9.2 TOWN OF ANDES

This section presents the jurisdictional annex for the Town of Andes.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Marty Donnelly, Supervisor 134 Damgaard Road, Andes, NY 13731 845.676.4791 Townclerk1@catskill.net	David Merzig, Esq., Town Attorney 8 Dietz Street, Oneonta, NY 13820 607.432.4242 David.merzig@kehoemerziglaw.com

B.) TOWN PROFILE

The Town of Andes is located in the southeastern portion of Delaware County. It is situated on the western slopes of the Catskill Mountains. The following hamlets are located within the Town: Andes and Tremperskill[1,2]. Approximately one-third of the Town is located within the Catskill Park. The Town covers an area of 112.5 square miles[2].

According to the U.S. Census, the 2010 population for the Town was 1,301[3]. The major road network consists of State Route 28, County Route 1, and County Route 2[1].

The Town of Andes is located in the Catskill/Delaware Watershed, which provides drinking water to New York City. The primary drainage basin for the Town of Andes is the East Branch Delaware River, which is impounded by the Pepacton Dam to form the Pepacton Reservoir that cuts through the south-central part of the Town. The Reservoir serves as part of the water supply for New York City and has several tributaries that connect the River and the Reservoir. Other water bodies in the Town include the Tremper Kill and Liddle Brook[2].

Hazard Vulnerabilities in the Town

The following section discusses vulnerabilities from high-ranked hazards within the Town of Andes. Complete profiles of all hazards of concern are included in Section 5 of this Plan. Potential losses from Flood and Severe Storm were modeled using FEMA's **Hazards United States-Multi-Hazard (HAZUS-MH)** software. HAZUS-MH uses Geographic Information Systems technology to estimate physical, economic, and social impacts of disasters[4]. For details regarding the methodology used for the vulnerability assessment, the Town's vulnerability to each of the hazards assessed and for further explanation of the tables included below, please refer to the appropriate hazard profiles in Section 5.4 of this Plan. For details regarding specific disaster events that have impacted the Town, please see Section C of this document, "Documented Losses to Natural Hazard Events Specific to the Community".

Severe Storm

The entire Town is exposed and thus vulnerable to a severe storm event. HAZUS-MH estimates the 100-year **mean return period (MRP)** wind speeds for Delaware County to be 35 to 60 miles per hour (mph). This equates to a Tropical Depression to a Tropical Storm. For the 100-year MRP event, HAZUS-MH

[1] Delaware County Highway Map (Delaware County Department of Public Works, 1997)
[2] Town of Andes Comprehensive Plan (2003)
[3] U.S. Census (2010)
[4] http://www.fema.gov/hazus

estimates $1,765 in damages to the general building stock (structure) or less than one-percent of the Town of Andes' building inventory. For the 500-year MRP wind event, HAZUS-MH estimates wind speeds to range from 63 to 77 mph across the County. This equates to a Tropical Storm to a Category One hurricane. HAZUS-MH estimates $83,932 in damages to the general building stock (structure) or less than one-percent of the Town's building inventory. The residential buildings are estimated to experience the majority of the damage (wood and masonry).

HAZUS-MH estimates the probability that critical facilities (i.e., medical facilities, fire/EMS, police, EOC, schools, and user-defined facilities such as shelters and municipal buildings) may sustain damage as a result of 100-year and 500-year MRP wind-only events. Additionally, HAZUS-MH estimates the loss of use for each facility in number of days. At this time, HAZUS-MH does not estimate damages from restricted transportation or loss of utilities as part of the hurricane model.

HAZUS-MH does not estimate any damage or loss of use for critical facilities as a result of a 100-year MRP event. Table 9.2-1 lists the estimated loss of use in days for each critical facility and the probability of sustaining the damage category as defined by the column heading, for the 500-year wind-only events.

Table 9.2-1. Estimated Impacts to Critical Facilities by the 500-Year MRP Hurricane Event (Wind Only)

500-Year Event						
		(Days)	Percent Probability of Sustaining Damage			
Name	Type	Loss Of Use	Minor	Moderate	Severe	Complete
Andes VFD	Fire	0	0	0	0	0
ANDES CENTRAL SCHOOL	Schools	0	0	0	0	0
Methodist Church	Shelter	0	1	0	0	0
Highway Garage	Municipal	0	0	0	0	0

Source: HAZUS-MH 2.0

Severe Winter Storm

Table 9.2-2 summarizes percent damages that could result from severe winter storm conditions for the Town's total building stock (structure only). Given professional knowledge and information available, the potential losses for this hazard are considered to be overestimated; hence, conservative estimates for losses associated with severe winter storm events.

Table 9.2-2. General Building Stock (Structure Only) Exposure and Estimated Losses from Severe Winter Storm Events

Total (All Occupancies) RV	1% Damage Loss Estimate	5% Damage Loss Estimate	10% Damage Loss Estimate
$162,728,000	$1,627,280	$8,136,400	$16,272,800

Source: HAZUS-MH 2.0
RV = Replacement Cost Value.

Flood

Flood-prone areas:
Of the Town's total land area, 4.1 square miles are located within the FEMA-designated 1% annual chance flood boundary[5].

[5] Delaware County DFIRM (FEMA, 2012)

It is important to note that not all flood hazard areas within Delaware County are identified in the Delaware County **Flood Insurance Study (FIS)** or on the Delaware County **Flood Insurance Rate Map (FIRM).** Identified flood hazard areas vary in the level of accuracy with which they've been delineated, and flood hazards change over time. Consequently all development and infrastructure on floodplains or other areas where water can accumulate within the Town of Andes are considered vulnerable to the flood hazard, regardless of inclusion in the FIS/FIRM.

In general, an "approximate" flood hazard study determines the horizontal extent of the flood hazard only, based on the best available data. Flood hazard areas studied by approximate methods are shown as "A" zones on the Delaware County FIRM. A "detailed" flood hazard study is more accurate than an approximate study and provides additional information about the flood hazard, such as water surface elevation during a flood of a given magnitude. Flood hazard areas studied by detailed methods are shown as "AE" zones on the Delaware County FIRM[6]. Flood hazard areas studied by detailed methods for the Delaware County FIS were selected with priority given to known areas of flood hazard, and areas of projected development.

In the Town of the Andes, no water bodies were studied by detailed methods. Reaches of the Tremperskill and Bullet Hole Brook were studied using approximate methods. Flood hazards for Wolf Hollow, State Road Hollow, Fall Clove, Bryant's Brook, and Barkaboom Stream were not determined[7].

Floodplain population and the National Flood Insurance Program

The Town of Andes has a total of 161 properties that intersect with the FEMA-defined 1% annual chance (100-year) flood zone[8]. It is estimated that in the Town of Andes, 65 residents live within the FEMA-defined 1% annual chance (100-year) flood zone[9].

As of January 2012 FEMA reports that 36 properties in the Town of Andes carry flood insurance under the **National Flood Insurance Program (NFIP)**. There were 4 **Repetitive Loss**[10] properties in the Town of Andes at that time[11].

HAZUS-MH results

HAZUS-MH estimates that for a 1% annual chance event, 76 people may be displaced and 25 people may seek short-term sheltering, representing 5.6% and 1.8% of the Town's population, respectively. For the 0.2% annual chance event, it is estimated that 84 people may be displaced and 28 people may seek short-term sheltering, representing 6.2% and 2.1% percent of the Town's population, respectively[12].

As summarized in Table 9.2-4 below, there is $100,658,909 of total assessed property (structure and land) exposed to the 1% annual chance flood in the Town of Andes. For the 0.2% annual chance event, it is estimated that there is $100,658,909 of total assessed property exposed in the Town.

[6] For more information on FEMA Flood Insurance Studies and Flood Insurance Rate Maps, please see Section 5.4.3
[7] Delaware County DFIRM (FEMA, 2012)
[8] Delaware County DFIRM (FEMA, 2012); Town of Andes Tax Parcels (Delaware County Real Property, 2011)
[9] Please see Section 5.4.3 for a full description of the methods used to determine exposure to the flood hazard
[10] Repetitive Loss properties have received two flood insurance payouts of over $1000 within a ten-year period
[11] FEMA, 2012
[12] HAZUS-MH 2.0

Table 9.2-3. Estimated Assessed Value (Building and Land) Located in the 100- and 500-Year MRP Flood Boundaries

1% annual chance			0.2% annual chance		
Land AV	Building AV	Total AV	Land AV	Building AV	Total AV
$58,078,468	$42,580,441	$100,658,909	$58,078,468	$42,580,441	$100,658,909

Source: Real Property Data (July 2011) provided by Delaware County
Note: AV = Assessed Value

HAZUS-MH calculates the estimated potential damage to the general building stock inventory associated with the 1% and 0.2% annual chance flood events. HAZUS-MH estimates approximately $3.1 Million and over $3.5 Million of potential general building stock loss as a result of the 1% and 0.2% annual chance MRP events. Table 9.2-5 summarizes the potential loss estimates by occupancy class.

Table 9.2-4. Estimated Potential General Building Stock Loss (Structure and Contents) by the 100-Year and 500-Year MRP Flood Events

Total Buildings (All Occupancies)		Percentage of Total Building Value		Residential Buildings		Commercial Buildings		Industrial Buildings	
1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance
$3,124,000	$3,514,000	1.2	1.4	$1,054,000	$1,185,000	$1,348,000	$1,505,000	$119,000	$119,000

Agriculture Buildings		Religious Buildings		Government Buildings		Education Buildings	
1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance	1% Annual Chance	0.2% Annual Chance
$13,000	$15,000	$186,000	$217,000	$1,000	$2,000	$403,000	$471,000

Source: HAZUS-MH 2.0

There are four critical facilities and two utilities located within the 100- and 500-year flood boundaries. Table 9.2-6 and 9.2-7 summarizes the potential loss estimates to the Town's inventory as calculated by HAZUS-MH.

Table 9.2-5. Critical Facilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Type	Exposure		Potential Loss			
		1% Annual Chance	0.2% Annual Chance	1% Annual Chance Structure Damage %	1% Annual Chance Content Damage %	0.2% Annual Chance Structure Damage %	0.2% Annual Chance Content Damage %
Andes Central School	School			12.2	71.2	12.5	71.5
Andes VFD	Fire	x	x	2.6	2.9	8.5	14.0
Methodist Church	Shelter	x	x	-	-	5.1	19.3
Downsville Fire Hall	Shelter		x	-	-	-	-

Source: FEMA, 2011; HAZUS-MH 2.0
Notes:

(1) 'X' indicates the facility location as provided by Delaware County is located in the preliminary DFIRM flood zone.
(2) HAZUS did not calculate potential loss estimates for some facilities located in the preliminary DFIRM flood zone. This is because these facilities are either located outside of the flood depth grid generated by HAZUS or the depth of flooding does not amount to any damages to either the structure or contents based on the depth damage function in HAZUS. The difference between the flood depth grid generated by HAZUS and the preliminary DFIRM flood zones is

most likely due to the resolution of the elevation model used (1/3 Arc Second or 10 meters) which differed from the elevation data used to generate the DFIRM itself.

(3) In some cases, HAZUS calculated potential flood loss to structures outside the preliminary FEMA DFIRM. These facilities are located inside the HAZUS flood depth grid.

(4) Loss estimate calculations for electric facilities are not supported in HAZUS-MH 2.0.

Table 9.2-6. Utilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Type	Exposure		Potential Loss	
		1% Annual Chance	0.2% Annual Chance	0.2% Annual Chance Damage %	0.2% Annual Chance Damage %
Andes Library Well Treatment System	Potable Water Facility			1.1	1.1
Andes (V) Library Wastewater Treatment System	WWTF			9.4	9.4

Source: FEMA, 2011; HAZUS-MH 2.0

Notes:

(1) 'X' indicates the facility location as provided by Delaware County is located in the preliminary DFIRM flood zone.

(2) Loss estimate calculations for electric and communication facilities are not supported in HAZUS-MH 2.0.

(3) HAZUS did not calculate potential loss estimates for some facilities located in the preliminary DFIRM flood zone. This is because these facilities are either located outside of the flood depth grid generated by HAZUS or the depth of flooding does not amount to any damages to either the structure or contents based on the depth damage function in HAZUS. The difference between the flood depth grid generated by HAZUS and the preliminary DFIRM flood zones is most likely due to the resolution of the elevation model used (1/3 Arc Second or 10 meters) which differed from the elevation data used to generate the DFIRM itself.

(4) In some cases, HAZUS calculated potential flood loss to structures outside the preliminary FEMA DFIRM. These facilities are located inside the HAZUS flood depth grid.

Ice jam flood hazard:

The Ice Engineering Research Group reports 2 historic ice jams along the Tremperskill in the Town of Andes [13].

Dam breach flood hazard:

A dam is included in the **National Inventory of Dams (NID)** if: 1) it is a "high" or "significant" hazard potential class dam. A high hazard classification indicates that the loss of at least one human life is likely if the dam fails, or, 2) it is a "low" hazard potential class dam that exceeds 25 feet in height and 15 acre-feet storage or, 3) it is a "low" hazard potential class dam that exceeds 50 acre-feet storage and 6 feet height[14]. Table 9.2-7 lists the dams in the Town of Andes provided by the NID and the Planning Committee. Dams are displayed on the map in Section J (Figure 9.2-1).

Table 9.2-7: Dams in the Town of Andes

Name	River	Type	Downstream Hazard
LAUREL LAKE DAM	TR-DELAWARE RIVER	EARTH	LOW
MUD POND DAM	TR-DELAWARE RIVER	EARTH	LOW
MOUNTAIN LAKE DAM	TR-BIG POND	EARTH	LOW
BISHOP LAKE	Unknown	Unknown	Unknown
ROBERT L BISHOP DUCK MARSH DAM	CLOVE HOLLOW BROOK	EARTH	LOW
KAZAM POND DAM	HOLLOW BROOK	EARTH	MODERATE

[13] Ice Engineering Research Group (2011)

[14] http://geo.usace.army.mil/pgis/f?p=397:1:0

Name	River	Type	Downstream Hazard
BIG POND DAM	TR-BEAVER KILL	LAID-UP	NO HAZARD
EUGENE WIEDERKEHR POND DAM	TR-E BRANCH DELAWARE	BUTTRESS	NO HAZARD
GEORGE PATTERSON POND DAM	TR-MARY SMITH BROOK	EARTH	LOW
LEWIS KOLAR DAM	CANADA HOLLOW CREEK	EARTH	LOW
LITTLE POND DAM	TR-BEAVER KILL CREEK	BUTTRESS	LOW
PARADISE LAKE DAM	TR-BEAVER KILL	EARTH	LOW
SCHWARTZBERG POND DAM	TR-TREMPER KILL	EARTH	LOW

Source: Delaware County, 2006; Input from Planning Committee

Wildfire

Wildland Urban Interface (WUI) areas are located throughout the County. See Figure 5.4.5-2 in Section 5.4.5 (Wildfire) for an illustration of the WUI in Delaware County. A small portion along the eastern border of the Town of Andes is located within the WUI. It is estimated that 54 people in the Town are exposed to the WUI, or 4% of the Town's total population[15].

Buildings constructed from wood or vinyl siding are generally more likely to be impacted by the wildfire hazard than buildings constructed of brick or concrete. According to HAZUS-MH's default general building stock database, approximately 67% of the buildings in the County are constructed of wood.

In the Town of Andes, 2.4% of the Town's total building stock is exposed and thus vulnerable to the wildfire hazard (replacement value $6,138,000)[16].

It is recognized that a number of critical facilities, transportation and utility assets are located in the wildfire hazard area, and are also vulnerable to the threat of wildfire. Many of these facilities are the locations for vulnerable populations (i.e., schools) and responding agencies to wildfire events (i.e., fire, police). The Planning Committee did not identify any critical facilities to the Town that are vulnerable to the wildfire hazard.

Growth/Development Trends

No known or anticipated new development has been identified in the Town of Andes at this time.

C.) DOCUMENTED LOSSES TO NATURAL HAZARD EVENTS SPECIFIC TO THE TOWN

The table below presents only a history of events where documented losses were provided and is not a complete history of events for the Town. For details regarding the event history of the specific hazards, please refer to the appropriate hazard profiles in Section 5.4 of this Plan.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses

[15] HAZUS-MH 2.0; GeoMAC, 2012
[16] HAZUS-MH 2.0; GeoMAC, 2012

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 26 – July 10, 2006	Severe Storm and Flooding	DR-1650 (IA and PA)	Yes	The Town experienced approximately $4.9M in expenses and/or losses. Dam (impoundment) on Barkaboom Road went out, resulting in ~$80K FEMA claim to repair road damage.
June 19-20, 2007	Severe Storm and Flooding	DR-1710 (PA)	Yes	The Town experienced approximately $2.1M in expenses and/or losses. Pond (impoundment) on Beech Hill breached and took out a road in the Town of Hardenburgh.
July 23, 2008	Severe Storms and Flooding	N/A	N/A	All roads in the Towns of Andes, Stamford, and Middletown were closed.
December 11-31, 2008	Severe Winter Storm (snow and ice)	EM-3299 / DR-1827 (PA)	Yes	The Town had blocked roadways and widespread power outages from this storm. The Town experienced over $161,000 in expenses and/or losses.
October 1, 2010	Severe Storm	N/A	N/A	Damages in the Town included pipe washouts, flooded tubes, walls damaged, mud slides, and road washouts. The Town had approximately $500,000 in expenses and/or losses.

D.) NATURAL HAZARD RISK/VULNERABILITY RISK RANKING

Rank #	Hazard Type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard [a,c]	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking [b]
1	Severe Storm	100-Year MRP: $1,765 500-Year MRP: $83,932 Annualized Loss: $1,947	Frequent	39	High [d]
1	Severe Winter Storm	1%: $1,627,280 5%: $8,136,400	Frequent	39	High [d]
2	Flood	1% Annual Chance MRP: $3,124,000 0.2% Annual Chance MRP: $3,514,000	Frequent	27	Medium [e]
2	Landslide	Not available	Frequent	27	Medium
3	Drought	Not available	Frequent	21	Medium
4	Wildfire	Not available	Frequent	18	Low
5	Earthquake	500-Year MRP: $93,060 2,500-Year MRP: $1,198,063 Annualized Loss: $1,142	Occasional	20	Low [e,f]
5	Extreme Temp	Not available	Frequent	18	Low
5	Infestation	Not available	Frequent	18	Low

Notes: MRP = Mean Return Period; WUI - Wildland Urban Interface.

a. Building damage ratio estimates based on FEMA 386-2 (August 2001)

b. High = Total hazard priority risk ranking score of 39 and above
Medium = Total hazard priority risk ranking of 21-38
Low = Total hazard risk ranking 20 or below

c. The valuation of general building stock and loss estimates was based on the default general building stock database provided in HAZUS-MH 2.0 (RSMeans 2006).

d. Loss estimates are structural values only; does not include the value of contents.

e. Loss estimates represent both structure and contents.

f. The HAZUS-MH earthquake model results are reported by Census Tract. In some cases, there is more than one municipality per Census Tract. Therefore, these results include the Towns of Andes and Hamden.

E.) CAPABILITY ASSESSMENT

This section identifies the following capabilities of the local jurisdiction:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

E.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)
Building Code	Y	New York State Code
Zoning Ordinance	Y	1/31/1989
Subdivision Ordinance	Y	1/28/1985
NFIP Flood Damage Prevention Ordinance	Y	06/2012
Cumulative Substantial Damages	N	
Freeboard	Y	2' above BFE as per NYS Building Code/Local Flood Damage Prevention Ordinance
Stormwater Management Plan / Ordinance	Y	Additional stormwater regulations in Delaware watersheds as per 1997 Watershed Rules and Regulations
Comprehensive Plan / Master Plan / General Plan	Y	2003
Capital Improvements Plan	N	
Site Plan Review Requirements	Y	Part of zoning regulations
Open Space Plan	N	
Stream Corridor Management or Protection Plan	Y	East Branch Delaware River Stream Corridor Management Plan 12/2007
Economic Development Plan	N	
Comprehensive Emergency Management Plan	Y	Delaware County CEMP
Emergency Response Plan		
Post Disaster Recovery Plan	N	
Post Disaster Recovery Ordinance	N	
Real Estate Disclosure Requirement	Y	
Highway Management Plan	Y	2010
COOP / COG Plan	N	
Mobile Home Regulations	Y	Part of zoning regulations
Other (Special Purpose Ordinances such as critical or sensitive areas)	In progress	Road preservation law

E.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Delaware County Planning Department Town Planner Advisory Service; Delaware County Soil and Water Conservation District
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Code Enforcement Officer
Planners or engineers with an understanding of natural hazards	Y	Delaware County Planning Department Town Planner Advisory Service; Delaware County Soil and Water Conservation District; Delaware County Department of Public Works
NFIP Floodplain Administrator	Y	Code Enforcement Officer
Surveyor(s)	Y	Kaatskill Mountain Surveyors, LLP
Personnel skilled or trained in "GIS" applications	Y	Delaware County Planning Department Town Planning Advisory Service
Scientist familiar with natural hazards	Y	Delaware County Soil and Water Conservation District
Emergency Manager	Y	Jay Tweedie
Grant Writer(s)	Y	Delaware County Planning Department Town Planning Advisory Service and Marge Merzig, Keough Consulting
Staff with expertise or training in benefit/cost analysis	N	

E.3) Fiscal Capability

The table below identifies common funding mechanisms the Town could consider for the implementation of mitigation initiatives. For each funding mechanism, the table shows if it has been used by the Town to fund projects in the past; what projects it was used for (if applicable); and possible limitations on its use for future projects.

A full description of fiscal tools and funding mechanisms is provided in Volume I, Section 6 - Mitigation Strategy, of this plan. It is assumed that the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Grant program will be pursued, so they are not listed here.

Financial Resources	Used for past projects? If yes, which ones?	Limitations on future use?
Community Development Block Grants (CDBG)	Yes – housing rehabilitation (current) and sewer project	No
Capital Improvements Project Funding	Yes – new highway garage	No
Authority to Levy Taxes for specific purposes	No	No

Financial Resources	Used for past projects? If yes, which ones?	Limitations on future use?
User fees for water, sewer, gas or electric service	Yes – water, sewer, electric	No
Impact Fees for homebuyers or developers of new development/homes	No	No
Incur debt through general obligation bonds	Yes	No
Incur debt through special tax bonds	No	No
Incur debt through private activity bonds	No	No
Withhold public expenditures in hazard-prone areas	No	No
State mitigation grant programs (e.g. NYSOEM, NYSDEC, NYSDOS)	Yes	No
Catskill Watershed Corporation grant programs	Yes	No
Delaware County Stream Corridor Management Program (Stream Management Implementation Grants etc.)	Yes	No
Federal (ACOE, NRCS, etc.)	Yes	No

E.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	Unavailable	Unavailable
Public Protection	Unavailable	Unavailable
Storm Ready	County	Unknown
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable.

The classifications listed above relate to the community's effectiveness in providing services that may impact its vulnerability to the natural hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual: http://www.fema.gov/library/viewRecord.do?id=2434
- The Building Code Effectiveness Grading Schedule: http://www.isomitigation.com/bcegs/0000/bcegs0001.html
- The ISO Mitigation online ISO's Public Protection website: http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website: http://www.weather.gov/stormready/howto.htm

- The National Firewise Communities website: http://firewise.org/

F.1) COMPLETED MITIGATION ACTIVITY/EFFORTS

According to the Town of Andes, the following have been identified mitigation activities or efforts that have been completed within the community:

Prevention and Planning:

- Adopted a Flood Damage Prevention Ordinance and Delaware County FIS/FIRM updated under the MapMod program. FIS/FIRM effective 6/2012.

- Adopted East Branch Delaware River Stream Corridor Management Plan (2009)
    - The Town has adopted the East Branch Delaware River Stream Corridor Management Plan and appointed representatives to the Stream Corridor Management Program's Project Advisory Committee (PAC). The Town Supervisor serves on the PAC's Education and Outreach Advisory Committee.

Public Education and Awareness:

- Fire prevention program at the school; an emergency preparedness plan/contact guide was issued
- Taxpayer donations funded the purchase of a backup generator for the fire department
- Village-wide mailing to owners of property within the 1% annual chance (100-year) floodplain according to 8/2009 Preliminary DFIRM. Address list was generated based on parcel boundaries, not building footprints. Mailing advised property owners of the flood hazard and the availability of flood insurance.
- 8/2009 Preliminary DFIRM data posted on Delaware County Community Online Mapping and Information Tool, which allows user to search for their property by address, name or tax parcel number.

Natural Resource Protection:

- East Branch Delaware River/Tremper Kill/Tuttle Farm streambank stabilization project; completed in 2007

Emergency Services:

- Personal protective vests were purchased for the fire department

Property Protection:

- Repaired bridges and upsized culverts
- Andes-DeLancey (CR-2)/Tremperkill bridge – replaced I-Beam in 2010
- Dingle Hill Road – replaced a fallen arch with a 10-ft. culvert. Hydraulic study was completed by NYSDEC.
- Fall Clove Road – replaced a 5-ft. culvert with a 9-ft. culvert. Hydraulic study was completed by NYSDEC.
- Gladstone Hollow Road – replaced a 4-ft. culvert with a 7-ft. culvert. Hydraulic study was completed by NYSDEC.
- Close Hollow Road – new forms were placed beneath the structure because it had been undermined. (FEMA-funded)
- Beech Hill and Barkaboom Roads – slope failures were repaired

F.2) HAZARD VULNERABILITIES IDENTIFIED

The following hazards and problem areas were identified within the Town of Andes during the development of this Jurisdictional Annex:

- Streambank stabilization through Ballantine Park and past the fire department
- Most roads in the Town have flooded at some point
- Street drains in the hamlet need better maintenance
- Laid-stone walls along the stream in the hamlet are unstable
- Pedestrian bridge across the stream to the school is falling apart (~$200,000 project to restore)
- Landslides (both high cost)
    - Dingle Hill Road approximately 1.5 miles from Route 30
    - Bush Hill Road near NYC Route 30A
- Fall Clove Road, Weaver Hollow Road, Wolf Hollow Road
    - Culverts need to be replaced by bridges

F.3) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Property/Infrastructure Protection										
1	Obtain funding for and construct the new culvert on Wolf Hollow Road.	Existing	Flood; Severe Storm	1-1 1-6 1-9	Town DPW	Medium – High (protection of critical infrastructure)	High	Mitigation Grant funding, Local Budgets for match	Longterm DOF	Medium-High
2	**Retrofit structures located in hazard-prone areas to protect structures from future damage:** • Repetitive loss and severe repetitive loss properties as priority. • Phase 1: Identify appropriate candidates for retrofitting based on cost-effectiveness versus relocation. • Phase 2: Where retrofitting is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.									
		Existing	Flood, Severe Storm, Earthquake	1-1 1-2 1-3 1-5 1-6 2-1 2-2 3-2	Town of Andes with support from Delaware County, NYSOEM, FEMA	High	High	FEMA Mitigation Grant Programs, ICC, CDBG, other grant funding	Long-term DOF	Medium-High*

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
3	**Acquire and demolish or relocate structures located in hazard-prone areas to protect structures from future damage:** • Repetitive loss and severe repetitive loss properties as priority. • Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting. • Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability. • Phase 3: Where relocation will not be cost-beneficial but acquisition/demolition is a possibility, work with property owners toward implementation of that action based on available funding from FEMA and local match availability. Work with the owners of acquired properties to find appropriate housing within the community, if they desire.									
		Existing	Flood, Severe Storm	1-1 1-2 1-5 1-6 1-9 2-1 2-2 3-2	Town of Andes with support from Delaware County, NYSOEM, FEMA	High	High	FEMA Mitigation Grant Programs, ICC, CDBG, other grant funding	Long-term DOF	Medium-High*
4	Address dangerous trees threatening people and property through proactive vegetation management programs in conjunction with property owners and utility companies.	NA	Severe Storm, Severe Winter Storm	1-1 1-6 1-9	Town Highway Department	Medium	Low/Medium	Operating Budget	Short	High
Natural Resource Management										
5	Streambank stabilization will be a priority through Ballantine Park and past the fire department.	Existing	Flood; Severe Storm	1-1 1-6 1-9	Town Highway Department	High (protection of critical infrastructure and critical facility)	Medium – High	Mitigation Grant funding, Local Budgets for match	Longterm DOF	High

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Prevention and Planning										
6	**Flood Risk Mapping and Analysis in the Delaware basins through the RiskMAP program** This ongoing initiative is a collaborative effort between NYCDEP, NYSDEC, FEMA and NYC West-of Hudson Watershed municipalities. It will produce updated Flood Insurance Studies/Flood Insurance Rate Maps for the following stream reaches:									
		New & Existing	Flood, Severe Storm	1-1 1-3 1-6 1-9 2-1 2-2 2-3 3-1	NYCDEP, NYSDEC, FEMA with support from W. of Hudson Flood Mapping Steering Committee	Medium	Medium	NYCDEP	Ongoing	High
National Flood Insurance Program Participation										
7	**Maintain compliance with and good-standing in the NFIP including:** • Adoption and enforcement of floodplain management requirements ○ regulating all new and substantially improved construction in Special Hazard Flood Areas • Floodplain identification and mapping, • Flood insurance outreach to the community. • Further, continue to meet and/or exceed the minimum NFIP standards and criteria through the following NFIP-related continued compliance actions identified as Initiative 8 (below).									
		New & Existing	Flood, Severe Storms	1-1 1-2 1-4 1-5 1-6 1-7 2-1 2-2 3-2 4-2	NFIP Floodplain Administrator with support from other municipal departments, DCPD, SCMPr, NYSDEC, NYSOEM, FEMA	High	Low - Medium	Local Budget	Ongoing	High

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
8	Archive elevation certificates	NA	Flood, Severe Storm	1-1 1-4 1-5 2-2 4-1	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Education and Outreach										
9	**Training for municipal officials, staff and first responders:** • Work with existing federal, state and county programs to bring appropriate training to municipalities and first responders, including but not limited to: ○ NFIP floodplain development requirements and compliance ○ Disaster response: ▪ Implementation of local emergency response procedures ▪ DelCo Comprehensive Emergency Management Plan/National Incident Management System ○ Post-Disaster Code Enforcement and damage assessments ○ Stream and floodplain function as it relates to flood damage prevention ○ Mitigation project development and administration ○ Public Assistance claims administration ○ New York Alert									
		NA	All Hazards	1-4 1-9 2-1 2-2 2-3 3-4 4-1 4-2	Town of Andes with support from Delaware County, NYSDEC. NYSDOS, NYSOEM, FEMA	Low - Medium	Low - Medium	County and state programs; Municipal Budget; HMA programs with local or county match	Short	High

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
10	**Public education and outreach:** • Work with existing federal, state and county programs to bring appropriate public outreach to Town residents, especially those most vulnerable to natural disasters. Topics will include but not be limited to: ○ Disaster preparedness ○ Hazard mitigation ○ Stream management for riparian landowners									
		NA	All Hazards	1-2 1-7 1-9 2-1 2-2 2-3 3-1 3-2 4-4	Town of Andes with support from Delaware County, NYSDEC. NYSDOS, NYSOEM, FEMA	Low - Medium	Low - Medium	County programs; Municipal Budget; HMA programs with local or county match	Short	High
AHMP implementation and maintenance										
11	**Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Section 7.0.** • Specifically, report the following information to the Delaware County Hazard Mitigation Coordinator on a regular basis: ○ Losses from disasters ○ Progress on mitigation initiatives ○ Changes in hazard vulnerabilities • To ensure a thorough reporting of the above, the Town will coordinate with: ○ Municipal departments ○ First Responders operating in the Town ○ Other organizations and agencies as appropriate									
		New & Existing	All Hazards	All	T. of Andes with support from Delaware County and entities involved in disaster response	High	Low – High (for 5-year update)	Local Budget, possibly FEMA Mitigation Grant Funding for 5-year update	Ongoing	High

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
12	**Participate in local, county and/or state level projects and programs to develop improved structure and facility inventories and hazard datasets to support enhanced risk assessment efforts.** • Such programs may include developing a detailed inventory of critical facilities based upon FEMA's Comprehensive Data Management System (CDMS) which could be used for various planning and emergency management purposes including: ○ Support the performance of enhanced risk and vulnerability assessments for hazards of concern. ○ Support state, county and local planning efforts including mitigation (including updates to the State HMP), comprehensive emergency management, debris management, and land use. Improved structural and facility inventories could incorporate flood, wind and seismic-specific parameters (e.g. first floor elevations, roof types, structure types based on FEMA-154 "Rapid Visual Screening of Buildings for Potential Seismic Hazards" methodologies). It is recognized that these programs will need to be initiated and supported at the County and/or State level, and will require training, tools and funding provided at the county, state and/or federal level.									
		Existing	All Hazards	1-1 1-3 1-5 1-6 1-8 2-3 3-1 4-1	DCPD GIS, DCDES, SCMPr, FEMA, NYSOEM	Medium-High	Medium-High	Mitigation grant programs (PDM or HMGP) with local match	Longterm DOF	Medium
Emergency Services										
13	Town to establish mutual aid agreements with other highway departments.	N/A	Flood, Severe Storm, Severe Winter Storm; Landslide	3-1 4-2	Town DPW	Medium (improved recovery from hazard events)	Low	Local Budget	Short	High
14	Purchase a backup generator for the Fire Department (may be done by Dec. or Jan.). Look into installing backup power for the church, highway garage and the other water supply reservoir.	Existing	Severe Storm; Severe Winter Storm (utility outages)	1-1 4-3	Town DPW	Medium – High (life safety, maintenance of critical facilities and services)	Medium	EM and Mitigation Grant funding, Local Budgets for match	Short for FD; Longterm DOF for other facilities	High (FD); Medium (other facilities)

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
15	Create/enhance/ maintain mutual aid agreements with neighboring communities for continuity of operations.	New & Existing	All Hazards	3-1 4-2	T. of Andes with support from Surrounding municipalities and County	Low	Low	Local Budget	Ongoing	High
16	Periodically hold a meeting of people involved in disaster response in the municipality to review local emergency response procedures (as described in Municipal and Institutional Emergency Response Plans, Fire/EMS and Police procedures, Delaware County CEMP, etc.)	New & Existing	All Hazards	4-1 4-2 4-3 4-4	T. of Andes with support from DCDES, local Fire/EMS, DCPD	Medium	Low	Local Budget	Ongoing	High
17	Identify and develop agreements with entities that can provide support with damage assessments and FEMA/SOEM paperwork after disasters	NA	All Hazards	1-4 1-5 2-2 2-3 3-1 4-1 4-3	T. of Andes with support from County, NYSOEM, FEMA	Medium	Medium	Local budget	Short	Medium

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.

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

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

G.) ANALYSIS OF MITIGATION ACTIONS

This table summarizes the participant's mitigation actions by hazard of concern and the six mitigation types to illustrate that the municipality has selected a comprehensive range of actions/projects.

Hazard of Concern	Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Drought	11, 13, 14, 16	12, 13, 14	11, 12, 13, 14	12, 13, 14	11, 13, 14, 15, 16, 17	13, 14
Earthquake	11, 13, 14, 16	5, 12, 13, 14	11, 12, 13, 14	12, 13, 14	11, 13, 14, 15, 16, 17	13, 14
Flooding	9, 10, 11, 13, 14, 16	1, 5, 6, 8, 9, 12, 13, 14	8, 9, 11, 12, 13, 14	12, 13, 14	1, 4, 11, 13, 14, 15, 16, 17	2, 3, 13, 14
Infestation	11, 13, 14, 16	12, 13, 14	11, 12, 13, 14	12, 13, 14	11, 13, 14, 15, 16, 17	13, 14
Landslide	11, 13, 14, 16	12, 13, 14	11, 12, 13, 14	12, 13, 14	4, 11, 13, 14, 15, 16, 17	13, 14
Severe Storm	9, 10, 11, 13, 14, 16	1, 5, 6, 8, 9, 12, 13, 14	8, 9, 11, 12, 13, 14	7, 12, 13, 14	1, 4, 11, 13, 14, 15, 16, 17	2, 3, 13, 14
Severe Winter Storm	11, 13, 14, 16	1, 12, 13, 14	11, 12, 13, 14	7, 12, 13, 14	1, 4, 11, 13, 14, 15, 16, 17	13, 14
Wildfire	11, 13, 14, 16	12, 13, 14	11, 12, 13, 14	12, 13, 14	11, 13, 14, 15, 16, 17	13, 14

Notes:

1. **Prevention:** Government, administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
2. **Property Protection:** Actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
3. **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

4. **Natural Resource Protection:** Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. **Emergency Services:** Actions that protect people and property, during and immediately following, a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.
6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.

H.) PRIORITIZATION OF MITIGATION INITIATIVES

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits equal or exceed Costs? (Yes or No)	Is project Grant eligible? (Yes or No)	Can Project be funded under existing programs/budgets? (Yes or No)	Priority (High, Med., Low)
1	2	M	M	Y	Y	N	H
2	3	H	M	Y	Y	N	H
3	3	H	H	Y	Y	N	M
4	2	H	L	Y	N	Y	H
5	8	H	H	Y	Y	N	M
6	8	H	H	Y	Y	N	M
7	3	M	L	Y	N	Y	H
8	8	M	M	Y	Y	N	H
9	10	H	L	Y	N	Y	H
10	5	L	L	Y	N	Y	H
11	8	L	L	Y	Y	N	H
12	9	L	L	Y	Y	N	H
13	17	H	H	Y	Y	N	H
14	8	M	M	Y	Y	N	M
15	2	L	L	Y	N	Y	H
16	4	M	L	Y	N	Y	H
17	7	M	M	Y	N	Y	M

Notes: H = High. L = Low. M = Medium. N = No. N/A = Not applicable. Y = Yes.
*This initiative has a Medium priority based on the prioritization scheme used in this planning process (implementation based on grant funding), however it is recognized that addressing repetitive and severe repetitive loss properties is considered a high priority by FEMA and SOEM (as expressed in the State HMP), and thus shall be considered a High priority for all participants in the planning process.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

I.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

A more detailed flood loss analysis could be conducted on a structural level (versus the Census block analysis conducted for the HMP). The location of each building, details regarding the building (see additional data needed below) and the assessed or fair market value could be included in HAZUS-MH. The FEMA DFIRM boundaries, FEMA Flood Insurance Study detailed studies, base flood elevations and available Light Detection and Ranging (LiDAR) data or digital elevation models (DEM) could be used to generate a more accurate flood depth grid and then integrated into the HAZUS model. The flood depth-damage functions could be updated using the U.S. Army Corps of Engineer damage functions for residential building stock to better correlate HAZUS-MH results with FEMA benefit-cost analysis models. HAZUS-MH would then estimate more accurate potential losses per structure.

Additional data needed to perform the analysis described above:

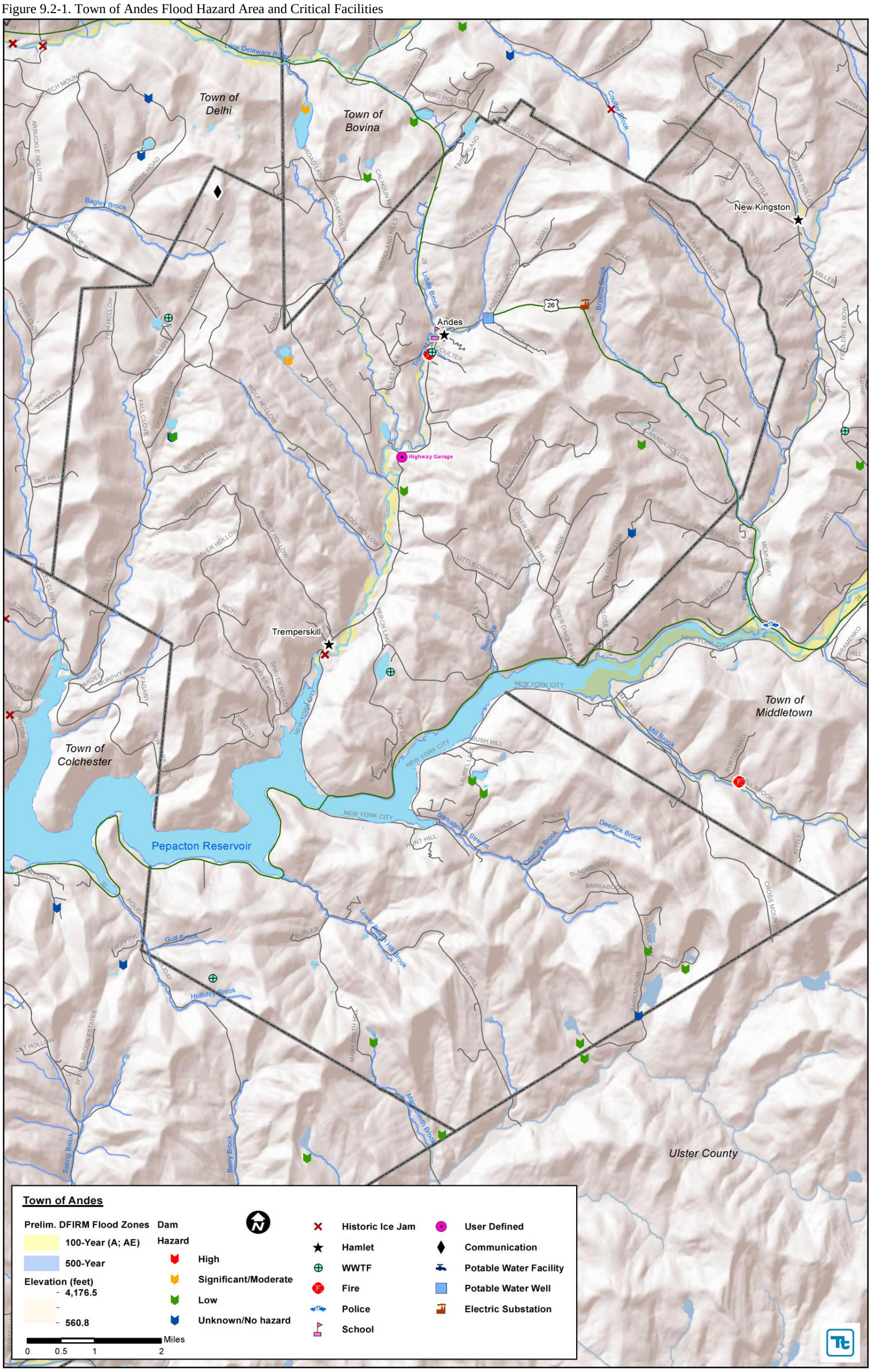
1. Building footprint in GIS
2. Specific building information – first-floor elevation (elevation certificates), number of stories, foundation type, basement, square footage, occupancy type, year built, type of construction etc.
3. Assessed or fair market value of structure

J.) HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps have been generated and are provided below for the Town of Andes to illustrate the probable areas impacted within the Town of Andes. These maps are based on the best available data at the time of the preparation of this Plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping

techniques and technologies, and for which the Town of Andes has significant exposure. The Planning Area maps are provided in the hazard profiles within Section 5.4, Volume I of this Plan.

Figure 9.2-1. Town of Andes Flood Hazard Area and Critical Facilities



Sources: FEMA, 2011

Notes: The entire municipality is vulnerable to the following hazards: drought, earthquake, extreme temperature, infestation, severe storm, and severe winter storm. Please note preliminary DFIRMs were used to generate this figure and are not considered regulatory at this time. No new development has been identified for the Town of Andes at this time.

Figure 9.2-2. Town of Andes Wildland-Urban Interface and Landslide Hazard Areas

Sources: GeoMAC, 2012; Tetra Tech, 2012; Delaware County, 2011
Note: No potential future development was identified for the Town of Andes.