temporary accommodations could then serve during storms.	< $500K	Yes
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Attract new business and industry such as innovative technology/software, sustainable/environmental focused businesses, Arts related business and/or industry (Recording studios, performing and visual arts, computer-based arts, etc.). In addition to adding to the tax base, these industries will attract and retain the younger generations to our community.	< $500K	Yes
Village of Saugerties	Update Local Waterfront Revitalization Plan	Identify flood risk mitigation strategies as well as areas for potential economic development in the waterfront zone. LWRP from 1985 needs to be updated to address increased flood risk. Collaboration with NYS Department of State, Office of Communities and Waterfronts. $10,000 cost estimate from community.	<$500K	No
Strategy 3: Improve emergency preparedness and increase the resiliency of critical health and social service facilities				
Town & Village of New Paltz	Renewable Energy Strategies	Develop renewable energy strategies for Town and Village	< $500K	Yes
Town of Rochester	Installation of Alternative Energy Source at Emergency Stations	Install solar power at emergency response facilities throughout Town to provide alternative sources of power during emergencies.	$50,000	No

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Village of Saugerties	Tide Gauge with Storm Surge Prediction	Improve warning system for tidal flooding for local flood elevations. Need for additional Hudson River gauge station between Norrie Point and Schodack Island to serve northern Ulster County as well as Greene and Columbia Counties. Gauge could be installed at the Saugerties Lighthouse to better coordinate readings from the Mount Marion gauge on the Esopus Creek. Advance warning would improve emergency management & flood preparation. Davidson Laboratory at Steven's Institute of Technology provides storm surge warnings for remote Hudson River gauges in southern Dutchess County and Rensselaer County. Flood levels indicated for these gauge sites do not directly correspond to flood levels on local populated waterfronts. Regional collaboration with Davidson Laboratory and Ulster County Emergency Management	< $500K	No
Strategy 5: Provide assistance to homeowners to protect themselves from future flooding through mitigation measures, elevation, acquisition, relocation and general flood proofing				
Town & Village of New Paltz	Flood Protection of Housing in Critical Areas	Increase freeboard, and elevate critical systems in existing residences for those who cannot afford to do it themselves. Project would include identifying applicable residences, design and engineering and construction assistance and funding.	> $1M	Yes
Town of Saugerties	Herrick's Bridge Residential Neighborhood	Study the alternatives for addressing flooding within the Herrick's Bridge Residential Neighborhood. This area is inundated by flood waters and suffers repeated damage. Alternatives studied would include flood proofing, elevating, or relocating residences. In addition, establishing alternative routes between Woodstock and Saugerties would be studied as the main route (Route 212) is closed during flood events due to inundation.	< $500K	No
Town of Saugerties	Malden Home Elevation	Increase freeboard, and elevate critical systems in existing residences in Malden. Project would include identifying applicable residences, design and engineering and construction assistance and funding.	> $1M	No
Village of Saugerties	NFIP Community Rating System	Enroll Village in National Flood Insurance Program's (NFIP) Community Rating System (CRS) to reduce flood damage and foster floodplain management. Conduct creditable activities to meet/exceed prerequisites for enrollment in CRS. $40,000 estimate from community.	<$500K	No
Strategy 6: Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability				
Town & Village of New Paltz	Filming/Mapping of Storm Sewer Systems	Map and provide video inspections of the existing storm water system. Currently, The Town and Village have an incomplete understanding of its current storm sewer system. This project would help identify where the current storm sewer system drains.	$150,000	Yes
Town & Village of New Paltz	Metering & Monitoring of Town Water Supply System	Installation of water meters in all residences within the Town Water District to monitor water usage and demand. Installation of the meters will also allow the Town to evaluate and potentially relocate leaky water mains and upgrade aging infrastructure.		Yes

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Town & Village of New Paltz	New Bridge over Wallkill South of Village for Secondary Access	Construct a new bridge to the west side of the Wallkill to maintain access when the Carmine Liberta Bridge is not accessible. Would provide access to UC Fairgrounds, recreation fields with a link to the rail trail and could include a water supply pipe.	> $1M	Yes
Town of Olive	Broadhead Road Bridge Replace-ment	Two bridges on Brodhead Road: Two bridges on Brodhead Rd. over the Bridal Veil Stream are too small to handle flood waters and will be replaced with larger bridges. Bridges currently cause stream constriction resulting in flooding issues and road damage.	>$1M	No
Town of Olive	Hillside Drive Bridge Replace-ment	Hillside Drive Bridge: Town owned bridge over Drybrook Creek is too narrow to handle emergency traffic & increased water flow during flooding. Replace with a larger bridge to reduce flooding and road damage.	>$1M	No
Town of Olive	Lang Road Stormwater Runoff Project	Identify and implement necessary stormwater management improvements to address and reduce flooding issues over private property and Town property on Lang Rd./Watson Hollow Road in West Shokan. Stormwater comes off the mountain, runs across town owned property, and originally ran through drainage channels to NYC Reservoir property. Over years these ditches have been filled in & water has nowhere to go. Private property easements would need to be negotiated and filed with maintenance agreements signed guaranteeing ditches/channels are kept open for water flow.	> $500K but < $1M	No
Town of Olive	Needs Assess-ment: Moonhaw Road Stormwater Runoff Project	Determine measures needed to rectify stormwater runoff issues on Moonhaw Road and the Maltby Hollow Stream.	< $500K	No
Town of Olive	Needs Assess-ment: Removal of Minor Hyatt Bridge aka Coldbrook Bridge from Esopus Creek	In Hurricane Irene the Coldbrook Bridge dislodged from its foundation and washed downstream and currently lies in the streambed of the Esopus Creek. A determination will be made as to whether or not the bridge should be removed from the stream bed as it lies upstream of the NY City Five Arch Bridge on Route 28A in Boiceville.	< $500K	No
Town of Olive	Replace 3 Culvert Pipes on Jomar Lane	Replace three (3) Culvert Pipes on Jomar Lane that are too small to handle water runoff and causing road damage & private property damage as a result from heavy rains	> $500K but < $1M	No
Town of Olive	Sahler Mill Road Pond Bridge Replacement	Sahler Mill Road Pond: Replace existing bridge over Beaver Dam Creek with larger bridge.	>$1M	No
Town of Olive	Upgrade Culvert to Bridge on Brown Road	Upgrade small bridge on Brown Road: Existing Culvert Pipe on Brown Road over the Rochester Creek is too small to handle flood water. NYS DEC has recommended it be replaced with a small bridge.	> $500K but < $1M	No
Town of Olive	Upgrade Culvert to Bridge on Desilva Road	Bridge installed on Desilva Road: Large culvert pipe is too narrow and constrictive. Will be replaced with bridge of adequate size over the Bostock Creek. Causing flooding issues on roads and NYS Rte 28.	> $500K but < $1M	No

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Village of Ellenville	Ellenville Flood Control Project Certification	Inspect, upgrade, repair and install new flood control measures. (Project also suggested by the county)	< $500K	No
Town of Olive	Upper Boiceville Road Bridge Replacement	Upper Boiceville Road: Bridge is too narrow and constrictive & should be replaced with a larger bridge. This bridge is located upstream & uphill from bridge on Desilva Road at Bostock Creek. This is the only road into Boiceville when Rte 28 floods. This project should be done in conjunction with the DeSilva Road Bridge project	>$1M	No
Town of Rosendale	Burying Utility Lines	Bury utility lines along Route 32, Main Street and James Street. Develop new streetscapes once utility lines are buried.	> $1M	No
Town of Rosendale	Creek Locks Road (C.R. 73) Embankment Repair	Embankment has experienced surface erosion causing the narrowing of a traveling lane and a safety hazard (school bus driver complaints). There is a need to place concrete barriers along the shoulder to protect the users of the road. This project would re-establish a stable embankment. (Project was also suggested by the County).	< $500K	No
Town of Rosendale	Flood Canal Dredging	Dredging of flood canal channel (shoaling along Rondout)	> $1M	No
Town of Rosendale	Flood Mapping	Reexamine flood mapping of town to make it more up to date. Include areas that flood frequently even if they may not be in the 100 year floodplain.	>$500K but <$1M	No
Town of Rosendale	Improvements to James Street	This project would provide streetscape improvements along James Street, as well as replace water and sewer lines along the same street. Improvements would include bike lanes, sidewalks, and traffic calming measures. These improvements would connect the community center to the Main Street business district and the proposed Little League ball fields on the south side of the creek.	>$500K but <$1M	No
Town of Rosendale	Landslide, Dam Failure and Wild Fire Mitigation Plans	Implement various measures at specific vulnerable locations identified in the 2009 UC Hazard Mitigation Plan.	<$500K	No
Town of Rosendale	Policy/Planning Code Revisions	Update Comprehensive Plan; revise zoning codes to address floodplain management issues during site plan review, subdivision approval.	<$500K	No
Town of Rosendale	Relocate Communications Tower on Maple Hill	Identified in 2009 UC Hazard Mitigation Plan as vulnerable.		No
Town of Rosendale	Water Main Replacement	Replace water main on Main Street (bury utility lines, redo streetscape, develop new lighting, widen sidewalk for traffic calming)	>$500K but <$1M	No
Town of Saugerties	Create Wetland to Slow Water Discharge	Dredge Barclay's Pond and excavate land to south. Recreate the channel behind Butzels' Island. If the channel and wetland were recreated, the flood waters would be considerably slowed. This could be a collaborative effort between the Town and Village.	< $500K	No

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Town of Saugerties	Culvert Work	Resize culverts in Barclay Heights, Mt. Marion, Blue Mountain Park, Village of Saugerties	> $1M	No
Town of Saugerties	Culvert Work	Replace two corrugated pipes crossing West Saugerties Road (CR 135) with three sided box culverts.	< $500K	No
Town of Saugerties	Debris Removal	Key drainage areas in several cul-de-sacs in Barclay Heights require debris removal.	< $500K	No
Town of Saugerties	Septic Mainte-nance Standards	Create/Improve maintenance standards to reduce pathogen pollution in streams during wet weather	< $500K	No
Village of Saugerties	Cantine & Barclay's Pond Dredging	Identify and implement a dredging project behind Cantine Dam & Barclay's Pond to address safety and invasive species issues	< $500K	No
Village of Saugerties	Sewer Extension to Creekside Neighborhoods	Residential waterfront properties on Oakledge Park, Esopus Creek Road, Lighthouse Drive and Ferry Street rely on septic systems. Risk of pathogen pollution to creek during storm events. Connecting homes to municipal sewer will protect water quality. Collaboration with Town of Saugerties. Project would include scoping and implementation of the sewer extension	< $500K	Yes
Village of Saugerties	US Coast Guard Station	Harden against flooding and ensure emergency preparations are in place to support community emergency plans and procedures. (Lighthouse Drive) (Project also suggested by the County).	> $500K but < $1M	No
Town of Woodstock	Bury Power Lines	Bury approximately 1200' of power line from Yerry Hill Road to Pump House #2 (Municipal water supply) to prevent fallen trees from disrupting power	<$500K	No
Town of Woodstock	Identify Illegal Stormwater Connection	Provide funding to detect illegal storm water connections to sanitary sewer	<$500K	No
Town of Woodstock	Move Highway Communications Antenna	Move the highway communications antenna from its present location to the municipal tower and include installation of a propane fueled generator	<$500K	No
Town of Woodstock	Relocate Existing Emergency Water Main Connection to Woodstock Town Hall	Relocate existing emergency connection between Kingston Water District main line and the municipal water supply to the Woodstock Town Hall to provide for filtration	>$500K but <$1M	No
Town of Woodstock	Replace Bridge	Replace bridge at intersection of NY State Route 212 and Play House Lane with one with wider abutments	<$500K	No
Town of Woodstock	Replace Bridge Abutment	Replace one abutment to MacDaniel Road bridge which has been compromised by flooding near intersection of Mink Hollow Road	<$500K	No
Town of Woodstock	Replace Culverts	Replace aluminized boxed culvert at intersection of Lower Byrdcliffe Road and Bellows Lane with a larger concrete box	<$500K	No
Town of Woodstock	Replace Culverts	Replace old steel culvert with larger 9' x 12' x 30' concrete box culvert to protect Wittenberg Road	<$500K	No
Town of Woodstock	Restore Rock Wall	Restore integrity of rock wall on Mink Hollow Road, approximately 800'	<$500K	No

Table V-1 Additional Resiliency Recommendations

Community	Project Name	Description	Estimated Cost	Regional Project
Town of Woodstock	Storm Drain	Replace stormwater drainage system installed in the 1980s	<$500K	No
Strategy 7: Strengthen the transportation network by developing alternative and emergency routes				
Town & Village of New Paltz	Safe Pedestrian sidewalks and Bike Paths	Sidewalk and bike path improvements and upgrades throughout the Town and Village to accommodate emergency evacuation and access. When flooding occurs, walking or biking is an alternative to getting around flooded roadways. Project would have both local & regional benefits.	> $500K but < $1M	Yes
Town of Rochester	Rail Trail Completion	Study implementation strategies to complete a 1.5 - 2 mile stretch of rail trail through the Town of Rochester. The completed rail trail would be used by emergency vehicles during emergencies.	< $500K	No
Strategy 8: Preserve and restore natural areas including floodplains, streams and wetlands to help mitigate flooding				
Village of Ellenville	Riverwalk	Provide low-impact and low-profile pedestrian amenities along newly restored portions of the Town and Village's streams. These may include lighting, seating, and wayfinding signage. No addition of impervious material is anticipated; rather these walkways would be incorporated into the final design of the restoration work, likely as improvements to maintenance paths.	< $500K	Yes
Town & Village of New Paltz	Community Gardens	The gardens are located on town property, near the sewage treatment plant, near the bank of the Wallkill River. Relocate community gardens so that they will be less susceptible to flooding.	< $500K	Yes
Town of Olive	Butternut Stream Restoration Project	Butternut Stream on Red Maple Road has filled in with sediment. Stream should be restored and redefined.	< $500K	No
Town of Rosendale	Public Access	Create Public Access to Creek along Snyder Avenue, Hardenburgh Lane, existing and future Little League Fields	>$500K but <$1M	No
Village of Saugerties	Remove Sunken Houseboat	Remove remains of houseboat at inlet at Cantine Island that is a potential flood hazard as floating debris. Partner with Cantine Island Co-housing Community.	< $500K	No
Town of Saugerties	Wetland Designation	Designate more protected wetland areas within the township, George Sickle Rd, and the area surrounding the Plattekill Creek.	< $500K	No
Town of Wawarsing	Riverwalk	Provide low-impact and low-profile pedestrian amenities along newly restored portions of the Town and Village of Ellenville's streams. These may include lighting, seating, and wayfinding signage. No addition of impervious material is anticipated; rather these walkways would be incorporated into the final design of the restoration work, likely as improvements to maintenance paths.	<$500K	Yes
Town of Woodstock	Remove Debris from Stream	Remove approximately 1500' woody debris and gravel from Sawkill Stream, just east of municipal wells	<$500K	No

B. Master Table of Projects

Table V-2 presents all projects developed by NYRCR Ulster Communities throughout the eight-month planning process. This comprehensive list includes Proposed Projects and Featured Projects, which may be funded through the NYRCR Program and Additional Resiliency Recommendations. Projects are listed by Reconstruction and Resiliency Strategy. Projects are not ranked or prioritized, and are presented in no particular order of importance.

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Strategy 1: Regional Coordination and Communication					
Village of Ellenville, Town of Rochester, Town of Rosendale, Town of Wawarsing	Rondout Watershed Study and Improvements	Scoping and implementation of proposed improvements and flood mitigation for the Rondout watershed, which experienced severe localized flooding during Hurricane Irene and Tropical Storm Lee. The inundation of the communities from Rondout Watershed floodwaters impacted homes, businesses, roadways, bridges, culverts, and farms. The Town of Wawarsing, Village of Ellenville, Town of Rochester, and Town of Rosendale are working together to identify measures to minimize future flooding in the watershed and to implement those recommendations system wide to best address what is a widespread problem. Addressing the flooding issues at the source, will permanently mitigate the resulting damage to the communities. The study and the recommendations that result from the study could be implemented in phases.	Intermunicipal Proposed Project	Total Estimated Project Cost: $10,500,000 Potential CDBG-DR Funding: Village of Ellenville ($2,625,000), Town of Rochester ($2,625,000), Town of Rosendale ($2,625,000), Town of Wawarsing ($2,625,000)	Yes
Village of Ellenville, Town of Wawarsing	Stream Bank Restoration	Hurricane Irene and Tropical Storm Lee caused widespread flooding, resulting in stream bank and streambed erosion along major streams in Wawarsing, including but not limited to: the Good Beer Kill-east and west branch, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully, and Fantine Kill. Stream bank restoration analysis will determine the most effective methods for improving/restoring damaged streams. Implementation of the restoration measures will protect stream banks from future storms and improve functionality of natural drainage systems. After an initial evaluation of the reaches of the streams most in need of restoration, physical measures will be implemented to improve the health of the streams and the resiliency of the stream corridors. The Town of Wawarsing and the Village of Ellenville will coordinate to determine the most effective methods for improving/restoring damaged streams. Stream bank restoration can be implemented in phases.	Intermunicipal Proposed Project	Total Estimated Project Cost: $3,674,000 Potential CDBG-DR Funding: Village of Ellenville ($1,174,000), Town of Wawarsing ($2,500,000)	Yes

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town & Village of New Paltz	Flood Prevention Strategies and Stormwater Management for Wallkill River & Waterways (streams, tributaries, etc.)	Complete Watershed Management Study to better understand the Wallkill Watershed and current causes of flooding to then develop and prioritize flood prevention strategies (both upstream and downstream). The study would consider alternative implementation strategies to control flooding including but not limited to bioswales, relief channels, flood water storage, reservoirs, rain gardens, use of permeable surfaces, building elevation, day lighting submerged waterways, protection of wetlands & green space, widening of river banks, stream bank reclamation, public education, etc. During Hurricane Irene and Tropical Storm Lee the Wallkill River and tributaries flooded nearby properties causing storm related damage.	Proposed Project	$500,000	Yes
Town of Olive	The Esopus Creek in Boiceville and The Bushkill and Maltby Hollow Creeks in West Shokan Flood Mitigation Project	Scoping, modeling (including hydraulic and hydrologic modeling) and implementation of recommended improvements to address repetitive flooding in the Rte 28 corridor and the Esopus Creek in Boiceville and the Bushkill and Maltby Hollow Creeks in West Shokan. During Hurricane Irene and Tropical Storm Lee, the Esopus Creek experienced extreme localized flooding. The scoping phase of this project would identify implementable measures to mitigate flooding. This project can be implemented in phases.	Proposed Project	$1,000,000	No
Village of Saugerties	Water supply protection: Supplemental Source Exploration	Scoping of required improvements to identify a secondary water source for the Village and Town. Storm activity (during Superstorm Sandy) caused water supply not to be viable during prolonged turbid events. Locating and developing a secondary source to supplement the reservoir would provide an alternative water supply during prolonged turbid events. Areas for ground water exploration have already been identified. The next phase of the study would include test drilling and additional ground water modeling. This project would be implemented in phases.	Proposed Project	$385,000	Yes
Town of Wawarsing	Stream Bank Restoration	Additional implementation of various stream bank restoration measures identified in the Proposed Rondout Watershed Management Study (Proposed Project) and the Stream Bank Restoration Project (Proposed Project). The Town has allocated additional funding for phased implementation to improve the health of the following streams and stream corridors: the Good Beer Kill-east and west branch, the Sandberg, the Vernooy Kill, the Rondout, the North and South Gully, and the Fantine Kill.	Featured Project	$12,500,000	Yes

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town & Village of New Paltz	Emergency Plan	Prepare an emergency response and reaction plan - especially for vulnerable and under-served population. Once plan is in place, focus on public education- get churches, service organizations and schools involved.	Additional Resiliency Recommen-dation	< $500K	Yes
Town & Village of New Paltz	Policy/Code Revisions	Create new standard/policy for new construc-tion, requiring all critical systems to be above the flood line. Revise policy/code to require flood prevention strategies	Additional Resiliency Recommen-dation	< $500K	Yes
Town of Rosendale	Backup Water Supply	Identify the required improvements needed to create a secondary water source for the Town.	Additional Resiliency Recommen-dation	< $500K	No
Town of Rosendale	Coordination of Emergency Services	Prepare an emergency service plan for coordinating with Federal, State and County agencies including the local jurisdiction to implement a readiness plan to address the various hazards, support local highway department with training, equipment and technical information. Offering of public education and materials. Set up an information page on Town website for the public to access and monitor. Equip emergency shelters (cots, water, etc). Develop resilient communications technology.	Additional Resiliency Recommen-dation	< $500K	No
Town of Rosendale	Educate Community in Disaster Planning	Alerts to seniors with particularly important information regarding emergency preparedness.	Additional Resiliency Recommen-dation	< $500K	No
Village of Saugerties	Pathogen Pollution Mitigation	Conduct water quality testing to identify sources and improve septic tank maintenance standards to reduce pathogen pollution in streams during wet weather. Recent water quality testing by Riverkeepers volunteers shows evidence of pathogen pollution with storm events, which is a public health risk. Regional project with Ulster County Department of Health and other watershed municipalities	Additional Resiliency Recommen-dation	< $500K	No
Village of Saugerties	Stream Rehabilitation Study and Rehabilitation	Local match for next phase of Army Corps (USACE) Reconnaissance Study of Esopus Creek & Plattekill Creek Watershed. Regional project with other watershed municipalities: Woodstock and Olive. This could be a collaborative effort between the Town and Village.	Additional Resiliency Recommen-dation	< $500K	Yes

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Strategy 2: Implement measures to fortify and increase the resiliency of existing and future commercial development					
Town of Rosendale	Fann's Plaza Redevelop-ment	Conduct a master planning study for Fann's Plaza with the goal of providing a mix of uses and senior housing. Improving the vitality of this area is important to supporting the economic base of the Town. Development and stormwa-ter management systems at the proposed plaza would be required to minimize impervious surfaces and implement green infrastructure improvements to ensure its long-term viability and sustainability.	Proposed Project	$150,000	No
Town of Rosendale	Stormwater Mitigation, Route 32/ Washington Park	Improve drainage along Route 32 at Fann's Plaza and Washington Park to address storm water flooding. Roadway flooding and road closures prevents through access and obstructs access to the mobile home park, during and after acute storm events. Drainage improvements will minimize localized flooding in future events.	Proposed Project	$1,137,000	No
Town of Woodstock	Upgrade Route 212	Upgrade the drainage system along an approximately one mile stretch of Route 212 from Route 375 to the Post Office using green infrastructure features for stormwater manage-ment. Currently, poor drainage leads to roadway inundation because storm drains become overwhelmed. Roadway inundation during Hurricane Irene and Tropical Storm Lee, resulting in road closures cutting off access to Woodstock's Central Business District, impacting business owners, and preventing residents from accessing much needed supplies. Upgrading the stormwater manage-ment system utilizing sustainable infrastructure would improve drainage along this one mile stretch of road protecting access during and after future storm events.	Proposed Project	$2,500,000	No
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Initiate a marketing campaign to expand and promote our area as a destination for Agri-tourism, including wineries, hand crafted beers made from local hops, local cheeses, hard cider and other apple products, etc. This will increase tourism and improve revenue for local farms and agriculture, making them more resilient during loses due to storms.	Additional Resiliency Recommen-dation	< $500K	Yes

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Encourage local "Day Trip" tour operators in our area, including hiking tours, historical tours, mountain and road bike tours, kayak tours, agricultural tours, etc. Given our exit off the thruway and centralized location with easy access to other communities in Ulster County, New Paltz is the perfect location as a base for Day Trips.	Additional Resiliency Recommen-dation	< $500K	Yes
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Comprehensive Planning & Development to encourage economic development that will connect the Downtown Business District, Gateway District, Historic District, B1 and B3 Districts, and Rail Trail. These districts are currently disjointed, but by encouraging the proper businesses, residential housing & services, and tourist related facilities and businesses, this would be a huge economic boost to our area and would promote a more walkable, bike-able community, which is also important during storms when roads are closed. The B3 District in particular would be the perfect location for hotels, senior communi-ties, and more affordable units. These tempo-rary accommodations could then serve during storms.	Additional Resiliency Recommen-dation	< $500K	Yes
Town & Village of New Paltz	Economic Development Projects as Part of Recovery/ Resiliency Projects.	Attract new business and industry such as innovative technology/software, sustainable/ environmental focused businesses, Arts related business and/or industry (Recording studios, performing and visual arts, computer-based arts, etc.). In addition to adding to the tax base, these industries will attract and retain the younger generations to our community.	Additional Resiliency Recommen-dation	< $500K	Yes
Village of Saugerties	Update Local Waterfront Revitalization Plan	Identify flood risk mitigation strategies as well as areas for potential economic development in the waterfront zone. LWRP from 1985 needs to be updated to address increased flood risk. Collaboration with NYS Department of State, Office of Communities and Waterfronts. $10,000 cost estimate from community.	Additional Resiliency Recommen-dation	<$500K	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Strategy 3: Improve emergency preparedness and increase the resiliency of critical health and social service facilities					
Village of Ellenville	Generators for Ellenville School and Village Water Supply	Purchase and install a generator at the Ellenville Central School radio station so that officials can reach residents on a large-scale basis during times of emergency. During flood events power outages were widespread, In addition, the project seeks to purchase and install two additional generators for the Village's water supply system, specifically the Fallsview and Center Street wells.	Proposed Project	$225,000	No
Town & Village of New Paltz	Consolidated Municipal and Emergency Operations Center	Create a Consolidated Municipal and Emergency Operations Center in an existing structure outside the floodplain that would consolidate the Town and Village municipal and emergency services and serve as an Emergency Service Providers Shelter. Town Hall was the designated emergency shelter for the community, but was cut-off during Hurricane Irene due to flooding.	Proposed Project	$5,000,000	Yes
Town of Olive	Relocate West Shokan Firehouse Co #3	Construct a new firehouse for the West Shokan Firehouse Co. #3 that is outside of the floodplain so that the fire company can continue to provide emergency services during flooding events. During Hurricane Irene and Tropical Storm Lee, apparatus, equipment and personnel had to be relocated to higher ground, severely compromising the ability of emergency service providers to assist in the recovery effort. Relocating the firehouse out of the flood plain would eliminate its existing vulnerability, and ensure the ability for the emergency service providers to access their equipment and vehicles during future flooding events.	Proposed Project	$750,000	No
Town of Olive	Relocate Boiceville Firehouse Co #5	Construct a new firehouse for the Boiceville Firehouse Co. #5. Boiceville Firehouse #5 is located in the floodplain and was inundated with water during Hurricane Irene and Tropical Storm Lee severely compromising the ability of emergency service providers to assist in the recovery effort. The new firehouse would be located outside of the floodplain eliminating its existing vulnerability, and ensuring the ability for the emergency service providers to access their equipment and vehicles during future flooding events.	Proposed Project	$750,000	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Rosendale	Generators for Town Facilities	Purchase and installation of backup power generators for three critical Town facilities to keep them operational during storms. These facilities are: the flood control project, Rosendale Town Hall, and the pool house, which is used for showers during power outages. Power outages during Hurricane Irene and Tropical Storm Lee led to loss of service in critical Town facilities. Provision of a permanent back-up power supply will support these critical facilities during and after acute storm events.	Proposed Project	$30,000	No
Village of Saugerties	Water Supply Protection: Pre-filter	Install a pre-filter at the Village of Saugerties Potable Water Treatment Plant allowing the treatment plant to continue operating during storm events. Currently, the water supply is not protected from inflow of turbid water during storms and therefore the treatment plant must be taken off-line during turbid events. Excessively high turbidity experienced during Hurricane Irene and Tropical Storm Lee forced the shutdown of the Village of Saugerties Potable Water Treatment Plant. This will permanently increase the resiliency of the existing drinking water system in Saugerties.	Proposed Project	$1,600,000	Yes
Village of Ellenville	Mobile Water Pumps	Purchase of mobile water pumps to be used by the Fire companies to expedite removal of flood water from critical facilities. Facilities were damaged by inundation forcing closure and resulting in long term damage to properties, both during the storm events and after from water damage and mold. Mobile water pumps would serve the immediate needs and also prevent long term damage by removing standing water. Availability of these pumps would prevent that damage in future events.	Featured Project	$60,000	No
Town of Olive	Relocate Town Offices & Highway Complex out of Flood Plain	Conduct a space allocation and needs analysis to determine requirements for the Town and Highway offices and equipment, so that they would be relocated out of the floodplain. Once needs have been identified, draft building plans would be prepared and property for relocation would be acquired. The new facility would be constructed using green technology and infrastructure. The new location outside the floodplain would enable the Town and Highway offices to serve as a Command Center during disasters to meet the FEMA'S National Incident Command System requirements.	Featured Project	$6,000,000	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Wawarsing	Mobile Water Pumps on Trailer	Purchase of mobile water pumps to be used by the DPW and Highway Department to expedite removal of flood water from critical facilities. Facilities were damaged by inundation forcing closure and resulting in long term damage to properties, both during the storm events and after from water damage and mold. Mobile water pumps would serve the immediate needs and also prevent long term damage by removing standing water. Availability of these pumps would prevent that damage in future events.	Featured Project	$60,000	No
Town of Wawarsing	Portable Generators & Transfer Switches	During Hurricane Irene and Tropical Storm Lee, key municipal and emergency service facilities lost power for extended periods. Portable generators would allow for emergency source of power where needed. Purchase and distribution of portable generators to be transported where needed, i.e., gas stations, banks, food stores etc. to assist in getting vital services up and running until a more permanent solution could be arranged.	Featured Project	$50,000	No
Town & Village of New Paltz	Renewable Energy Strategies	Develop renewable energy strategies for Town and Village	Additional Resiliency Recommen-dation	< $500K	Yes
Town of Rochester	Installation of Alternative Energy source at Emergency Stations	Install solar power at emergency response facilities throughout Town to provide alternative sources of power during emergencies.	Additional Resiliency Recommen-dation	$50,000	No
Village of Saugerties	Tide Gauge with Storm Surge Prediction	Improve warning system for tidal flooding for local flood elevations. Need for additional Hudson River gauge station between Norrie Point and Shodack Island to serve northern Ulster County as well as Greene and Columbia Counties. Gauge could be installed at the Saugerties Lighthouse to better coordinate readings from the Mount Marion gauge on the Esopus Creek. Advance warning would improve emergency management & flood preparation. Davidson Laboratory at Steven's Institute of Technology provides storm surge warnings for remote Hudson River gauges in southern Dutchess County and Rensselaer County. Flood levels indicated for these gauge sites do not directly correspond to flood levels on local populated waterfronts. Regional collaboration with Davidson Laboratory and Ulster County Emergency Management	Additional Resiliency Recommen-dation	< $500K	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Strategy 4: Strengthen current emergency shelters at both a local and regional level and develop new sheltering opportunities where needed, particularly for vulnerable populations					
Village of Ellenville, Town of Wawarsing	Emergency Shelter	During Hurricane Irene and Tropical Storm Lee, residents that didn't evacuate were forced to leave their homes due to extensive flooding or power outages. There was insufficient shelter capacity to house them, existing shelters did not accommodate special needs (pets, handicap access, etc.), or were inaccessible due to road closures. Construction of additional shelter with sufficient resources would accommodate residents during/after future events. The project coordinates construction of an emergency shelter for use by the Town of Warwarsing and the Village of Ellenville that would be located in the Village of Ellenville. The shelter would include handicapped accessible bathrooms/shower facilities at two locations in the Village as well as emergency generators at both locations. Shelters would be configured to provide sufficient power for 02 charging stations as needed. The shelters will be pet-friendly and cat/dog crates will be provided.	Intermunicipal Proposed Project	Total Estimated Project Cost: $1,200,000 Potential CDBG-DR Funding: Village of Ellenville ($600,000), Town of Wawarsing ($600,000)	Yes
Village of Ellenville, Town of Rochester, Town of Wawarsing	Temporary Regional Shelter Located in a New Wing to be Constructed at Ellenville Regional Hospital	Construction of a permanent wing at the Ellenville Regional Hospital which could be utilized to accommodate medically vulnerable persons during acute storm events if space allows. During Hurricane Irene and Tropical Storm Lee, medically vulnerable residents that didn't evacuate found insufficient shelter capacity to house/serve them, or where there was capacity, the shelters were not equipped to accommodate persons with specific medical needs, The cost associated with construction of the new Hospital wing represents a potential local share towards this project.	Intermunicipal Featured Project	Total Estimated Project Cost: $1,000,000 Potential CDBG-DR Funding: Village of Ellenville ($400,000), Town of Rochester ($200,000), Town of Wawarsing ($400,000)	Yes
Town of Rochester	Alligerville Emergency Station	Structural and roof repairs to the Alligerville Fire and Emergency Station on Creek Road so that the station may be used as an emergency shelter. Emergency station sustained structural damage and damage to its roof during Superstorm Sandy.	Proposed Project	$50,000	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Rochester	Rehabilitate Existing Community Center to Serve as Disaster Relief Shelter	Upgrade and rehabilitate the existing community center for use as a shelter during and after storm events. Improvements would include ADA upgrades, insulation, showers, and a backup power source. Floodwaters from Hurricane Irene and Tropical Storm Lee damaged numerous properties and infrastructure forcing residents to evacuate their homes, and in some cases preventing their return for extended periods. Residents were left without access to basic services, and in some cases were temporarily without homes. Upgrading the existing community center to provide shelter during/after storm events would provide residents with a safe alternative.	Proposed Project	$75,000	No
Strategy 5: Provide assistance to homeowners to protect themselves from future flooding through mitigation measures, elevation, acquisition, relocation and general flood proofing					
Town of Rosendale	Flood Mitigation and Protection to Homeowners Prone to Flooding	Scoping and implementation of measures to address chronic residential flooding that was particularly acute and destructive during Hurricane Irene and Topical Storm Lee. Implementation measures could include: elevation and possible relocation to Creekside Lane (7-10 houses); Riverview Terrace; Island View Adult Home. Other considerations would include improvements along Route 213 west from Route 32 to the Rosendale Town Line and along Creeklocks Road.	Proposed Project	$45,000	No
Village of Saugerties	Dredging Assistance	The Village proposes to assist property owners by coordinating dredging along impacted properties. Superstorm Sandy, Hurricane Irene and Tropical Storm Lee contributed to silting of the harbor, which impairs waterfront access. The project would include public-private cost sharing: property owners would cover dredge contractor cost while the Village would assist by handling the engineering, permit process, environmental review costs, work oversight, and contingencies. Organizing a single project to serve multiple properties will help make dredging more affordable for individuals.	Proposed Project	$45,000	No
Village of Saugerties	Housing Flood-proofing Assistance	Assess alternatives (including flood proofing, elevation, and relocation) for protecting houses along Lighthouse Drive and Ferry Street from flooding. Storm activity, during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee flooded homes along Lighthouse Drive and Ferry Street. The project would include flood proofing audits for homes along Lighthouse Drive and Ferry Street, to educate residents regarding various options.	Proposed Project	$120,000	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town & Village of New Paltz	Flood protection of housing in critical areas	Increase freeboard, and elevate critical systems in existing residences for those who cannot afford to do it themselves. Project would include identifying applicable residences, design and engineering and construction assistance and funding.	Additional Resiliency Recommendation	> $1M	Yes
Town of Saugerties	Herrick's Bridge Residential Neighborhood	Study the alternatives for addressing flooding within the Herrick's Bridge Residential Neighborhood. This area is inundated by flood waters and suffers repeated damage. Alternatives studied would include flood proofing, elevating, or relocating residences. In addition, establishing alternative routes between Woodstock and Saugerties would be studied as the main route (Route 212) is closed during flood events due to inundation.	Additional Resiliency Recommendation	< $500K	No
Town of Saugerties	Malden Home Elevation	Increase freeboard, and elevate critical systems in existing residences in Malden. Project would include identifying applicable residences, design and engineering and construction assistance and funding.	Additional Resiliency Recommendation	> $1M	No
Village of Saugerties	NFIP Community Rating System	Enroll Village in National Flood Insurance Program's (NFIP) Community Rating System (CRS) to reduce flood damage and foster floodplain management. Conduct creditable activities to meet/exceed prerequisites for enrollment in CRS. $40,000 estimate from community.	Additional Resiliency Recommendation	<$500K	No
Strategy 6: Repair, upgrade and protect existing infrastructure assets and critical facilities from flood damage to reduce their vulnerability.					
Town & Village of New Paltz	Carmine Liberta Bridge	Scope and implement required improvements to the Carmine Liberta Bridge, which is in need of repair or replacement due to damaged sustained during Hurricane Irene and Tropical Storm Lee. The Bridge is the only roadway access to the west side of the river from New Paltz and heavily trafficked by residents, tourists, commercial vehicles and emergency services. Pedestrian and bicycle paths will be part of the redesign and construction.	Proposed Project	$400,000	Yes
Town & Village of New Paltz	Inflow and Infiltration Investigation and Permanent Wastewater Collection System Repairs	Scope and implement improvements to the existing collector sewer system, make point repairs and collector sewer replacement as needed. This project would reduce the inflow and infiltration associated with flooding events to safeguard the plant's processes. The existing sewer collection system was overwhelmed during Hurricane Irene and Tropical Storm Lee causing contaminated waters to go into the Wallkill River. Improvements to the collection system combined with hardening the WWTP would minimize failure of the infrastructure during future 100-yr storm events.	Proposed Project	$1,500,000	Yes

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town & Village of New Paltz	Route 299 West and Springtown Road	Scoping and implementation of required improvements to address flooding along Route 299 West and Springtown Road, from Main Street to Mountain Rest Road. This segment is currently a major access point from the eastern portion of the community to the west and regularly gets inundated, shutting off access to and from the Village. It is also a gateway to areas in western Ulster County and a thoroughfare for tourism and recreation.	Proposed Project	$250,000	Yes
Town & Village of New Paltz	Sewer Treatment Plant Hardening	Install flood proofing measures to the wastewater treatment plant to mitigate the future risk of inundation by floodwaters (as occurred during Hurricane Irene and Tropical Storm Lee) during future 100-yr storm events. Flood proofing measures could include: construction of higher concrete berm at the current site and reinforcing the current site; and/or construction of a "Package Plant" at a nearby location.	Proposed Project	$1,200,000	Yes
Town of Rosendale	Rosendale Flood Control Project Improvement	Install flood control measures on the south side of the Rondout Creek along James Street from Rte. 32 toward the Keator Avenue Bridge, focusing on the lower portion of James Street, which gets washed out during high water events and collapsed during Irene and Lee. Improved flood control measures would prevent future roadway compromise or failure.	Proposed Project	$600,000	No
Town of Rosendale	Rosendale Sewer Treatment Plant Stormwater Management Study	Scoping and implementation of protection measures for the vulnerable Rosendale Sewer Treatment Plant, which flooded in Hurricane Irene and Tropical Storm Lee. The STP failed during the storm events because it was overwhelmed without sufficient capacity to accommodate the demand from stormwater inundation and Creek flooding. STP hardening and upgrades will prevent failure during future storm events.	Proposed Project	$500,000	No
Town of Saugerties	Bridge Abutment Replacement	Replace the abutment and bridge deck at Drummond Falls Road East, which was damaged during the Superstorm Sandy, Hurricane Irene and Tropical Storm Lee and is now at heightened risk of failure. This project would augment the capacity of the storm sewer, hence preventing similar flooding in future events.	Proposed Project	$407,200	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Saugerties	Harden Malden Sewer Plant against flooding	Install and construct various flood proofing and hardening measures at the Malden Sewer Treatment Plant, which was inundated with stormwater and required additional town resources to be brought in to keep the facility operational during Hurricane Sandy. Possible measures would include installation of backflow valves at the plant and in low lying residences to prevent sewage contamination during major flood events.	Proposed Project	$165,000	No
Town of Saugerties	Replace Culvert-Platte Clove	Replace an inadequately sized culvert at Platte Clove Road, which was overwhelmed during Superstorm Sandy, Hurricane Irene and Tropical Storm Lee, and caused flooding, erosion, and damage to the infrastructure. Platte Clove Road is the only alternate route to Hunter Mountain when the main access from Route 23 is closed for repairs. Resizing the culvert to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms. The recent major storms and caused flooding, erosion, and damage to the infrastructure.	Proposed Project	$274,300	No
Town of Saugerties	Replace Culvert-Wilhelm Road	Replace an inadequately sized culvert at Wilhelm Road, which was overwhelmed during Hurricane Irene and Tropical Storm Lee, and Superstorm Sandy and caused flooding, erosion, and damage to the infrastructure. Widespread flooding due to insufficient culvert capacity led to roadway inundation Resizing the culvert to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms.	Proposed Project	$200,450	No
Town of Saugerties	Sewer Extension to Creekside Neighbor-hoods	Extend the municipal sewer system to residen-tial properties along the Esopus Creek that currently rely on septic systems. During storm events, these septic systems release patho-gens to the Esopus, endangering public health and reducing water quality. Extend municipal sewer service to these residences would mitigate compromises to water quality caused by contamination.	Proposed Project	$1,500,000	Yes
Town of Saugerties	Storm Sewer Replacement	Replace storm sewers at Cotton Tail Lane, which were inadequately sized to accommo-date the demand generated during 100 year storm events and were severely compromised during Hurricane Irene and Tropical Storm Lee, and Superstorm Sandy causing flooding and property damage.	Proposed Project	$100,550	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Village of Saugerties	Repair Supporting Structures Adjacent to Lighthouse	Repair a large gap in the dike that protects the harbor channel and make bulkhead, pier, and dock repairs in and around the Lighthouse. Damage to the dike occurred during Hurricane Irene and Tropical Storm Lee. This project is a partnership between the Village and the Saugerties Lighthouse Conservancy. While the dike is important for preventing siltation of the harbor channel, the bulkhead and pier protect the lighthouse, which is a community asset and historic building. The pier and dike are also popular as public fishing sites.	Proposed Project	$306,000	No
Village of Saugerties	Water Supply Protection: Silt & Debris Removal	Remove accumulated silt and debris from the Village reservoir that was deposited as a direct result of stormwater from Hurricane Irene and Tropical Storm Lee. This project would restore reservoir capacity and protect water quality.	Proposed Project	$365,000	Yes
Town of Woodstock	John Joy Road Improvements	Raising approximately 400 feet of John Joy Road and installing two culverts will prevent the road from being inundated during future storm events. Low elevation and poor drainage led to roadway inundation of John Joy Road overwhelming the storm drain system. Resized culverts and elevating the road will minimize localized flooding of the road in during and after future storm events.	Proposed Project	$75,000	No
Town of Woodstock	Mink Hollow Bridge Protection	Install stacked rock wall sheet piling to protect Mink Hollow Bridge, which was damaged by Hurricane Irene and Tropical Storm Lee. Bridge fortification would protect the travelway, prevent future erosion and potential bridge failure both during and after future flood events.	Proposed Project	$190,000	No
Town of Woodstock	Replace Culverts-Reynolds Lane and Church Road	Replace existing undersized metal culverts under the bridge at the intersection of Rte 212 and Reynolds Lane and at intersection of Church Rd and Rte 212 with appropriately sized concrete box culverts. During Hurricane Irene and Tropical Storm Lee, insufficient culvert capacity around Reynolds Lane and Church Road caused roadway flooding overwhelming the storm drainage system. Appropriately sized culverts will minimize localized flooding of the road in future storm events.	Proposed Project	$125,000	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Woodstock	Replace culverts-Lane Road	Replace inadequately sized culvert at intersection of Lane Road and Silver Hollow Road with appropriately sized concrete box culvert. During Hurricane Irene and Tropical Storm Lee, roadways were inundated and overwhelmed the storm drainage system. Widespread flooding due to insufficient culvert capacity led to roadway inundation around Lane Road and Silver Hollow Road. Resizing culverts to accommodate stormwater flows will minimize localized flooding of the roads during and after future storms.	Proposed Project	$450,000	No
Town of Rochester	Rochester Creek Bridge Project	Design and reconstruct the Rochester Creek Bridge to improve flow, and minimize damage from future flooding. The Rochester Creek Bridge suffered damage during Hurricane Irene, Superstorm Sandy and Tropical Storm Lee contributing to flooding of adjacent areas. NYSDOT has identified the Rochester Creek Bridge for reconstruction. NY Rising funds would be allocated to determine the optimal design for complimentary creekside repair.	Featured Project	$300,000	Yes
Village of Ellenville	Ellenville Flood Control Project Certification	Inspect, upgrade, repair and install new flood control measures. (Project also suggested by the county).	Additional Resiliency Recommendation	< $500K	no
Town & Village of New Paltz	Filming/ Mapping of Storm Sewer Systems	Map and provide video inspections of the existing storm water system. Currently, The Town and Village have an incomplete understanding of its current storm sewer system. This project would help identify where the current storm sewer system drains.	Additional Resiliency Recommendation	$150,000	Yes
Town & Village of New Paltz	Metering & Monitoring of Town Water Supply System	Installation of water meters in all residences within the Town Water District to monitor water usage and demand. Installation of the meters will also allow the Town to evaluate and potentially relocate leaky water mains and upgrade aging infrastructure.	Additional Resiliency Recommendation	< $500K	Yes
Town & Village of New Paltz	New Bridge over Wallkill South of Village for Secondary Access	Construct a new bridge to the west side of the Wallkill to maintain access when the Carmine Liberta Bridge is not accessible. Would provide access to UC Fairgrounds, recreation fields with a link to the rail trail and could include a water supply pipe.	Additional Resiliency Recommendation	> $1M	Yes
Town of Olive	Broadhead Road Bridge Replacement	Two bridges on Brodhead Road: Two bridges on Brodhead Rd. over the Bridal Veil Stream are too small to handle flood waters and will be replaced with larger bridges. Bridges currently cause stream constriction resulting in flooding issues and road damage.	Additional Resiliency Recommendation	>$1M	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Olive	Hillside Drive Bridge Replacement	Hillside Drive Bridge: Town owned bridge over Drybrook Creek is too narrow to handle emergency traffic & increased water flow during flooding. Replace with a larger bridge to reduce flooding and road damage.	Additional Resiliency Recommen-dation	>$1M	No
Town of Olive	Lang Road Stormwater Runoff Project	Identify and implement necessary stormwater management improvements to address and reduce flooding issues over private property and Town property on Lang Rd./Watson Hollow Road in West Shokan. Stormwater comes off the mountain, runs across town owned property, and originally ran through drainage channels to NYC Reservoir property. Over years these ditches have been filled in & water has nowhere to go. Private property easements would need to be negotiated and filed with maintenance agreements signed guaranteeing ditches/channels are kept open for water flow.	Additional Resiliency Recommen-dation	> $500K but < $1M	No
Town of Olive	Needs Assessment: Moonhaw Road Stormwater Runoff Project	Determine measures needed to rectify storm-water runoff issues on Moonhaw Road and the Maltby Hollow Stream.	Additional Resiliency Recommen-dation	< $500K	No
Town of Olive	Needs Assessment: Removal of Minor Hyatt Bridge aka Coldbrook Bridge from Esopus Creek	In Hurricane Irene the Coldbrook Bridge dislodged from its foundation and washed downstream and currently lies in the streambed of the Esopus Creek. A determination will be made as to whether or not the bridge should be removed from the stream bed as it lies upstream of the NY City Five Arch Bridge on Route 28A in Boiceville.	Additional Resiliency Recommen-dation	< $500K	No
Town of Olive	Replace 3 Culvert Pipes on Jomar Lane	Replace three (3) Culvert Pipes on Jomar Lane that are too small to handle water runoff and causing road damage & private property damage as a result from heavy rains	Additional Resiliency Recommen-dation	> $500K but < $1M	No
Town of Olive	Sahler Mill Road Pond Bridge Replacement	Sahler Mill Road Pond: Replace existing bridge over Beaver Dam Creek with larger bridge.	Additional Resiliency Recommen-dation	>$1M	No
Town of Olive	Upgrade Culvert to Bridge on Brown Road	Upgrade small bridge on Brown Road: Existing Culvert Pipe on Brown Road over the Roches-ter Creek is too small to handle flood water. NYS DEC has recommended it be replaced with a small bridge.	Additional Resiliency Recommen-dation	> $500K but < $1M	No
Town of Olive	Upgrade Culvert to Bridge on Desilva Road	Bridge installed on Desilva Road: Large culvert pipe is too narrow and constrictive. Will be replaced with bridge of adequate size over the Bostock Creek. Causing flooding issues on roads and NYS Rte 28.	Additional Resiliency Recommen-dation	> $500K but < $1M	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Olive	Upper Boiceville Road Bridge Replacement	Upper Boiceville Road: Bridge is too narrow and constrictive & should be replaced with a larger bridge. This bridge is located upstream & uphill from bridge on Desilva Road at Bostock Creek. This is the only road into Boiceville when Rte 28 floods. This project should be done in conjunction with the DeSilva Road Bridge project	Additional Resiliency Recommen-dation	>$1M	No
Town of Rosendale	Burying Utility Lines	Bury utility lines along Route 32, Main Street and James Street. Develop new streetscapes once utility lines are buried.	Additional Resiliency Recommen-dation	> $1M	No
Town of Rosendale	Creek Locks Road (C.R. 73) Embankment Repair	Embankment has experienced surface erosion causing the narrowing of a traveling lane and a safety hazard (school bus driver complaints). There is a need to place concrete barriers along the shoulder to protect the users of the road. This project would re-establish a stable embankment. (Project also suggested by the County).	Additional Resiliency Recommen-dation	< $500K	No
Town of Rosendale	Flood Canal Dredging	Dredging of flood canal channel (shoaling along Rondout)	Additional Resiliency Recommen-dation	> $1M	No
Town of Rosendale	Flood Mapping	Reexamine flood mapping of town to make it more up to date. Include areas that flood frequently even if they may not be in the 100 year floodplain.	Additional Resiliency Recommen-dation	>$500K but <$1M	No
Town of Rosendale	Improvements to James Street	This project would provide streetscape improvements along James Street, as well as replace water and sewer lines along the same street. Improvements would include bike lanes, sidewalks, and traffic calming measures. These improvements would connect the community center to the Main Street business district and the proposed Little League ball fields on the south side of the creek.	Additional Resiliency Recommen-dation	>$500K but <$1M	No
Town of Rosendale	Landslide, Dam Failure and Wild Fire Mitigation Plans	Implement various measures at specific vulnerable locations identified in the 2009 UC Hazard Mitigation Plan.	Additional Resiliency Recommen-dation	<$500K	No
Town of Rosendale	Policy/ Planning Code Revisions	Update Comprehensive Plan; revise zoning codes to address floodplain management issues during site plan review, subdivision approval.	Additional Resiliency Recommen-dation	<$500K	No
Town of Rosendale	Relocate communica-tions tower on Maple Hill	Identified in 2009 UC Hazard Mitigation Plan as vulnerable.	Additional Resiliency Recommen-dation		No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Rosendale	Water main replacement	Replace water main on Main Street (bury utility lines, redo streetscape, develop new lighting, widen sidewalk for traffic calming)	Additional Resiliency Recommen-dation	>$500K but <$1M	No
Town of Saugerties	Create wetland to slow water discharge	Dredge Barclay's Pond and excavate land to south. Recreate the channel behind Butzels' Island. If the channel and wetland were recreated, the flood waters would be consider-ably slowed. This could be a collaborative effort between the Town and Village.	Additional Resiliency Recommen-dation	< $500K	No
Town of Saugerties	Culvert Work	Resize culverts in Barclay Heights, Mt. Marion, Blue Mountain Park, Village of Saugerties	Additional Resiliency Recommen-dation	> $1M	No
Town of Saugerties	Culvert Work	Replace two corrugated pipes crossing West Saugerties Road (CR 135) with three sided box culverts.	Additional Resiliency Recommen-dation	< $500K	No
Town of Saugerties	Debris Removal	Key drainage areas in several cul-de-sacs in Barclay Heights require debris removal.	Additional Resiliency Recommen-dation	< $500K	No
Town of Saugerties	Septic Maintenance Standards	Create/Improve maintenance standards to reduce pathogen pollution in streams during wet weather	Additional Resiliency Recommen-dation	< $500K	No
Village of Saugerties	Cantine & Barclay's Pond Dredging	Identify and implement a dredging project behind Cantine Dam & Barclay's Pond to address safety and invasive species issues	Additional Resiliency Recommen-dation	< $500K	No
Village of Saugerties	Sewer Extension to Creekside Neighbor-hoods	Residential waterfront properties on Oakledge Park, Esopus Creek Road, Lighthouse Drive and Ferry Street rely on septic systems. Risk of pathogen pollution to creek during storm events. Connecting homes to municipal sewer will protect water quality. Collaboration with Town of Saugerties. Project would include scoping and implementation of the sewer extension	Additional Resiliency Recommen-dation	< $500K	Yes
Village of Saugerties	US Coast Guard Station	Harden against flooding and ensure emergency preparations are in place to support community emergency plans and procedures. (Lighthouse Drive) (Project also suggested by the County)	Additional Resiliency Recommen-dation	> $500K but < $1M	No
Town of Woodstock	Bury Power Lines	Bury approximately 1200' of power line from Yerry Hill Road to Pump House #2 (Municipal water supply) to prevent fallen trees from disrupting power	Additional Resiliency Recommen-dation	<$500K	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Woodstock	Identify Illegal Stormwater Connection	Provide funding to detect illegal storm water connections to sanitary sewer	Additional Resiliency Recommen-dation	<$500K	No
Town of Woodstock	Move Highway Communica-tions Antenna	Move the highway communications antenna from its present location to the municipal tower and include installation of a propane fueled generator	Additional Resiliency Recommen-dation	<$500K	No
Town of Woodstock	Relocate Existing Emergency Water Main Connection to Woodstock Town Hall	Relocate existing emergency connection between Kingston Water District main line and the municipal water supply to the Woodstock Town Hall to provide for filtration	Additional Resiliency Recommen-dation	>$500K but <$1M	No
Town of Woodstock	Replace Bridge	Replace bridge at intersection of NY State Route 212 and Play House Lane with one with wider abutments	Additional Resiliency Recommen-dation	<$500K	No
Town of Woodstock	Replace Bridge Abutment	Replace one abutment to MacDaniel Road bridge which has been compromised by flooding near intersection of Mink Hollow Road	Additional Resiliency Recommen-datio	<$500K	No
Town of Woodstock	Replace Culverts	Replace aluminized boxed culvert at intersec-tion of Lower Byrdcliffe Road and Bellows Lane with a larger concrete box	Additional Resiliency Recommen-dation	<$500K	No
Town of Woodstock	Replace Culverts	Replace old steel culvert with larger 9' x 12' x 30' concrete box culvert to protect Wittenberg Road	Additional Resiliency Recommen-dation	<$500K	No
Town of Woodstock	Restore Rock Wall	Restore integrity of rock wall on Mink Hollow Road, approximately 800'	Additional Resiliency Recommen-dation	<$500K	No
Town of Woodstock	Storm Drain	Replace stormwater drainage system installed in the 1980s	Additional Resiliency Recommen-dation	<$500K	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Strategy 7: Strengthen the transportation network by developing alternative and emergency routes					
Town & Village of New Paltz	Springtown Road Rail Trail Approach Reconstruction	Reconstruct the approach to the rail trail bridge from Springtown Road to reinforce the access road and provide emergency vehicles means of crossing the Wallkill during storm events to access the western portion of the community. During Hurricane Irene and Tropical Storm Lee, this roadway was inundated, shutting off access to and from the Village.	Proposed Project	$250,000	Yes
Town of Wawarsing	Oak Ridge Road Flood Mitigation	Conduct an alternatives analysis for improvements to reduce flooding along Oak Ridge Road in and around the intersection of US Route 209. Both events caused general flooding and various stream restrictions led to localized flooding of Oak Ridge Road and surrounding properties. The analysis will determine the best method for improving flow and drainage in the area to prevent future flooding.	Proposed Project	$76,300	No
Town of Wawarsing	Route 209 Alternative Analysis	In both Hurricane Irene and Tropical Storm Lee, Route 209 in Kerhonkson flooded, which prohibited through access for residents and emergency service providers. The alternatives analysis would identify an alternative route for 2-way traffic flow, thereby providing a viable secondary access route when 209 is closed.	Proposed Project	$75,000	No
Town & Village of New Paltz	Safe Pedestrian Sidewalks and Bike Paths	Sidewalk and bike path improvements and upgrades throughout the Town and Village to accommodate emergency evacuation and access. When flooding occurs, walking or biking is an alternative to getting around flooded roadways. Project would have both local & regional benefits.	Additional Resiliency Recommendation	> $500K but < $1M	Yes
Town of Rochester	Rail Trail Completion	Study implementation strategies to complete a 1.5 - 2 mile stretch of rail trail through the Town of Rochester. The completed rail trail would be used by emergency vehicles during emergencies.	Additional Resiliency Recommendation	< $500K	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Strategy 8: Preserve and restore natural areas including floodplains, streams and wetlands to help mitigate flooding					
Town of Olive	Bushkill Creek Stream Restoration	Scoping and implementation of extensive stream reconstruction measures on the Bushkill Creek. Hurricane Irene and Tropical Storm Lee caused massive amounts of debris to flow downstream and aggregate under the span of the Watson Hollow Bridge creating scour of abutment and channel flow restrictions. When the bridge floods, 183+ homes are cut off from emergency services, food and fuel. Implementation measures will include reducing land erosion on the banks and may include sediment and tree removal. Sediment has aggregated within the Bushkill, particularly at the Watson Hollow Bridge and downstream near the Watson Hollow Road embankment.	Proposed Project	$1,075,000	No
Town of Rochester	Rochester/ Rondout Creek and Tributaries Immediate Repair	Repair the riparian buffer, and remove debris deposited by recent storms (downed trees, tires etc.) from the Rochester/Rondout Creek and its tributaries, including at the Route 209 & Rochester Creek bridge abutments. The force of the water flows in these waterways during Hurricane Irene and Tropical Storm Lee resulted in significant accumulation of debris constricting flow and causing flooding of adjacent properties. Removing debris will decrease flooding during and after future events protecting the riverbanks and adjacent development. Collection pits, sumps and drains will also be cleared. Repairs will restore the carrying capacity and minimize adjacent flooding caused by the current stream constrictions. Funding will also be allocated for detour and emergency signage and barriers and riparian repair.	Proposed Project	$800,000	No
Town of Rosendale	Flood Mitigation and Protection for Key Intersections in Town	Address widespread roadway flooding, which occurred during Hurricane Irene and Tropical Storm Lee at several key intersections including: Route 32 at Rifton Bridge (flooding closed Rte 32 and all cut off access and egress to/ from the south side of Town); 4th Binnewater Lane & Binnewater Road (road closures isolated residents from emergency services); and Hickory Bush Road (road closures isolated residents from emergency services).Improvements at these intersections would eliminate widespread road closures maintaining roadway access for residents and emergency service providers.	Proposed Project	$1,045,000	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Saugerties	Stream and Stream Bank Rehabilitation	Provide a local match to support funding for a recent stream rehabilitation assessment commissioned by the NYS DEC, and allocate funds to implement stream bank restoration recommendations identified in the assessment. The streams being assessed and rehabilitated were damaged during Hurricane Irene and Tropical Storm Lee.	Proposed Project	$525,000	Yes
Village of Saugerties	Parks Restoration	Repair several parks throughout the Village, including Village Beach, Tina Chorvas Waterfront Park, and Seamon Park that suffered damage from all three recent major storms (Hurricane Irene, Tropical Storm Lee and Superstorm Sandy). Repairs would include the replacement of damaged docks and repair to eroded boat ramps to maintain public access to Esopus Creek. In addition, repairs would be made to the retaining wall in Seamon Park along Sawyer Kill. Landscaping and plantings would also be installed to arrest further erosion.	Proposed Project	$200,000	No
Village of Saugerties	Shoreline Stabilization at and Adjacent to Tina Chorvas Park	Stabilize the shoreline and repair existing bulkheads at and adjacent to Tina Chorvas Park. Hurricane Irene, Tropical Storm Lee and Superstorm Sandy caused general flooding, which destabilized and damaged the bulkheads and shoreline near Tina Chorvas Park. This initiative is a public-private partnership with the non-profit cultural resource organization, 'Arm of the Sea'.	Proposed Project	$300,000	No
Village of Ellenville	Riverwalk	Provide low-impact and low-profile pedestrian amenities along newly restored portions of the Town and Village's streams. These may include lighting, seating, and wayfinding signage. No addition of impervious material is anticipated; rather these walkways would be incorporated into the final design of the restoration work, likely as improvements to maintenance paths.	Additional Resiliency Recommendations	< $500K	Yes
Town & Village of New Paltz	Community Gardens	The gardens are located on town property, near the sewage treatment plant, near the bank of the Wallkill River. Relocate community gardens so that they will be less susceptible to flooding.	Additional Resiliency Recommendations	< $500K	Yes
Town of Olive	Butternut Stream Restoration Project	Butternut Stream on Red Maple Road has filled in with sediment. Stream should be restored and redefined.	Additional Resiliency Recommendations	< $500K	No
Town of Rosendale	Public Access	Create Public Access to Creek along Snyder Avenue, Hardenburgh Lane, existing and future Little League Fields	Additional Resiliency Recommendations	>$500K but <$1M	No

Table V-2 Master Project Table

Community	Project Name	Description	Project Category	Estimated Cost	Regional Project
Town of Saugerties	Wetland Designation	Designate more protected wetland areas within the township, George Sickle Rd, and the area surrounding the Plattekill Creek.	Additional Resiliency Recommendation	< $500K	No
Town of Wawarsing	Riverwalk	Provide low-impact and low-profile pedestrian amenities along newly restored portions of the Town and Village of Ellenville's streams. These may include lighting, seating, and wayfinding signage. No addition of impervious material is anticipated; rather these walkways would be incorporated into the final design of the restoration work, likely as improvements to maintenance paths.	Additional Resiliency Recommendation	<$500K	Yes
Town of Woodstock	Remove Debris from Stream	Remove approximately 1500' woody debris and gravel from Sawkill Stream, just east of municipal wells	Additional Resiliency Recommendation	<$500K	No
Village of Saugerties	Remove Sunken Houseboat	Remove remains of houseboat at inlet at Cantine Island that is a potential flood hazard as floating debris. Partner with Cantine Island Co-housing Community.	Additional Resiliency Recommendation	< $500K	No

C. Public Engagement Process

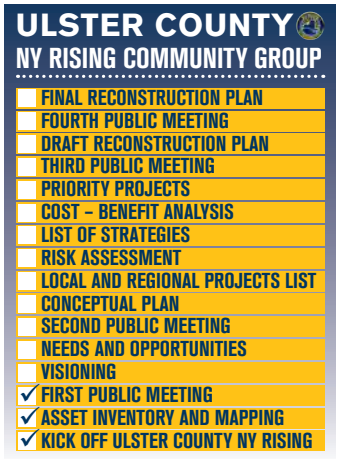
The NYRCR Program is fundamentally a grass-roots initiative. As such, a broad public engagement outreach process was an essential component of the NYRCR Program and particularly important given that the NYRCR Ulster Communities comprise ten distinctive municipalities spread out throughout the County.

The Committee agreed that a successful public engagement process would:

Recognize that the storms were not only devastating to communities included in the NYRCR Program, but also to those that were not.

Engage the broader Ulster County audience and solicit their valuable input and involvement throughout the process; and

Provide the tools to help communities reestablish themselves as vibrant communities that are less vulnerable to future disasters.



This display board was used during Public Engagement Meetings to provide the public with a check list of objectives/tasks that were completed to date. The check list starts with the Kick-Off Meeting and ends with the Final Reconstruction Plan.

Ulster NYRCR Planning Committee

The Ulster NYRCR Planning Committee (Committee) comprised of a cross-section of representatives from the Villages of Ellenville, New Paltz and Saugerties, and the Towns of Rochester, Rosendale and Wawarsing, New Paltz, Saugerties, Olive, and Woodstock. The Committee was comprised of 46 members, including representation from government (elected officials, appointed board members and staff), businesses, civic organizations, and residents, successfully creating a network of residents able to adequately represent the various needs of their communities. The Committee included three at-large members, to provide insight and expertise on regional issues, including the Director of the Ulster County Department of Planning, the Executive Director of Family of Woodstock, Inc., and the former director the Economic Development in the City of Kingston.

The Committee met as a group approximately every other week (12 meetings) from September 2013 through March 2014. In advance of each meeting, the Committee received notification about upcoming meetings, meeting summaries and events, photos of previous meetings, meeting time and date information, and agendas. Constant Contact emails also included links to the NYRCR website, worksheets, asset and project lists for review and preparation in anticipation of meetings.

The general format of the Committee meetings involved a group discussion, breakout sessions to accomplish specific NYRCR Program tasks including mapping, discussion of vision, goals and objectives, asset identification, project identification and refinement, with the Committee reconvening as a group at the end to discuss progress and next steps. Guest speakers on such topics as hydraulic and hydrologic modeling, and the risk assessment methodology and process presented at several Committee meetings. Summaries for all Committee meetings were prepared and made available on the NYRCR website (www.stormrecovery.ny.gov). Dates and activities for all NYRCR Ulster Committee meetings are listed in Table V-3.

Constant Contact (Arch Street Communications)

All Committee meetings were open to the public, and Committee members encouraged friends and neighbors to attend. In addition to these meetings, several of the Committee members organized interim meetings, site walks and information sessions within their own municipalities to review progress and provide input on every aspect of the plan. The Committee representatives organized and invited the whole Committee to attend a green infrastructure tour at SUNY New Paltz. Committee Members toured SUNY New Paltz to see and learn firsthand a variety of green infrastructure practices. On the campus, Committee members discovered projects including a permeable pavement parking lot, vegetated swales, and an enhanced bio-retention area to decrease the impact of storm water runoff.

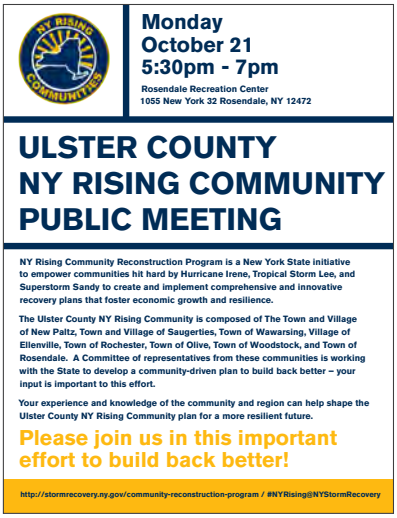
The Committee members were also instrumental in reaching out to vulnerable populations, to included them in the NYRCR dialog and encourage their attendance at Public Engagement Meetings. Committee members also used social media, Town and Village websites, Facebook pages and other local community group websites, to notify their personal networks about meeting progress, and upcoming public engagement opportunities.

Table V-3 Ulster NYRCR Planning Committee Meetings

Meeting #	Meeting Date	Description	Key Lessons
1	September 24, 2013	28	Kick-off meeting: Program Overview, Visioning Session
2	October 7, 2013	29	Visioning Exercise, Discussion of Geographic Scope
3	October 21, 2013	26	Finalize Vision Statement, Preliminary Asset Inventory
4	November 4, 2013	26	Review Public Engagement Meeting #1 Feedback, Review Conceptual Plan, Needs and Opportunities Exercise, Review Asset Mapping
5	November 18, 2013	29	Flood Mitigation Review, Review Asset Mapping, Risk Assessment Process Review
6	December 2, 2013	25	Review Public Engagement Meeting #2 Feedback, Revise Asset Mapping, Risk Assessment Input, Regional Projects Identification and Discussion
7	December 16, 2013	24	Flood Modeling (hydraulic, hydrologic) Presentation, Regional Projects List Review,
8	January 6, 2014	28	(Unmitigated) Risk Assessment: Preliminary Results and Discussion, Revise Asset Inventory and Mapping
9	January 23, 2014	26	Project Definition and Mapping, Identification of Priority Projects
10	February 10, 2014	23	Risk Mitigation Presentation, Review and Revise Project List
11	February 18, 2014	13	Projects List, Review of Funding Sources, Discussion of Regional Projects
12	March 3, 2014	20	Review Public Engagement #3 Meeting Feedback, Discussion of Rising to the Top and Other Regional Projects

Four Public Engagement Meetings

In addition to the work advanced by the Committee, various opportunities were developed for community outreach and public participation in the planning process. Each public engagement meeting was an opportunity for Ulster County residents to learn about the NYRCR planning process, assets and projects, and provide input to help develop community-driven plans for a more resilient future. The format and venue of the Public Engagement Meetings varied throughout the process, but generally included power point presentations, display boards and mapping, workgroups with maps and markers, survey sheets and comment boxes.



Flyers were created for all of the Public Engagement Meetings and were handed out at Committee Meetings, where Committee members were encouraged to post and distribute them in their respective towns. Emails with the flyers were sent to all committee members as well, giving them an opportunity to share and spread the word digitally. Flyers were also placed in local newspapers and as digital ads on newspaper website to inform the public and increase participation.

Public Engagement Meeting #1: Program Scope, Feedback on Vision, Identify Community Assets, Needs and Opportunities

Public Engagement Meeting #1 was held at the Rosendale Recreation Center in Rosendale, NY.

The goals for the first meeting were to familiarize community members with the NYRCR process, schedule

Public Engagement Meeting #1 (Arch Street Communications)

During the first Public Engagement Meeting, questions designed on display boards were used to seek public input and define the vision statement. At the second Public Engagement Meeting, a board with the final draft of the vision statement, goals and objectives was presented to the public for them to view and comment.

The Committee developed a preliminary list of needs and opportunities, which were presented at Public Engagement Meeting #1. The planning team refined this list throughout the planning process and divided the Needs and Opportunities into six different categories, which were presented on a display board during meetings for public to view and comment.

Public Engagement Meeting #1 (Arch Street Communications)

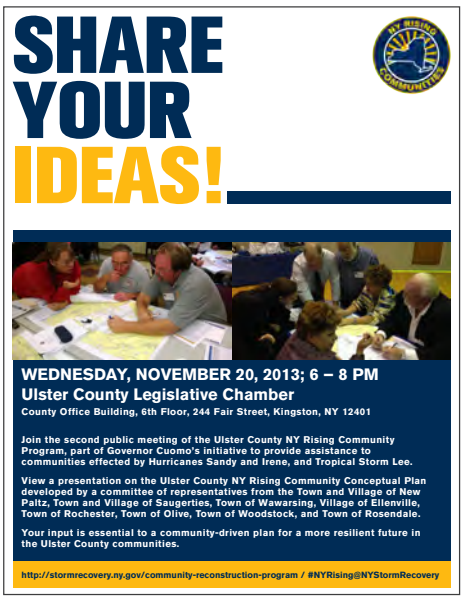
and timeline, NYRCR goals, and expected outcomes; to present and get feedback on the draft vision statement prepared by the Committee; to develop preliminary lists of community needs and opportunities; and to gather suggestions for potential projects.

The format of the first meeting involved a brief introduction to the NYRCR Program, an overview of the project timeline, and reported on the progress-to-date. This informational presentation was followed by an open house style community break out session during which community members provided input on the draft community vision, the geographic scope, added to the list of community assets, fleshed out a preliminary list of needs and opportunities, and contributed local and regional project ideas. For each topic, residents visited stations set up around the room to have conversations, note their feedback, and contribute ideas.

Public Engagement Meeting #2: Contents of Draft Conceptual Plan; Gather Feedback on Strategies and Projects

The second Public Engagement Meeting was held at the Ulster County Office Building, in the Legislative Chambers.

The primary goals for the second public engagement meeting were to review the Conceptual Plan; discuss draft strategies and projects; build support for the NYRCR Plan; engage with and listen to members of the public who have firsthand knowledge of the Ulster County region and the issues being addressed in the NYRCR planning process; identify reconstruction strategies to help shape the final NYRCR plan; promote community understanding of storm risks, the NYRCR Plan, and management measures that can be implemented; and forecast next steps of the NYRCR process.



Public Engagement Meeting #2 Flyer (Arch Street Communications)

The format of the meeting included a brief welcome presentation including a discussion of vulnerability and resilience. The presentation also included a review of the NYRCR program, and summary of the Conceptual Plan. Attendees participated in small-group discussions considering the vision and tying the vision, goals and objectives to the Conceptual Plan and their

Video Booth, Public Engagement Meeting #2 (Arch Street Communications)

Welcome Table, Public Engagement Meeting #2 (Arch Street Communications

Attendees Listen to the NYRCR Program Presentation, Public Engagement Meeting #2 (Arch Street Communications)

William Harding Presents the NYRCR Program, Public Engagement Meeting #2 (Arch Street Communications)

Attendees Review their Town's Asset Inventory, Public Engagement Meeting #2 (Arch Street Communications)

Through exercises defining assets within the NYRCR Ulster Communities, a display board was created to outline the asset inventory into five different categories. During the Public Engagement Meetings, the public viewed, commented and provided further clarification on additional assets.

group's definition of resiliency to assess the list of potential projects drafted by the Committee.

In addition to the various breakout sessions, and workgroups, a video recording booth was set up during the second Public Engagement Meeting where members of the public shared what they remembered about the storms, how it affected their community, and what building back better means to them. After the meeting, the interviews were edited together into one video and presented at the third public engagement meeting. A copy of the video is included as a CD with this report.

Public Engagement Meeting #3: Analysis and Prioritization of Strategies, Projects and Actions

The third Public Engagement Meeting was held at Ulster County Community College at the Stone Ridge Campus.

Goals for the third public engagement meeting focused on identifying and describing the Proposed and Featured Projects; assessing community support for these projects; gathering substantive feedback about projects; and informing the public that the priority project list will be further evaluated by the State to confirm funding eligibility; and presenting the Ulster NYRCR video.

Public Engagement Meeting #3 Flyer (Arch Street Communications)

This public meeting began with a brief overview of the NYRCR Program, a brief summary of the projects that have been prioritized by the NYRCR Communities, and a summary of potential candidates for regional implementation. The presentation also included a discussion of the Rising to the Top Competition, which was established by Governor Andrew Cuomo to foster innovation, encourage collaboration and promote the development of the best possible reconstruction plans. The Ulster NYRC Planning Committee discussed pursuing Rising to the Top bonus funding for several regional initiatives, which were presented and discussed at the public engagement meeting.

Following the presentation, meeting attendees reviewed and commented on maps and Proposed and Featured Project lists for each community. Residents were given "passports" – a packet of worksheets with questions and rating opportunities for each of the listed projects, as well as space for additional questions and feedback about the project.

Passport comments were summarized and provided for review by the Ulster NYRCR Communities at the Committee meeting immediately following the Public Engagement meeting. Attendees confirmed that the projects identified by the Committee represented a good cross section of priority initiatives that would make the NYRCR Ulster Communities more resilient, benefit economic development, best support vulnerable populations, and have regional benefits.

Public Engagement Meeting #4: Final Plan

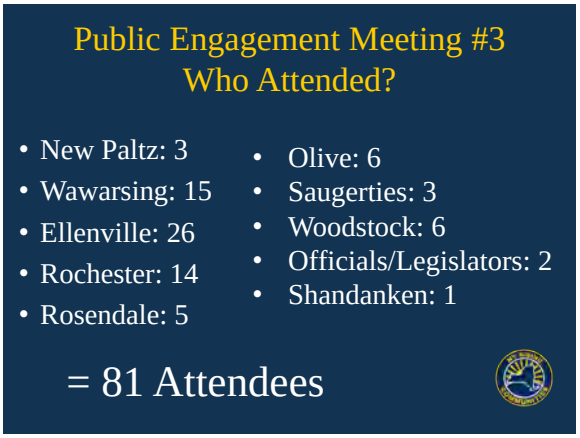
A final Public Engagement Meeting to present the NYRCR Ulster Plan will be held in May. The goal of this final meeting will be to present the Final Plans, review the selected projects, and the process and timeline for implementation.

Co-chair Steve Kelley Welcomes the Public, Public Engagement Meeting #3 (Arch Street Communications)

Committee Member Reviews Project Mapping with the Public, Public Engagement Meeting #3 (Arch Street Communications)

Town of Rochester Project Table, Public Engagement Meeting #3 (Arch Street Communications)

Nina Peek Presents the NYRCR Program, Public Engagement Meeting #3 (Arch Street Communications)



Public Engagement Summary Slides, Planning Committee Meeting #12 (Arch Street Communications)

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D. Community Asset Inventory

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
1	Town and Village of New Paltz	Historic Huguenot Street	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
2	Town and Village of New Paltz	Cragswood Road	Infrastructure Systems	Transportation	No	No	--												
3	Town and Village of New Paltz	Coffey Road	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
4	Town and Village of New Paltz	Springtown Road	Infrastructure Systems	Stormwater	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
5	Town and Village of New Paltz	Residential Flooding Springtown Road	Housing	Single-Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
6	Town and Village of New Paltz	Dip in Road	Infrastructure Systems	Transportation	No	No	--												
7	Town and Village of New Paltz	Water accumulation Springtown Road/ Mountain Rest Road	Infrastructure Systems	Transportation	No	No	--												
8	Town and Village of New Paltz	Wallkill Valley Rail Trail	Natural and Cultural Resources	Parks and Recreation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
9	Town and Village of New Paltz	SUNY Student Union Building/Haggerty Administration Building	Health and Social Services	Higher Education Institutions	No	No	--												
10	Town and Village of New Paltz	SUNY Athletics Center	Health and Social Services	Emergency Operations-Response	No	No	--												
11	Town and Village of New Paltz	Towne and Country Apartments	Housing	Multi Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
12	Town and Village of New Paltz	Hasbrouck Ave/South Chestnut Street Flooding	Infrastructure Systems	Transportation	No	No	--												
13	Town and Village of New Paltz	Rte 32 Flooding	Infrastructure Systems	Transportation	No	No	--												
14	Town and Village of New Paltz	Flooding along Plains Road	Infrastructure Systems	Transportation	No	No	--												
15	Town and Village of New Paltz	Rte 208 Flooding	Infrastructure Systems	Transportation	No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
16	Town and Village of New Paltz	Flooding at intersection	Infrastructure Systems	Transportation	No	No	--												
17	Town and Village of New Paltz	Wetland	Natural and Cultural Resources	Wetlands and marshes	No	No	--												
18	Town and Village of New Paltz	Millbrook Preserve	Natural and Cultural Resources	Natural Habitats	No	No	--												
19	Town and Village of New Paltz	SUNY New Paltz	Economic	Employment Hub	Yes	Yes, FEMA	High												

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
20	Town and Village of New Paltz	Unison Arts Center	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No, Locally Significant	High												
21	Town and Village of New Paltz	Duzine Elementary School	Health and Social Services	Schools	Yes	Yes, FEMA	--												
22	Town and Village of New Paltz	Lenape Elementary School	Health and Social Services	Schools	Yes	Yes, FEMA	--												
23	Town and Village of New Paltz	New Paltz Middle School	Health and Social Services	Schools	Yes	Yes, FEMA	--												
24	Town and Village of New Paltz	New Paltz High School	Health and Social Services	Schools	Yes	Yes, FEMA	--												
25	Town and Village of New Paltz	Ulster Board of Cooperative Educational Services	Health and Social Services	Schools	No	Yes, FEMA	--												
26	Town and Village of New Paltz	Mountain Laurel Waldorf School	Health and Social Services	Schools	Yes	No	--												
27	Town and Village of New Paltz	New Paltz United Methodist Church Pre-school	Health and Social Services	Schools	Yes	No	--												
28	Town and Village of New Paltz	Huguenot Street Cooperative Nursery School	Health and Social Services	Schools	Yes	No	--												
29	Town and Village of New Paltz	Little Explorers Nursery & Daycare Center	Health and Social Services	Daycare and Eldercare	Yes	No	--												
30	Town and Village of New Paltz	First Care Walk-in Medical Center	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	--												
31	Town and Village of New Paltz	New Paltz Family Health Center	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	--												
32	Town and Village of New Paltz	Mountain View Nursing & Rehabilitation Center	Housing	Senior Housing	Yes	Yes, FEMA	--												
33	Town and Village of New Paltz	Johnson Fuel	Infrastructure Systems	Liquid Fuels	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
34	Town and Village of New Paltz	Kimlin Propane Co Inc.	Infrastructure Systems	Liquid Fuels	No	No	--												
35	Town and Village of New Paltz	Town of New Paltz Town Hall	Health and Social Services	Government and Administrative Services	No	No	High												
36	Town and Village of New Paltz	Village of New Paltz Village Hall	Health and Social Services	Government and Administrative Services	No	No	High												
37	Town and Village of New Paltz	Town of New Paltz Community Center	Natural and Cultural Resources	Community Center	No	No	Medium												
38	Town and Village of New Paltz	Village of New Paltz Dept. Public Works	Health and Social Services	Public Works Facilities	No	No	High												
39	Town and Village of New Paltz	Town of New Paltz Highway & Building Department	Health and Social Services	Public Works Facilities	No	No	High												

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
40	Town and Village of New Paltz	New Paltz Fire Department Station #1	Health and Social Services	Emergency Operations-Response	No	No	High												
41	Town and Village of New Paltz	New Paltz Rescue Squad	Health and Social Services	Emergency Operations-Response	No	No	High												
42	Town and Village of New Paltz	New Paltz Police Department	Health and Social Services	Emergency Operations-Response	No	No	High												
43	Town and Village of New Paltz	Family of New Paltz	Health and Social Services	Daycare and Eldercare	Yes	No	High												
44	Town and Village of New Paltz	St. Joseph's Church and Food Pantry	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
45	Town and Village of New Paltz	New Paltz United Methodist Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
46	Town and Village of New Paltz	Reformed Church of New Paltz	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
47	Town and Village of New Paltz	New Paltz Religious Society of Friends/ Quakers	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
48	Town and Village of New Paltz	New Paltz Church of the Nazarene	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
49	Town and Village of New Paltz	Redeemer Evangelical Lutheran Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
50	Town and Village of New Paltz	St. Andrew's Episcopal Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Medium												
51	Town and Village of New Paltz	NY State Department of Environmental Conservation Region 3 Office	Health and Social Services	Government and Administrative Services	No	No	High												
52	Town and Village of New Paltz	SUNY New Paltz Campus Police	Health and Social Services	Emergency Operations-Response	No	No	Medium												
53	Town and Village of New Paltz	New Paltz Golf Course	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
54	Town and Village of New Paltz	ARC Housing	Health and Social Services	Daycare and Eldercare	Yes	No, Locally Significant	Medium												
55	Town and Village of New Paltz	Huguenot Park Apartments	Housing	Senior Housing	Yes	No, Locally Significant	Medium												
56	Town and Village of New Paltz	Meadowbrooks Housing	Housing	Affordable Housing	Yes	No, Locally Significant	Medium												
57	Town and Village of New Paltz	Boys Home	Housing	Supportive Housing	Yes	No, Locally Significant	Medium												
58	Town and Village of New Paltz	Downtown Historic District	Economic	Downtown Center	No	No, Locally Significant	Medium												
59	Town and Village of New Paltz	Elting Memorial Library	Natural and Cultural Resources	Libraries	No	No, Locally Significant	Medium												
60	Town and Village of New Paltz	Salvation Army	Natural and Cultural Resources	Community Centers	Yes	No	Low												

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61	Town and Village of New Paltz	Lefevre House Bed & Breakfast	Economic	Lodging	No	No, Locally Significant	Medium												
62	Town and Village of New Paltz	Daniel Dubois House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No, Locally Significant	Medium												
63	Town and Village of New Paltz	McKenna Theater	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No, Locally Significant	Low												
64	Town and Village of New Paltz	Julien Studley Theater	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No, Locally Significant	Low												
65	Town and Village of New Paltz	Parker Theater	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No, Locally Significant	Low												
66	Town and Village of New Paltz	Samuel Dorsky Museum	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No, Locally Significant	Low												
67	Town and Village of New Paltz	Locust Lawn	Natural and Cultural Resources	Natural Protective Features	No	No, Locally Significant	Low												
68	Town and Village of New Paltz	Locust Tree Building	Economic	Small Business	No	No, Locally Significant	Medium	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
69	Town and Village of New Paltz	Ulster County New Paltz Park	Economic	Tourism Destinations	No	No, Locally Significant	Medium												
70	Town and Village of New Paltz	Recreational Fields	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
71	Town and Village of New Paltz	Ulster County Pool	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
72	Town and Village of New Paltz	Moriello Pool	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
73	Town and Village of New Paltz	Clearwater Park	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
74	Town and Village of New Paltz	Hasbrouck Park	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
75	Town and Village of New Paltz	Huguenot Street CSA & Community Gardens	Economic	Grocery-Food Suppliers	No	No	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
77	Town and Village of New Paltz	Verizon Wireless	Infrastructure Systems	Telecommunications	No	Yes, FEMA	High												
79	Town and Village of New Paltz	Time Warner Cable	Infrastructure Systems	Telecommunications	No	Yes, FEMA	High												
80	Town and Village of New Paltz	Sewage Treatment Plant	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	No	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
81	Town and Village of New Paltz	Aqueduct	Infrastructure Systems	Water Supply	No	Yes, FEMA	Low												
82	Town and Village of New Paltz	New Paltz Recycling Center - Town Dump	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	No	Yes, FEMA	Low												
83	Town and Village of New Paltz	Ulster County Area Transit Departure Stop	Infrastructure Systems	Transportation	No	No, Locally Significant	Medium												

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84	Town and Village of New Paltz	Adirondack Trailways Bus Terminal	Infrastructure Systems	Transportation	No	Yes, FEMA	Low												
85	Town and Village of New Paltz	Wallkill Valley Rail Trail	Natural and Cultural Resources	Parks and Recreation	No	Yes, FEMA	High												
86	Town and Village of New Paltz	Rail Trail Bridges	Natural and Cultural Resources	Parks and Recreation	No	Yes, FEMA	High												
87	Town and Village of New Paltz	Carmine Liberta Bridge	Infrastructure Systems	Transportation	No	Yes, FEMA	High	High	Yes	Yes	Yes	Yes	Yes	Yes	3	3	4.00	3	36
88	Town and Village of New Paltz	Core Business District - Village	Economic	Tourism Destinations	No	No, Locally Significant	High												
89	Town and Village of New Paltz	Taliafiero Farm CSA	Economic	Grocery-Food Suppliers	Yes	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
90	Town and Village of New Paltz	Wallkill View Farm	Natural and Cultural Resources	Agricultural areas	Yes	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
91	Town and Village of New Paltz	Million Dollar Farm	Natural and Cultural Resources	Agricultural areas	No	Yes, FEMA	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
92	Town and Village of New Paltz	Ray Bradley Farm	Natural and Cultural Resources	Agricultural areas	No	No, Locally Significant	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
93	Town and Village of New Paltz	Symanski Farm	Natural and Cultural Resources	Agricultural areas	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
94	Town and Village of New Paltz	Light-Joseph Farm	Housing	Single-Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
95	Town and Village of New Paltz	Kara Kenney Farm	Natural and Cultural Resources	Agricultural areas	No	No, Locally Significant	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
96	Town and Village of New Paltz	Jenkins Leukens Orchards	Economic	Grocery-Food Suppliers	Yes	No, Locally Significant	High												
97	Town and Village of New Paltz	Bruderhof Farm	Natural and Cultural Resources	Agricultural areas	No	No, Locally Significant	--												
98	Town and Village of New Paltz	Fackler Farm	Natural and Cultural Resources	Agricultural areas	No	No, Locally Significant	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
100	Town and Village of New Paltz	Springtown Sweet View Farm	Natural and Cultural Resources	Agricultural areas	No	No, Locally Significant	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
101	Town and Village of New Paltz	Dressels Orchards	Economic	Grocery-Food Suppliers	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
102	Town and Village of New Paltz	Dodd Farm	Natural and Cultural Resources	Agricultural areas	No	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
103	Town and Village of New Paltz	Moriello Orchards/Apple Hill Farm	Economic	Grocery-Food Suppliers	Yes	No, Locally Significant	High												
104	Town and Village of New Paltz	Open Space Institute	Economic	Small Business	No	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
105	Town and Village of New Paltz	Robibero Winery	Economic	Small Business	No	No, Locally Significant	High												
106	Town and Village of New Paltz	Boat Launch	Infrastructure Systems	Navigable waterway facilities	No	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41

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107	Town and Village of New Paltz	Mohonk Preserve	Natural and Cultural Resources	Parks and Recreation	No	No, Locally Significant	High												
108	Town and Village of New Paltz	Minnewaska State Park	Natural and Cultural Resources	Parks and Recreation	No	No, Locally Significant	High												
109	Town and Village of New Paltz	Mohonk Mountain House	Economic	Lodging	No	No, Locally Significant	Medium												
110	Town and Village of New Paltz	243 Main Street Office Building	Economic	Small Business	No	No	High												
111	Town and Village of New Paltz	Stop & Shop Plaza	Economic	Grocery-Food Suppliers	Yes	No	High												
112	Town and Village of New Paltz	Shoprite Plaza	Economic	Grocery-Food Suppliers	Yes	No	High												
113	Town and Village of New Paltz	Rite Aid Plaza	Economic	Large Business	Yes	No	High												
114	Town and Village of New Paltz	Super 8 Motel	Economic	Lodging	Yes	No	High												
115	Town and Village of New Paltz	87 Motel	Economic	Lodging	Yes	No	High												
116	Town and Village of New Paltz	Econolodge	Economic	Lodging	Yes	No	High												
117	Town and Village of New Paltz	New Paltz Hostel	Economic	Lodging	Yes	No	Medium												
118	Town and Village of New Paltz	Orchard Heights B&B	Economic	Lodging	No	No	Medium												
119	Town and Village of New Paltz	Frito Lay Inc	Economic	Large Business	No	No	High												
120	Town and Village of New Paltz	Freihofer Charles Baking Company	Economic	Small Business	No	No	High												
121	Town and Village of New Paltz	My Market	Economic	Grocery-Food Suppliers	Yes	No	High												
122	Town and Village of New Paltz	Earthgood Health Food Store	Economic	Grocery-Food Suppliers	Yes	No	Medium												
123	Town and Village of New Paltz	New Paltz Farmers Market	Economic	Grocery-Food Suppliers	Yes	No	High												
124	Town and Village of New Paltz	The Living Seed Yoga & Holistic Health Center	Economic	Small Business	No	No	Medium												
150	Town and Village of New Paltz	Libertyville Road	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
151	Town and Village of New Paltz	Rte 299--Main Street Flooding	Infrastructure Systems	Transportation	No	No	--	High	Yes	Yes	Yes	Yes	Yes	Yes	3	3	4.00	3	36
6	Town and Village of Saugerties	Herrick's Bridge	Housing	Single-Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
7	Town and Village of Saugerties	Flooded Homes	Housing	Single-Family Residence	No	No	--												

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8	Town and Village of Saugerties	Isolated neighborhood	Housing	Single-Family Residence	No	No	--												
9	Town and Village of Saugerties	Blue Mountain Reservoir	Infrastructure Systems	Water Supply	No	No	--												
10	Town and Village of Saugerties	Malden-on-Hudson Wastewater Treatment Plant	Infrastructure Systems	Wastewater	No	No	--	High	Yes	Yes	Yes	No	No	Yes	2	3	3.00	3	27
11	Town and Village of Saugerties	Lighthouse	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
12	Town and Village of Saugerties	Glasco Wastewater Treatment Plant	Infrastructure Systems	Wastewater	No	No	--												
18	Town and Village of Saugerties	Saxton-Katsbaan Fire District Saxton Station (55)	Health and Social Services	Emergency Operations-Response	No	No	--												
19	Town and Village of Saugerties	Mt Marion Fire Department (41)	Health and Social Services	Emergency Operations-Response	No	No	--												
20	Town and Village of Saugerties	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
21	Town and Village of Saugerties	Village Sewage Treatment Plant	Infrastructure Systems	Wastewater	No	No	--												
22	Town and Village of Saugerties	Town Hall/Police Station	Health and Social Services	Emergency Operations-Response	No	No	--												
27	Town and Village of Saugerties	Opus 40	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
32	Town and Village of Saugerties	Mount Marion School	Health and Social Services	Schools	No	No	--	High	Yes	No	No	Yes	No	No	1	3	2.00	2	12
34	Town and Village of Saugerties	Esopus Bend Nature Preserve	Natural and Cultural Resources	Natural Protective Features	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
35	Town and Village of Saugerties	Coast Guard Station	Health and Social Services	Emergency Operations-Response	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
37	Town and Village of Saugerties	Diaz Ambulance	Economic	Marina-Water Based Business	No	No	--												
38	Town and Village of Saugerties	Tina Chorvas Park	Natural and Cultural Resources	Parks and Recreation	No	No	--	High	Yes	Yes	Yes	No	No	Yes	2	3	3.00	3	27
39	Town and Village of Saugerties	Riverfront Park - Glasco	Natural and Cultural Resources	Parks and Recreation	No	No	--	Extreme	Yes	Yes	Yes	No	Yes	Yes	2.5	3	4.50	3	41
40	Town and Village of Saugerties	Riverfront Park - Malden	Natural and Cultural Resources	Parks and Recreation	No	No	--	Extreme	Yes	Yes	Yes	No	No	Yes	2	3	4.00	3	36
41	Town and Village of Saugerties	Arm of the Sea Theater's studios and storage	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No	--	Extreme	Yes	Yes	Yes	No	No	Yes	2	3	4.00	4	48
43	Town and Village of Saugerties	Village Beach	Natural and Cultural Resources	Parks and Recreation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
44	Town and Village of Saugerties	Blue Mountain Manor	Housing	Single-Family Residence	No	Yes, FEMA	Medium	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32

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48	Town and Village of Saugerties	Tidal marshes on both sides of Creek channel	Natural and Cultural Resources	Water Bodies	No	No	--												
49	Town and Village of Saugerties	Bulkheads of creek channel	Natural and Cultural Resources	Water Bodies	No	No	--												
50	Town and Village of Saugerties	Ruth Glunt Nature Trail	Natural and Cultural Resources	Parks and Recreation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
51	Town and Village of Saugerties	Saugerties Powerboat Association	Economic	Marina-Water Based Business	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
52	Town and Village of Saugerties	Lynch's Marina	Economic	Marina-Water Based Business	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
53	Town and Village of Saugerties	Lighthouse Cove Marina	Economic	Marina-Water Based Business	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
56	Town and Village of Saugerties	Barclay's Dam	Infrastructure Systems	Water Supply	No	No	--												
57	Town and Village of Saugerties	Ferry Dock	Economic	Marina-Water Based Business	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
58	Town and Village of Saugerties	Harbor and Dykes	Natural and Cultural Resources	Water Bodies	No	No	--												
59	Town and Village of Saugerties	Oakledge Park Residential Neighborhood	Housing	Single-Family Housing	No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
63	Town and Village of Saugerties	Saugerties Senior Housing	Housing	Senior Housing	Yes	No	--												
67	Town and Village of Saugerties	Industrial Park	Economic	Small Business	No	No	--												
70	Town and Village of Saugerties	Army Reserve Center	Health and Social Services	Military Installations	No	No	--												
71	Town and Village of Saugerties	Lezette School Bus Garage	Infrastructure Systems	Transportation	No	No	--												
75	Town and Village of Saugerties	Better Community Housing	Housing	Senior Housing	Yes	No	--												
78	Town and Village of Saugerties	Senior Center	Health and Social Services	Emergency Operations-Response	Yes	No	--												
100	Town and Village of Saugerties	Lighthouse Drive Residences	Housing	Single-Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
101	Town and Village of Saugerties	Saugerties Marina	Economic	Marine-Based Business	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
--	Town and Village of Saugerties	Saugerties (Village) Water District	Infrastructure Systems	Water Supply	No	No	--												
1	Town of Olive	Ashokan Bush Kill Creek Flooding	Natural and Cultural Resources	Water Bodies	No	No	--												
2	Town of Olive	Boiceville Flooding	Economic	Downtown Center	No	No	--												
3	Town of Olive	Boiceville Market	Economic	Grocery-Food Suppliers	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54

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4	Town of Olive	Chester Properties Inc.	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	No	No	Yes	No	No	1	3	3.00	2	18
5	Town of Olive	Boiceville Wastewater Treatment Facility	Infrastructure Systems	Wastewater	No	Yes, FEMA	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
6	Town of Olive	Olive Fire Company #3	Health and Social Services	Emergency Operations-Response	Yes	Yes, FEMA	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
7	Town of Olive	Olive Fire Company #4	Health and Social Services	Emergency Operations-Response	No	No	High												
8	Town of Olive	Olive Fire Company #1	Health and Social Services	Emergency Operations-Response	No	No	High												
9	Town of Olive	Olive Fire Company #5	Health and Social Services	Emergency Operations-Response	Yes	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
10	Town of Olive	Hudson Valley Water Company #5 Water Treatment Facility	Infrastructure Systems	Water Supply	No	No	High												
11	Town of Olive	Bruneul, Emile, Studio and Sculpture Garden	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	High												
12	Town of Olive	Ashokan-Turnwood Covered Bridge	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No, Locally Significant	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
13	Town of Olive	Boiceville Florist	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
14	Town of Olive	The Landmark Grille	Economic	Restaurants	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
15	Town of Olive	Maverick West Medical Facility	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
16	Town of Olive	Johanansen Office Complex	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
17	Town of Olive	Stucki Embroidery	Economic	Industrial, Warehousing and Manufacturing	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
18	Town of Olive	Ronsen Piano Hammer Co., Inc.	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
19	Town of Olive	Nekos Boiceville Pharmacy	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
20	Town of Olive	Boiceville Wine & Spirits, Inc.	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
21	Town of Olive	Onteora School Complex	Health and Social Services	Schools	No	No, Locally Significant	High												
22	Town of Olive	Bushkill Bridge--Co. Rte. 42	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
23	Town of Olive	Watson Hollow Rd., Co. Rt. 42	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
24	Town of Olive	Town of Olive Offices & Highway Complex	Health and Social Services	Government and Administrative Services	Yes	Yes, FEMA	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
25	Town of Olive	Olive Fire Company #2	Health and Social Services	Emergency Operations-Response	No	No	High												
26	Town of Olive	Lester S. Davis Park	Natural and Cultural Resources	Parks and Recreation	No	No, Locally Significant	Medium	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
27	Town of Olive	Grant Avery Park	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
28	Town of Olive	Olivebridge Park	Natural and Cultural Resources	Parks and Recreation	No	No	Medium												
29	Town of Olive	Olive First Aid Unit, Inc.	Health and Social Services	Emergency Operations-Response	No	No	High												
30	Town of Olive	Olive First Aid Unit, Inc.	Health and Social Services	Emergency Operations-Response	No	No	High												
31	Town of Olive	Olive First Aid Unit, Inc.	Health and Social Services	Emergency Operations-Response	Yes	Yes, FEMA	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
32	Town of Olive	Luky Petroleum, Inc.	Economic	Small Business	No	No	High	Moderate	Yes	No	No	Yes	No	No	1	3	1.50	1	5
33	Town of Olive	Community Bank	Economic	Banks and Financial Services	No	No	High	Moderate	Yes	No	No	Yes	No	No	1	3	1.50	1	5
34	Town of Olive	Beginnings Day Care	Health and Social Services	Daycare and Eldercare	No	No	High	Moderate	Yes	No	No	Yes	No	No	1	3	1.50	2	9
35	Town of Olive	Town of Olive Court & Police	Health and Social Services	Emergency Operations-Response	No	No	High												
36	Town of Olive	American Legion Hall & Sr. Center	Natural and Cultural Resources	Community Centers	No	No	High												
37	Town of Olive	NY State Police Substation	Health and Social Services	Emergency Operations-Response	No	No	High												
38	Town of Olive	Olive Transfer Station	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	No	No	High												
39	Town of Olive	Tongore Pines Sr. Housing	Housing	Senior Housing	No	No	High												
40	Town of Olive	Boiceville Inn	Economic	Restaurants	No	No	High												
41	Town of Olive	Bread Alone	Economic	Large Business	No	No	High												
42	Town of Olive	Coldwell Banker Real Estate	Economic	Small Business	No	No	High												
43	Town of Olive	Pine View Bakery	Economic	Restaurants	No	No	High												
44	Town of Olive	Olive Animal Hospital	Economic	Small Business	No	No	High												
45	Town of Olive	Old School Baptist Meeting House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	High												
46	Town of Olive	Shokan Reformed Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High												
47	Town of Olive	Ashokan UM Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High												

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
48	Town of Olive	St. Augustines Chapel	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
49	Town of Olive	Ashokan Center	Health and Social Services	Schools	Yes	No, Locally Significant	High												
50	Town of Olive	Olive Free Library	Natural and Cultural Resources	Libraries	No	No	High												
51	Town of Olive	West Shokan Post Office	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
52	Town of Olive	Joma Cafe	Economic	Restaurants	Yes	No, Locally Significant	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
53	Town of Olive	Ulster Highway Dept. Substation	Health and Social Services	Public Works Facilities	No	No	High												
54	Town of Olive	Town of Olive Office Building	Health and Social Services	Government and Administrative Services	Yes	Yes, FEMA	High												
55	Town of Olive	Town of Olive Highway Garage	Health and Social Services	Public Works Facilities	Yes	Yes, FEMA	High												
56	Town of Olive	Town of Olive Equipment Bldg.	Health and Social Services	Public Works Facilities	Yes	Yes, FEMA	High												
57	Town of Olive	Town of Olive Salt Shed	Health and Social Services	Public Works Facilities	Yes	Yes, FEMA	High												
58	Town of Olive	Town of Olive Dog Kennel	Health and Social Services	Government and Administrative Services	Yes	Yes, FEMA	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
59	Town of Olive	Roberts Auction	Economic	Small Business	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
60	Town of Olive	Olivebridge Post Office	Health and Social Services	Government and Administrative Services	No	No	High												
61	Town of Olive	Tettas Food Port	Economic	Grocery-Food Suppliers	No	No	High												
62	Town of Olive	Olivebridge United Methodist Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High												
63	Town of Olive	Samsonville United Methodist Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
64	Town of Olive	The Country Inn	Economic	Restaurants	No	No	High												
65	Town of Olive	Shokan Square	Economic	Small Business	No	No	High												
66	Town of Olive	Olive Plaza	Economic	Small Business	No	No	High												
67	Town of Olive	Sheldon Hill Forestry	Economic	Small Business	No	No	High												
68	Town of Olive	Carma Automotive	Economic	Small Business	No	No	High												
69	Town of Olive	RJ Wilkins Plaza	Economic	Small Business	No	No	High												
70	Town of Olive	Verizon, NY Substation	Economic	Large Business	No	No	High												
71	Town of Olive	Hillside Drive Bridge--Olive owned	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
72	Town of Olive	Brown Road Culvert--Olive owned	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High												

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73	Town of Olive	DeSilva Road Bridge--Olive owned	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
74	Town of Olive	Upper B'ville Rd. Bridge--Olive owned	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
75	Town of Olive	Brodhead Rd. Bridges --Olive owned	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
76	Town of Olive	Red Maple Rd. Streambed Sediment Deposit	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High												
77	Town of Olive	Jomar Lane Culverts (3)	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High												
78	Town of Olive	Girard Residence	Housing	Single Family Residence	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
79	Town of Olive	Daniels Residence	Housing	Single Family Residence	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
80	Town of Olive	Seven Residences	Housing	Single Family Residence	Yes	No, Locally Significant	High	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
81	Town of Olive	Klippel Apartments	Housing	Multi Family Residence	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
82	Town of Olive	NYC Bridge--Five Arch	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
83	Town of Olive	Ulster Maltby Hollow Bridge	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
84	Town of Olive	South Hollow Bridge Flooding	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
100	Town of Olive	Trails Motel	Economic	Lodging	No	No	--												
101	Town of Olive	Cold Brook Road and Esopus Creek	Infrastructure Systems	Transportation	No	No	--	Moderate	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.00	3	27
102	Town of Olive	Upper Sahler Mill Road at Beaverdam Creek	Infrastructure Systems	Transportation	No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
103	Town of Olive	Lang Road	Infrastructure Systems	Transportation	No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
1	Town of Rochester	Carlo Drive	Infrastructure Systems	Transportation	No	No	--												
2	Town of Rochester	Minnewaska State Park	Natural and Cultural Resources	Parks and Recreation	No	Yes, FEMA	High												
3	Town of Rochester	Pompeys Cave	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No, Locally Significant	High												
4	Town of Rochester	Saunderskill Farms	Economic	Grocery-Food Suppliers	No	No, Locally Significant	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54
5	Town of Rochester	Kelder farms	Economic	Grocery-Food Suppliers	No	No, Locally Significant	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54
6	Town of Rochester	Rondout Creek	Natural and Cultural Resources	Water Bodies	No	No	--												

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7	Town of Rochester	Kerhonkson Elementary school	Health and Social Services	Schools	Yes	Yes, FEMA	--												
8	Town of Rochester	Rondout Central School	Health and Social Services	Schools	Yes	Yes, FEMA	--												
9	Town of Rochester	Accord Fire District Accord Station	Health and Social Services	Emergency Operations-Response	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
10	Town of Rochester	Accord Fire District Rochester Station (15)	Health and Social Services	Emergency Operations-Response	Yes	No	--												
11	Town of Rochester	Town Hall	Health and Social Services	Government and Administrative Services	Yes	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
12	Town of Rochester	Town Court	Health and Social Services	Government and Administrative Services	No	No	--												
13	Town of Rochester	Palentown School	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
14	Town of Rochester	Kerhonkson Fire Company	Health and Social Services	Emergency Operations-Response	Yes	No	--												
15	Town of Rochester	Ellenville Regional Hospital	Health and Social Services	Primary-Regional Hospitals	Yes	No	--												
16	Town of Rochester	Benedictine Hospital	Health and Social Services	Primary-Regional Hospitals	Yes	No	--												
17	Town of Rochester	Rochester Creek Bridge	Infrastructure Systems	Transportation	Yes	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
18	Town of Rochester	Accord Bridge	Infrastructure Systems	Transportation	Yes	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
19	Town of Rochester	Rochester Reformed Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	--	Extreme	yes	yes	yes	no	no	yes	2	3	4.00	4	48
20	Town of Rochester	Chapel of Our Lady of Lourdes Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	--												
21	Town of Rochester	Ulster County Sheriff Sub Station	Health and Social Services	Emergency Operations-Response	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
22	Town of Rochester	Accord Fire District Alligerville Station (15)	Health and Social Services	Emergency Operations-Response	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
23	Town of Rochester	Municipal Garage	Health and Social Services	Government and Administrative Services	No	No	--												
24	Town of Rochester	Kerhonkson Accord First Aid Squad	Health and Social Services	Emergency Operations-Response	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
25	Town of Rochester	Markle, Jacob F., Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
26	Town of Rochester	Middaugh Stone House and Dutch Barn	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
27	Town of Rochester	Baker, Sebastian, Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
28	Town of Rochester	Hoornbeck, Jacob, Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												

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29	Town of Rochester	Sahler Stone House and Dutch Barn	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
30	Town of Rochester	Stilwill-Westbrook Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
31	Town of Rochester	Van Wagenen Stone House and Farm Complex	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
32	Town of Rochester	Westbrook, Dirck, Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
33	Town of Rochester	Krom, Lucas Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
34	Town of Rochester	Schoonmaker, C. K., Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
35	Town of Rochester	Winfield Corners Stone House	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
36	Town of Rochester	Friends of Historic Rochester Museum	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--	Moderate	yes	yes	yes	yes	no	yes	2.5	3	3.00	4	36
37	Town of Rochester	Hudson Valley Resort Water Treatment Facility	Infrastructure Systems	Wastewater	No	No	--												
38	Town of Rochester	Whitefield Road Bridge-Flooding	Infrastructure Systems	Transportation	No	No	--	Extreme	yes	yes	yes	no	no	yes	2	3	4.00	3	36
39	Town of Rochester	Red Brick House-Historic	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
40	Town of Rochester	D and H Rail Trail Entrance	Natural and Cultural Resources	Parks and Recreations	No	No	--	High	yes	yes	yes	yes	no	yes	2.5	3	3.50	3	32
50	Town of Rochester	Youth and Community Department	Natural and Cultural Resources	Community Centers	No	No	--												
51	Town of Rochester	Towpath Road	Infrastructure Systems	Transportation	No	No	--	High	yes	yes	yes	yes	no	yes	2.5	3	3.50	3	32
70	Town of Rochester	Rochester Community Center	Natural and Cultural Resources	Community Centers	No	No	--	Moderate	yes	No	No	yes	No	yes	1.5	3	2.00	2	12
--	Town of Rochester	Lucas Estates Water Company Water Treatment Facility	Infrastructure Systems	Wastewater	No	No	--												
--	Town of Rochester	The Rondout Aquifer	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Rochester	Zolota Osin Inc Water Treatment Facility	Infrastructure Systems	Wastewater	No	No	--												
1	Town of Rosendale	Hickory Bush Road	Infrastructure Systems	Transportation	No	No	--												
2	Town of Rosendale	Spring Hill Road	Infrastructure Systems	Transportation	No	No	--												
3	Town of Rosendale	Webster Lock Road	Infrastructure Systems	Transportation	No	No	--												
4	Town of Rosendale	Creek Locks Road	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
5	Town of Rosendale	Flood Canal System	Infrastructure Systems	Stormwater	No	No	--												

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6	Town of Rosendale	Residences West of Railroad Trestle	Housing	Single-Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
7	Town of Rosendale	Perrine's Bridge	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
8	Town of Rosendale	Dashville Dam	Infrastructure Systems	Transportation	No	No	--												
9	Town of Rosendale	Springtown Road	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
10	Town of Rosendale	Route 213	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
11	Town of Rosendale	Creekside Lane	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
12	Town of Rosendale	Route 213 Flooding	Infrastructure Systems	Transportation	No	No	--												
13	Town of Rosendale	Rosendale Salt Shed	Health and Social Services	Public Works Facilities	No	No	--												
14	Town of Rosendale	Mobile Home Park	Housing	Affordable Housing	Yes	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
15	Town of Rosendale	Wallkill Valley Rail Trail	Natural and Cultural Resources	Parks and Recreation	No	No	High												
16	Town of Rosendale	Washington Park	Housing	Affordable Housing	Yes	No	--												
17	Town of Rosendale	Sewer Plant	Infrastructure Systems	Wastewater	No	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
18	Town of Rosendale	Island View Adult Family Care	Health and Social Services	Daycare and Eldercare	Yes	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
19	Town of Rosendale	High Falls Firehouse (serves Rosendale)	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
20	Town of Rosendale	Tillson Volunteer Fire Department	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
21	Town of Rosendale	Park Heights Senior Housing	Health and Social Services	Daycare and Eldercare	Yes	No	Medium												
22	Town of Rosendale	Rosendale Recreation Center and Pool House	Natural and Cultural Resources	Community Centers	Yes	Yes, FEMA	High												
23	Town of Rosendale	Park & Ride Bus Station	Infrastructure Systems	Transportation	No	Yes, FEMA	High												
24	Town of Rosendale	Saint Peter's Catholic Church (used as shelter)	Natural and Cultural Resources	Cultural or Religious Establishments	No	Yes, FEMA	Medium												
25	Town of Rosendale	Iron Mountain	Economic	Large Business	No	Yes, FEMA	--												
26	Town of Rosendale	Joppenbergh Mountain	Natural and Cultural Resources	Natural Habitats	No	--	Low												
27	Town of Rosendale	Marbletown First Aid Unit	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
28	Town of Rosendale	Rosendale Police Department	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
29	Town of Rosendale	Cottekill Fire Department	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
30	Town of Rosendale	Future Town Hall	Health and Social Services	Government and Administrative Services	No	Yes, FEMA	High												

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31	Town of Rosendale	Brookside School (Special Education)	Health and Social Services	Schools	Yes	Yes, FEMA	High												
32	Town of Rosendale	American Legion	Natural and Cultural Resources	Cultural or Religious Establishments	No	Yes, FEMA	High												
33	Town of Rosendale	Rosendale Library	Natural and Cultural Resources	Libraries	No	No	High												
34	Town of Rosendale	Bloomington Fire Department	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
35	Town of Rosendale	High Falls Water District Water Treatment Facility	Infrastructure Systems	Wastewater	No	Yes, FEMA	High												
36	Town of Rosendale	Clarks Estates Homeowners Water Treatment Facility	Infrastructure Systems	Water Supply	No	Yes, FEMA	High												
37	Town of Rosendale	Rosendale Water Plant	Infrastructure Systems	Water Supply	No	Yes, FEMA	High												
38	Town of Rosendale	Tillson Estate Comm. Assoc. Water Treatment Facility	Infrastructure Systems	Water Supply	No	Yes, FEMA	High												
39	Town of Rosendale	Binnewater Fire Station	Health and Social Services	Emergency Operations-Response	No	Yes, FEMA	High												
40	Town of Rosendale	Snyder Estate Natural Cement Historic District	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	Low												
41	Town of Rosendale	Hardenburgh Group Home (disabled adults)	Housing	Supportive Housing	Yes	No	Medium												
42	Town of Rosendale	Family House	Housing	Senior Housing	Yes	No	Medium	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
43	Town of Rosendale	US Army Corps Flood Control System pump station	Infrastructure Systems	Stormwater	No	Yes, FEMA	High	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
44	Town of Rosendale	Bloomington Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	Yes, FEMA	High												
45	Town of Rosendale	Tillson Community Church	Natural and Cultural Resources	Cultural or Religious Establishments	No	Yes, FEMA	High												
46	Town of Rosendale	JMG Bus Station	Infrastructure Systems	Transportation	No	Yes, FEMA	Medium												
47	Town of Rosendale	Railroad Trestle (can provide access for emergency vehicles across Rondout)	Infrastructure Systems	Transportation	No	Yes, FEMA	High												
48	Town of Rosendale	IGA Market	Economic	Grocery-Food Suppliers	No	No	--												
49	Town of Rosendale	River Road	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
51	Town of Rosendale	Route 32/Rifton Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
70	Town of Rosendale	Main Street Flooding	Infrastructure Systems	Transportation	No	No	--												
71	Town of Rosendale	Communications Tower	Infrastructure Systems	Telecommunications	No	No	--												
72	Town of Rosendale	Fann's Plaza	Economic	Grocery-Food Suppliers	No	No	--												
73	Town of Rosendale	Riverview Drive	Housing	Single-Family Residence	No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32

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74	Town of Rosendale	James Street	Housing	Single-Family Residence	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
75	Town of Rosendale	AJ Snyder Little League Field	Natural and Cultural Resources	Parks and Recreation	No	No	--	Moderate	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.00	3	27
77	Town of Rosendale	Route 32	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	Yes	Yes	3	3	5.00	3	45
80	Town of Rosendale	Wallkill Valley Rail Trail	Natural and Cultural Resources	Parks and Recreation	No	No	High												
--	Town of Rosendale	Cottekill Brook	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Rosendale	Coxingkill Creek	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Rosendale	Dewitt Mill Stream	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Rosendale	Rondout Creek	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Rosendale	Wallkill River	Natural and Cultural Resources	Water Bodies	No	No	--												
2	Town of Wawarsing	Oak Ridge Road	Infrastructure Systems	Transportation	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
3	Town of Wawarsing	Nevele Road	Infrastructure Systems	Transportation	No	No	--												
4	Town of Wawarsing	Ellenville Central School	Health and Social Services	Schools	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54
5	Town of Wawarsing	Old Greenfield Rd	Infrastructure Systems	Transportation	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
6	Town of Wawarsing	Rte 209	Infrastructure Systems	Transportation	No	No	--	Extreme	yes	yes	yes	yes	no	no	2	3	4.00	3	36
7	Town of Wawarsing	Carlo Drive Area Housing	Housing	Single-Family Residence	No	No	--	Extreme	yes	yes	yes	yes	no	no	2	3	4.00	4	48
8	Town of Wawarsing	Ellenville Regional Hospital	Health and Social Services	Primary-Regional Hospitals	No	No	--	Extreme	yes	no	no	yes	no	yes	1.5	3	3.50	2	21
9	Town of Wawarsing	Joseph Y Resnick Airport	Infrastructure Systems	Transportation	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
10	Town of Wawarsing	Napanoch Sewer Imp Area wastewater treatment facility	Infrastructure Systems	Wastewater	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
11	Town of Wawarsing	Kerhonkson Sewer Improv. Area Wastewater treatment facility	Infrastructure Systems	Wastewater	No	No	--												
12	Town of Wawarsing	Eastern Correctional Facility	Health and Social Services	Public Works Facilities	No	No	--	Extreme	yes	no	yes	yes	no	no	1.5	3	3.50	3	32
13	Town of Wawarsing	Fantinekill Mobile Home Park	Housing	Affordable Housing	No	No	--	Extreme	yes	yes	yes	no	no	yes	2	3	4.00	4	48
14	Town of Wawarsing	Glen Mobile Home Park	Housing	Affordable Housing	No	No	--												
15	Town of Wawarsing	Hudson Meadows	Housing	--	No	No	--												
16	Town of Wawarsing	Kerhonkson Water District	Infrastructure Systems	Water Supply	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
17	Town of Wawarsing	Ogden Lane Mobile Home Park	Housing	Affordable Housing	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
19	Town of Wawarsing	Renaissance Project Inc.	Health and Social Services	Healthcare Facilities	No	No	--												
20	Town of Wawarsing	Samaritan Village	Natural and Cultural Resources	Community Centers	No	No	--												
21	Town of Wawarsing	Shady Acres Mobile Home Park	Housing	Affordable Housing	No	No	--												
23	Town of Wawarsing	Police Station Wawarsing	Health and Social Services	Emergency Operations-Response	No	No	--	Extreme	no	no	no	no	no	yes	0.5	3	2.50	1	8
24	Town of Wawarsing	Ulster Correctional Facility	Health and Social Services	Public Works Facilities	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54
25	Town of Wawarsing	Wawarsing Christian Academy	Health and Social Services	Schools	No	No	--	Extreme	yes	yes	yes	no	no	yes	2	3	4.00	4	48
26	Town of Wawarsing	Kerhonkson Elementary School	Health and Social Services	Schools	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54
27	Town of Wawarsing	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
28	Town of Wawarsing	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
29	Town of Wawarsing	Kerhonkson Fire Company	Health and Social Services	Emergency Operations-Response	No	No	--	High	yes	yes	yes	yes	no	no	2	3	3.00	3	27
30	Town of Wawarsing	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
31	Town of Wawarsing	Municipal Garage	Health and Social Services	Public Works Facilities	No	No	--												
32	Town of Wawarsing	Cragsmoor Historic District	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
33	Town of Wawarsing	Chetolah	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
34	Town of Wawarsing	Hoornbeek Store Complex	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
35	Town of Wawarsing	Spring Glen Synagogue	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	--												
36	Town of Wawarsing	Central Hudson - Sub Station	Infrastructure Systems	Telecommunications	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
37	Town of Wawarsing	Napanoch Water Well Field	Infrastructure Systems	Water Supply	No	No	--												
38	Town of Wawarsing	Sam's Point Preserve Visitor Center	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No	--												
39	Town of Wawarsing	Tower farm, Lake Maratanza	Infrastructure Systems	Telecommunications	No	No	--												
40	Town of Wawarsing	Lippman Park	Natural and Cultural Resources	Parks and Recreation	No	No	--												

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Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
41	Town of Wawarsing	Vernooy Kill State Forest	Natural and Cultural Resources	Parks and Recreation	No	No	--												
42	Town of Wawarsing	Merriman Dam	Infrastructure Systems	Water Supply	No	No	--												
43	Town of Wawarsing	Rail Trail Route	Natural and Cultural Resources	Parks and Recreation	No	No	--	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	3	41
44	Town of Wawarsing	Large Red Cedar Wetland	Natural and Cultural Resources	Wetlands and marshes	No	No	--												
45	Town of Wawarsing	Ontario & Western Port Ben Passenger Train Station	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
--	Town of Wawarsing	East Branch Beer Kill	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	Fantine Kill	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	North Cully	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	Rondout Creek	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	Sandburg Creek	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	South Gully	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	Vernooy Kill	Natural and Cultural Resources	Water Bodies	No	No	--												
--	Town of Wawarsing	West Branch Beer Kill	Natural and Cultural Resources	Water Bodies	No	No	--												
1	Town of Woodstock	Isolated Neighborhoods	Housing	Single-Family Residence	No	No	--												
2	Town of Woodstock	Residential Neighborhood	Housing	Single-Family Residence	No	No	--	Extreme	Yes	No	No	Yes	No	Yes	1.5	3	3.50	1	11
3	Town of Woodstock	Water Divide	Infrastructure Systems	Stormwater	No	No	--												
4	Town of Woodstock	Byrdcliffe Theatre	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
5	Town of Woodstock	Church of the Holy Transfiguration of Christ-on-the-Mount	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	--												
6	Town of Woodstock	Woodstock Wastewater Treatment Plant	Infrastructure Systems	Wastewater	No	No	--	Moderate	Yes	No	No	Yes	No	No	1	3	1.50	1	5
7	Town of Woodstock	Zena Elementary School	Health and Social Services	Schools	No	No	--	High	Yes	Yes	Yes	Yes	No	No	2	3	3.00	1	9
8	Town of Woodstock	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
9	Town of Woodstock	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
10	Town of Woodstock	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
11	Town of Woodstock	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
12	Town of Woodstock	Fire/First Aid Station	Health and Social Services	Emergency Operations-Response	No	No	--												
13	Town of Woodstock	Family of Woodstock	Health and Social Services	Healthcare Facilities	No	No	--												
14	Town of Woodstock	Woodstock School of Art	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
15	Town of Woodstock	Woodstock Highway Facility	Infrastructure Systems	Transportation	No	Yes	--	High	Yes	Yes	Yes	No	No	Yes	2	3	3.00	3	27
16	Town of Woodstock	Woodstock Elementary School	Health and Social Services	Schools	No	No	--												
17	Town of Woodstock	City of Kingston Water Treatment Plant	Infrastructure Systems	Water Supply	No	No	--	High	Yes	Yes	Yes	Yes	No	No	2	3	3.00	3	27
18	Town of Woodstock	City of Kingston Cooper Lake reservoir	Infrastructure Systems	Water Supply	No	No	--												
19	Town of Woodstock	Woodstock Police & Emergency Dispatch	Health and Social Services	Emergency Operations-Response	No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
20	Town of Woodstock	Woodstock Town Offices	Health and Social Services	Government and Administrative Services	No	No	--												
21	Town of Woodstock	Woodstock Municipal Communications Tower	Infrastructure Systems	Telecommunications	No	No	--												
22	Town of Woodstock	Woodstock Library	Natural and Cultural Resources	Libraries	No	No	--												
23	Town of Woodstock	Woodstock Post Office	Health and Social Services	Government and Administrative Services	No	No	--												
24	Town of Woodstock	Community Center and Youth Center	Natural and Cultural Resources	Community Centers	No	No	--												
30	Town of Woodstock	John Joy Road Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	No	2	3	4.00	3	36
31	Town of Woodstock	Reynolds Lane Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
32	Town of Woodstock	Church Road Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
33	Town of Woodstock	Lower Byrdcliff Rd Culvert	Infrastructure Systems	Transportation	No	No	--												
34	Town of Woodstock	Silver Hollow Road Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
35	Town of Woodstock	Macdaniel Road Bridge	Infrastructure Systems	Transportation	No	No	--												
36	Town of Woodstock	Mill Hill Rd Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
37	Town of Woodstock	Ohaya Mountain Road Embankment	Infrastructure Systems	Transportation	No	No	--												
38	Town of Woodstock	Pump House 1	Infrastructure Systems		No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
39	Town of Woodstock	Pump House 2	Infrastructure Systems		No	No	--	High	Yes	Yes	Yes	Yes	No	Yes	2.5	3	3.50	3	32
42	Town of Woodstock	Rt 212	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
50	Town of Woodstock	Mink Hollow Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
51	Town of Woodstock	Wittenberg Road Bridge	Infrastructure Systems	Transportation	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41
--	Town of Woodstock	Central Business District	Economic	Downtown Center	No	No													
--	Town of Woodstock	Mink Hollow Road Rock Wall	Infrastructure Systems	Transportation	No	No	--												
--	Town of Woodstock	Sawkill Stream	Natural and Cultural Resources	Water Bodies	No	No	--												
1	Village of Ellenville	Ellenville Senior Housing	Health and Social Services	Daycare and Eldercare	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	4	54
2	Village of Ellenville	Wastewater Treatment facility	Infrastructure Systems	Wastewater	No	Yes, FEMA	High												
3	Village of Ellenville	Ellenville Senior Apartments	Housing	Senior Housing	Yes	No, Locally Significant	High												
4	Village of Ellenville	Ellenville Village Hall	Health and Social Services	Government and Administrative Services	No	No, Locally Significant	High												
5	Village of Ellenville	Wawarsing Town Hall	Health and Social Services	Government and Administrative Services	No	No, Locally Significant	High												
6	Village of Ellenville	Ellenville Street Department	Health and Social Services	Public Works Facilities	No	No, Locally Significant	Medium												
7	Village of Ellenville	Ellenville Water Department	Infrastructure Systems	Water Supply	No	Yes, FEMA	High												
8	Village of Ellenville	Ellenville Police Department	Health and Social Services	Emergency Operations-Response	No	No, Locally Significant	High	Extreme	no	no	no	no	no	yes	0.5	3	2.50	1	8
9	Village of Ellenville	Ellenville Central School	Health and Social Services	Schools	No	No, Locally Significant	Medium	Extreme	yes	yes	yes	yes	no	yes	2.5	3	4.50	4	54
10	Village of Ellenville	Ellenville First Aid & Rescue Squad	Health and Social Services	Emergency Operations-Response	No	No, Locally Significant	High												
11	Village of Ellenville	Ellenville Joint Fire District Kimble Hose Company (26)	Health and Social Services	Emergency Operations-Response	No	No, Locally Significant	High												
12	Village of Ellenville	Ellenville Joint Fire District Pioneer Engine Company (26)	Health and Social Services	Emergency Operations-Response	No	No, Locally Significant	High												
13	Village of Ellenville	Ellenville Joint Fire District Scoresby Hose Company (26)	Health and Social Services	Emergency Operations-Response	No	No, Locally Significant	High												
18	Village of Ellenville	Provident Bank	Economic	Banks and Financial Services	Yes	No, Locally Significant	High												
19	Village of Ellenville	M&T Bank	Economic	Banks and Financial Services	Yes	No, Locally Significant	High												

Table V-4 Community Asset Inventory

Map Number	Community	Asset Name Description	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Risk Area	Lack of Defensive Flood Protection Measure	Elevation Below BFE	Occupied <= 2 ft. above BFE	At Confluence of Two or More Streams	Flood Risk from Storm Water	Lack of Vegetated Stream Bank Buffer	Landscape Attribute Score	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
20	Village of Ellenville	Bank of America	Economic	Banks and Financial Services	Yes	No, Locally Significant	High												
21	Village of Ellenville	Catskill Hudson Bank	Economic	Banks and Financial Services	Yes	No, Locally Significant	High												
22	Village of Ellenville	Matthews' Pharmacy	Health and Social Services	Healthcare Facilities	Yes	No, Locally Significant	High												
23	Village of Ellenville	Getty Gas Station	Economic	Large Business	Yes	No, Locally Significant	Medium												
24	Village of Ellenville	Citgo Gas Station	Economic	Large Business	Yes	No, Locally Significant	Medium												
25	Village of Ellenville	US Post Office	Health and Social Services	Government and Administrative Services	No	No	--												
26	Village of Ellenville	Hunt, George and John R. Memorial	Natural and Cultural Resources	Historic Landmarks and Facilities	No	No	--												
27	Village of Ellenville	Roslyn Street Pump Station	Infrastructure Systems	Wastewater	No	No	--	Extreme	Yes	Yes	Yes	Yes	No	Yes	2.5	3	4.50	3	41

Notes:
- Where a map number is not indicated, the asset was not found to correspond to a singular geographic location.
- Where Risk Area is not indicated, the asset is not located in the floodplain, and was not identified by the Committee as an asset that is subject to repetitive flooding.
- Where Community Value is not indicated, no feedback was provided by the Committee.

EXHIBIT 1

Riverine Landscape Attribute Determination Worksheet

Attribute: Defensive Flood Protection Measures

Asset: Lighthouse **Asset ID:** 326 **Address:** 168 Lighthouse Drive, Saugerties, NY

Determination:

- ☑ Defensive flood protection measures are absent, below BFE, in poor condition, or lack maintenance commitment (YES)
- ☐ Defensive flood protection measures are present, above BFE, in good condition, and have maintenance commitment (NO)

Determination methodology:

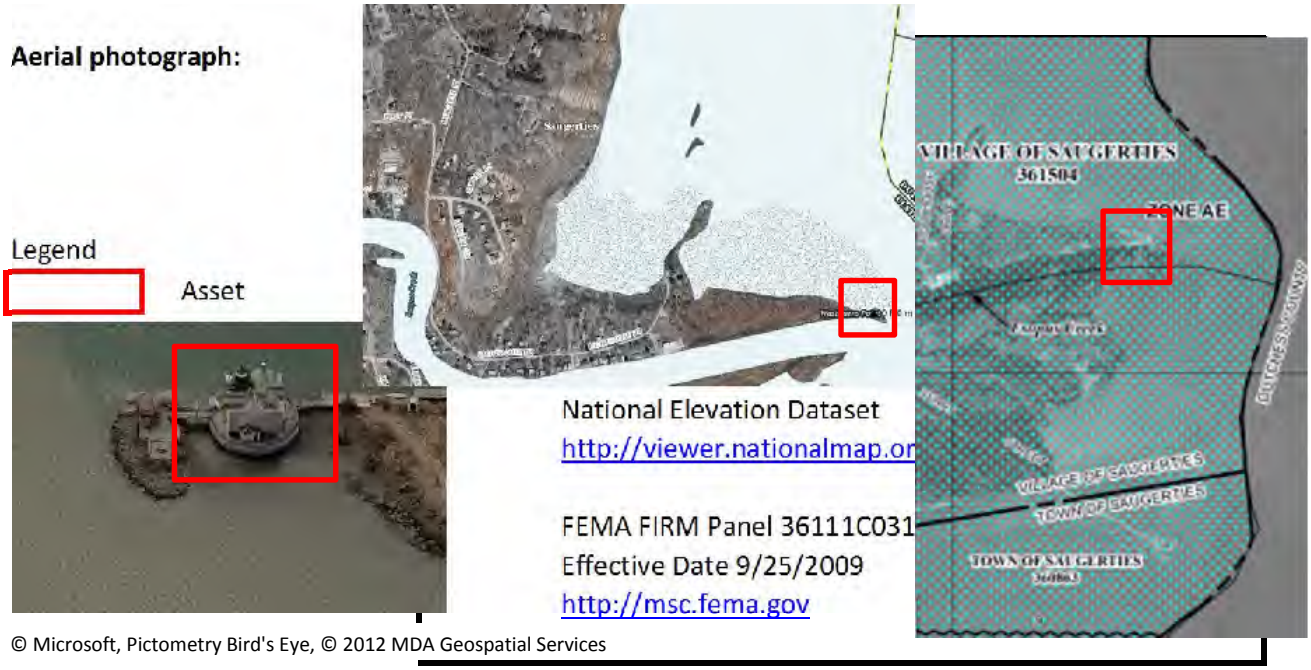
1) Conduct a site visit to observe presence, condition, and height of flood protection measures in the vicinity of the asset. Compare structure height to BFE levels (available from FEMA Flood Insurance Rate Maps (FIRM), http://msc.fema.gov). Determine base ground elevation using LiDAR GIS elevation maps or the National Elevation Dataset (using Topo layer on http://viewer.nationalmap.gov/viewer).

2) If direct observation is not feasible, interview local residents, experts and/or authorities for information regarding defensive flood protection measures.

Justification: Aerial imagery indicates that there are flood walls constructed around the perimeter of the asset. The elevation of the ground nearest the asset is between 0 and 10 feet, and the BFE for this location is 9 feet. It is not possible to determine the height of the flood walls, so it is assumed they are below BFE.

Data gaps/questions: Unable to determine height of flood walls relative to ground elevation.

Aerial photograph:



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Riverine Landscape Attribute Determination Worksheet

Attribute: Freeboard
Asset: Lighthouse **Asset ID:** 326 **Address:** 168 Lighthouse Drive, Saugerties, NY
Determination:

- [x] Elevation of the habitable or occupied portion of the asset is less than two (2) feet above BFE. (YES)
- [ ] Elevation of the habitable or occupied portion of the asset is more than two (2) feet above BFE. (NO)

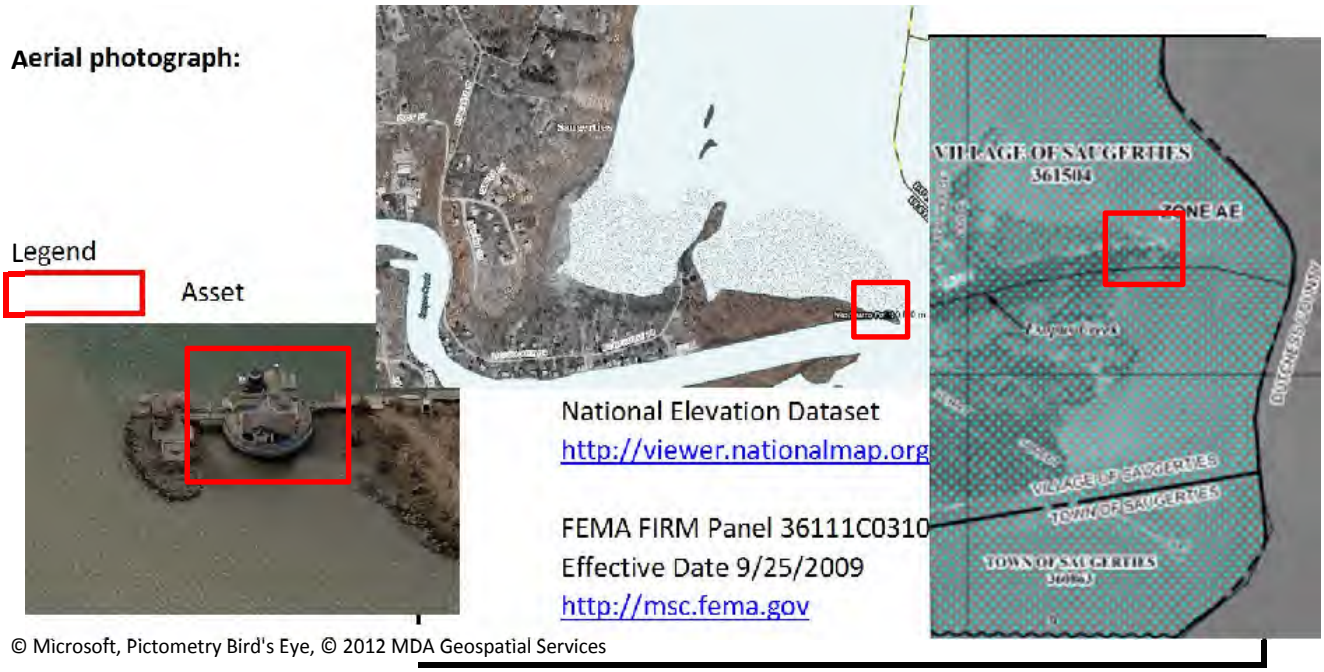
Determination methodology:

1) Refer to the most recent FEMA Flood Insurance Rate Map (FIRM) information (http://msc.fema.gov) to determine base flood elevation (BFE) for the asset location. Compare to elevation of the area (using LiDAR GIS map or the National Elevation Dataset: Topo layer on http://viewer.nationalmap.gov/viewer) to determine base ground elevation of the asset. Then, conduct a site visit to determine the height from the ground of the lowest habitable or occupied portion of the asset. Add this value to the ground elevation and compare to the BFE.

Justification: Aerial photos indicate that elevation of lowest habitable level is same as ground level. BFE in this area is 9', ground elevation is between 0 and 10 feet, likely closer to 0'. Assumed that ground elevation is more than 2 feet below BFE.

Data gaps/questions: Determination assumed.

Aerial photograph:



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Riverine Landscape Attribute Determination Worksheet

Attribute: Elevation
Asset: Lighthouse **Asset ID:** 326 **Address:** 168 Lighthouse Drive, Saugerties, NY
Determination: ☑ Elevation of the asset site is below BFE. (YES)
☐ Elevation of the asset site is above BFE. (NO)

Determination methodology:

1) Refer to the most recent FEMA Flood Insurance Rate Map (FIRM) information (http://msc.fema.gov) to determine base flood elevation (BFE) for the asset location. Compare to elevation of the area (from LiDAR GIS map or the National Elevation Dataset, Topo layer on http://viewer.nationalmap.gov/viewer) to determine base ground elevation of the asset. Compare this value to the BFE.

Justification: BFE in this area is 9', ground elevation is between 0 and 10 feet, likely closer to 0'. Assumed that ground elevation is more than 2 feet below BFE.

Data gaps/questions: Determination assumed.

Aerial photograph:

Legend

Asset

National Elevation Dataset
http://viewer.nationalmap.org

FEMA FIRM Panel 36111C0310E
Effective Date 9/25/2009
http://msc.fema.gov

Riverine Landscape Attribute Determination Worksheet

Attribute: Point of Confluence
Asset: Lighthouse **Asset ID:** 326 **Address:** 168 Lighthouse Drive, Saugerties, NY
Determination:

- [x] Asset is located within area subject to increased flood risk due to confluence of merging streams (YES)
- [ ] Asset is not located within area subject to increased flood risk due to confluence of merging streams (NO)

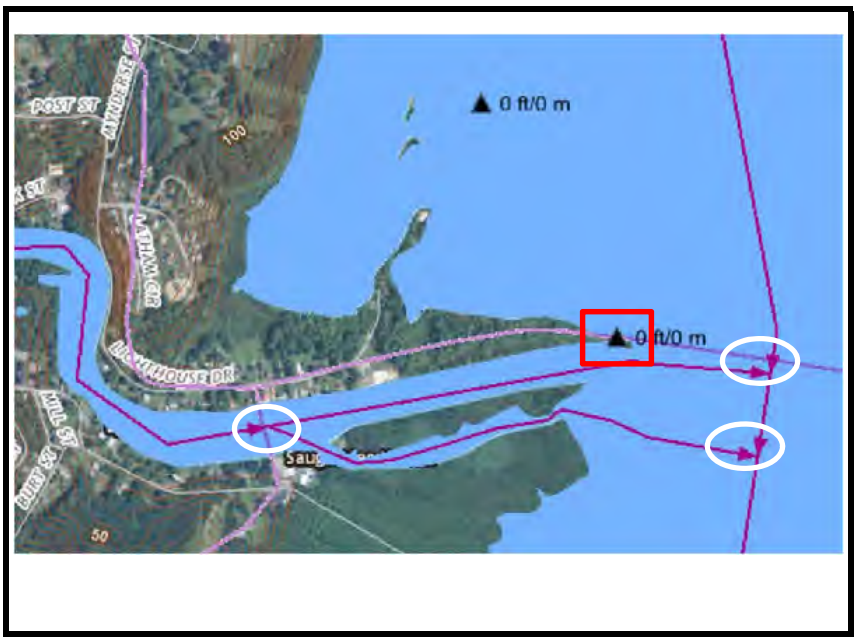
Determination methodology:

1) Locate the asset using USGS National Hydrography Maps (http://viewer.nationalmap.gov/viewer/nhd.html) using the topo setting. Turn on the Hydrography (NHD) layer and determine whether there are points of confluence of streams, rivers, or other waterbodies in the vicinity of the asset.
2) If a stream confluence is present, interview local residents, experts, or authorities for reports of flooding during past storms.
3) If mapping data is unavailable, determine presence of merging streams through site observations.

Justification: Asset is located directly at a point of confluence (Esopus Creek and Hudson River).

Data gaps/questions: None.

Aerial photograph:



Legend

Asset

National Hydrography Dataset
http://viewer.nationalmap.gov

Riverine Landscape Attribute Determination Worksheet

Attribute: Stormwater Discharge

Asset: Lighthouse **Asset ID:** 326 **Address:** 168 Lighthouse Drive, Saugerties, NY

Determination:

- ☐ Asset is located within area subject to increased flood risk due to storm water system discharge (YES)
- ☑ Asset is not located within area subject to increased flood risk due to storm water system discharge (NO)

Determination methodology:

1) Compare historic aerial imagery of the asset location (Google Earth or Sanborn maps). If the area upgrade from the asset location has developed significantly within the timeframe of available imagery, answer yes. Note years of available images in justification area below.

2) If historical imagery is unavailable or inconclusive, interview local residents, experts, or authorities about past flooding in the asset location.
3) If no information is available, answer YES.

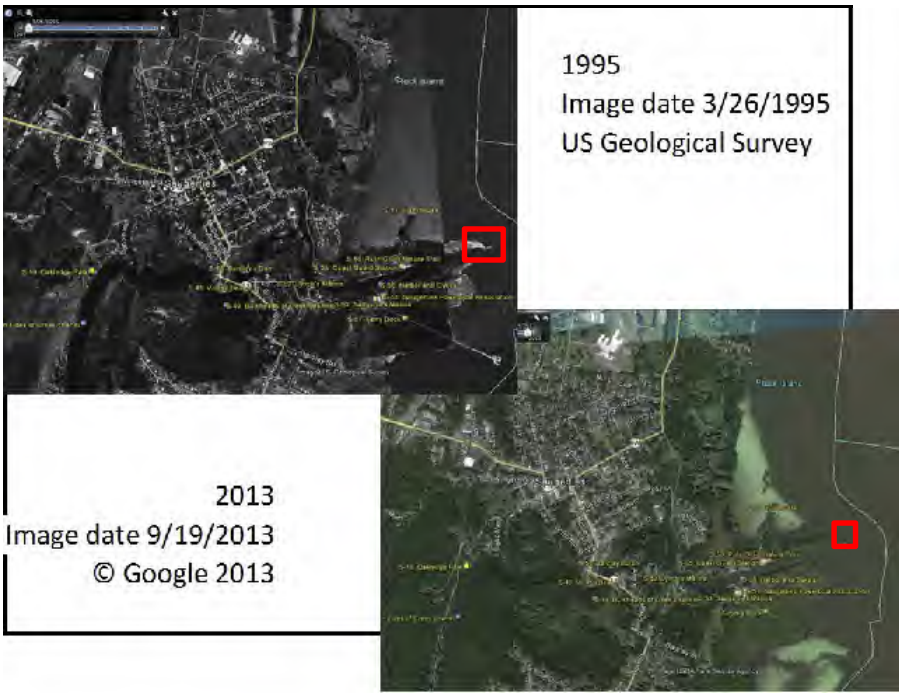
Justification: Development in the area of the asset has not substantively changed since 1995.

Data gaps/questions: None.

Aerial photograph:

Legend

Asset



Riverine Landscape Attribute Determination Worksheet

Attribute: Vegetated Streambank Buffers

Asset: Lighthouse **Asset ID:** 326 **Address:** 168 Lighthouse Drive, Saugerties, NY

Determination:

- ☑ Asset is within floodway fringe of stream and without adequate vegetated buffers to absorb or divert flood waters (YES)
- ☐ Asset is not within floodway fringe of stream and has adequate vegetated buffers to absorb or divert flood waters (NO)

Determination methodology:

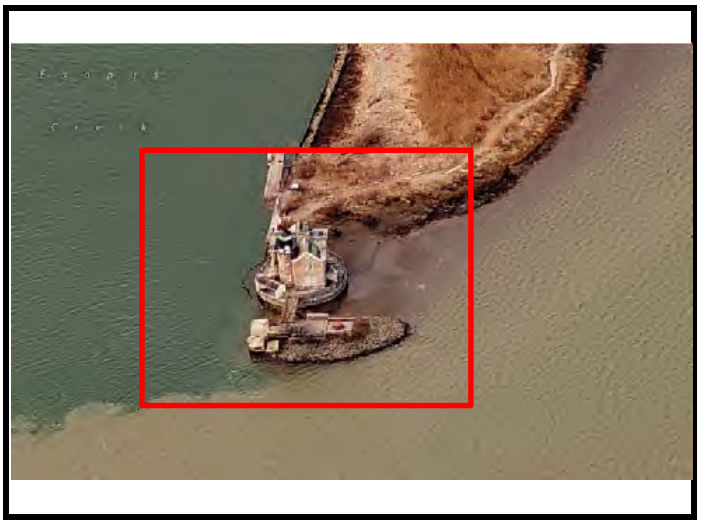
1) Identify asset location on FEMA FIRM (http://msc.fema.gov). If located in a zone designated A1-A30 or AE, asset is within flood fringe. If asset is not within flood fringe, answer no. If within flood fringe, continue to step 2.

2) Locate the asset on the National Map viewer (http://viewer.nationalmap.gov/viewer). Add the Land Cover layer (NLCD_2006). Determine if there are vegetated buffers between the asset and the flood source. Confirm with site observations or aerial and street-level imagery.

Justification: Asset is located directly in the flood source. There are no vegetated buffers present.

Data gaps/questions: None.

Aerial photograph:



Legend

Asset

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EXHIBIT 2

Vulnerability Score Determination Worksheet

Asset: Lighthouse **Community:** Saugerties

Asset class (select one): Health and social services

Instructions:
1) For each of the asset characteristics below, select the score for which the description best matches the characteristics of the asset under consideration. Enter that score number in the "Score" column.
2) In the "Justification" column, explain the source of information used to make the determination. Attach any relevant documentation on the subsequent pages.
3) If no information is available, use a score of 3 for that characteristic and note in the

	VULNERABILITY							
	Insignificant	**Minor**	**Moderate**	**Significant**	**Major**			
Characteristic	**1**	**2**	**3**	**4**	**5**	**Score**	**Weight**	**Justification**
Impact of storms on service/function of asset (including impact from historic storms and accessibility to/from asset during storms)	Limited interruption in service or short term reduced service; Services under more than usual stress but manageable	Service loss for up to 1 week or longer term reduced service; Services under more than usual stress on several fronts	Service loss for more than 1 week up to 1 month or longer term reduced service; Services under severe pressure	Service loss for more than 1 month or permanent reduced capacity	Permanent loss of service of any one of the essential services listed	3	40%	Input from committee on impact of historic storms.
Floor elevation relative to BFE (freeboard)	More than 2 ft. above BFE	0-2 ft. above BFE	At BFE to 1 ft below BFE	1-3 ft. below BFE	More than 3 ft. below BFE	5	40%	BFE in this area is 9', ground elevation is between 0 and 10 feet - likely closer to 0. It is assumed that asset is more than 3 feet below BFE.
Vulnerable population occupation	No occupation by vulnerable populations	0-20% vulnerable population occupancy	20-50% vulnerable population occupancy	50-70% vulnerable population occupancy	70-100% vulnerable population occupancy	1	20%	Asset not for occupation.
					Overall Vulnerability Score:	3	100%	

Vulnerability Score Determination Worksheet

Use this page to attach any relevant documentation.

National Elevation Dataset
http://viewer.nationalmap.org

FEMA FIRM Panel 36111C0310E
Effective Date 9/25/2009
http://msc.fema.gov

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E. End Notes

Photo Credits

Cover Page: Awosting Falls (Sandra Nencetti)

Dividers:

Section I

Flood ravaged farm in New Paltz (Julia Robbins)

Cragswood & Springtown Roads (Julia Robbins)

Emergency vehicle line up in Rosendale (Jeanne Walsh)

Mohonk preserve view from the top (Nina Peek)

Section II

Joppenbergh Mountain Trail (Nina Peek)

Emergency personnel near flooded home (Dr. David Rosenbaum)

SUNY New Paltz porous pavement sign (Arch Street Communications)

Flooded road (Jeanne Walsh)

Section III

Asset mapping at committee meeting (Arch Street Communications)

Rescue boat near flooded home (Dr. David Rosenbaum)

People in boats trying to get to town (Record Online)

Saugerties lighthouse (Patrick Landewe)

Section IV

Public engagement meeting presentation (Arch Street Communications)

Fire truck rescue during storm (Ed Kahil)

Governor Cuomo at SUNY New Paltz kick-off meeting (RecordOnline.com)

View from Joppenbergh Mountain (Nina Peek)

Section V

Flooded road (Jeanne Walsh)

Presentation at public engagement meeting (Arch Street Communications)

Inundation at SUNY New Paltz (News Pulse)

Emergency personnel gathering (Jeanne Walsh)

Methodology and Other Technical Notes

Cost Benefit Analysis

Methodology for Full Time Equivalent (FTE) Job Projections: A number of different methods were utilized to determine projections of estimated retained and/or added employees. Four approaches were utilized - depending on the baseline assumptions of the project:

1. The business to be potentially displaced/ retained was identifiable by name: In this case we used employment counts from a public source such as Manta.com or Dun & Bradstreet. Typically, businesses need to be of a certain size to be recorded by one of the business databases. Smaller establishments and branch offices tend to be missing.

2. The business to be potentially displaced/ retained was not identifiable by name (or was not part of one of the business databases). In this instance, we reviewed aerial photographs to estimate the total square footage of the business. We then applied an industry standard ratio to determine employment. For example, a use ratio of 1 FTE per 500 square feet for retail and 1 FTE per 1,000 square feet of industrial space was used to determine employment. A similar approach was used to determine potential employment to be added through a project with defined potential build out conditions.

3. Individual facilities without a defined scope: This methodology was applied primarily to emergency shelters. Since not much was known about the size and specific time of operation of these facilities, it was assumed that fewer than 5 FTEs, the smallest employment range category, would be necessary to operate the facility. Similar assumptions were made for single facility expansions.

4. Area-wide improvements without a defined scope: For projects with an undefined scope that affect multiple facilities (such as improvements to a downtown district), it was assumed that 10 employees or less would be retained/added. This was based on the assumption that each district would house no more than 10 small businesses and each of the businesses would be able to retain/add one employee.

F. Glossary

AKRF	AKRF, Inc.
ARCH	Arch Street Communications
BF	Base Flood Elevation
CBA	Cost Benefit Analysis
CBD	Central Business District
CDBG-DR	Community Development Block Grant – Disaster Recovery
CDM	CDM Smith
Communities	The Ten NYRCR Ulster Communities (Villages of Ellenville, New Paltz and Saugerties, and the Towns of Rochester, Rosendale and Wawarsing, New Paltz, Saugerties, Olive and Woodstock)
Consultant Team	The AKRF/CDM Team Assigned to the Ulster Communities
CPCB	Community Planning and Capacity Building
CRS	Community Rating System
ELAN	Nagle, Tatich, Cranston LLC d/b/a Elan.3 Consulting (E.3)
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
GIS	Geographic Information System
HSS	Health and Social Services
HU	U.S. Department of Housing and Urban Development
LWRP	Local Waterfront Revitalization Program
NCR	Natural and Cultural Resources
NDRF	National Disaster Recovery Framework

NFIP	National Flood Insurance Program
NYRCR	New York Rising Community Reconstruction Program
NYRCR Catskills/ Hudson Valley Regional Lead	Lori DuBord
NYS	New York State
NYS DEC	New York State Department of Environmental Conservation
NYS DHCR	New York State Department of Housing and Community Renewal
NYS DOS	New York State Department of State
NYS DOS Lead Planner	William C. Harding
NYS DOS Planners	Barbara Kendall, Lisa Melville
NYS DOT	New York State Department of Transportation
Planning Committee	Co-Chairs and At-Large Members Comprising Representatives from Each of the Ten (10) NYRCR Ulster Communities
RSFs	Recovery Support Function
UC	Ulster County
USACE	United States Army Corps of Engineers
USEPA	United State Environmental Protection Agency
USFWS	United States Fish and Wildlife Service