APPENDIX
Uxbridge Workshop

Includes:

- Base Map
- Participatory Mapping Maps (from group exercise)
    - One map for each of the four groups
- Supporting Maps
    - Zoning, Orthophoto (Aerial), Town Facilities & Infrastructure, Water Resources
- Presentation Slides
    - MVP Program presentation
    - Climate Change presentation
    - Hazards, Critical Infrastructure and Vulnerable Populations presentation
- Risk Matrix
    - Blank Example
    - Completed matrices for the four groups (note that one table completed a matrix for each of the three broad topic areas, so there are seven total matrices)

Municipal Vulnerability Preparedness (MVP) Workshop

Uxbridge Table Map

Legend

- Town Halls
- EOC
- Local Police
- Fire Station
- DPW Building
- Wastewater Treatment Facility
- Schools (Pre-K through High School)
- Shelters

Dams

- High Hazard
- Significant Hazard
- Low Hazard
- N/A

- Roads
- High Slope (15% and above)
- Water Bodies
- Streams

FEMA National Flood Hazard Layer

- 100-year Flood Area
- 500-year Flood Area

Evacuation Routes

- Highway
- Primary
- Secondary
- Tertiary

N W E S

CMRPC
Central Massachusetts Regional Planning Commission

Miles

0 0.21 0.42 0.84 1.26

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

Date: 9/24/2018

ENVIRONMENT

Municipal Vulnerability Preparedness (MVP) Workshop

Uxbridge Table Map

Legend

- Town Halls
- EOC
- Local Police
- Fire Station
- DPW Building
- Wastewater Treatment Facility
- Schools (Pre-K through High School)
- Shelters

Dams
- High Hazard
- Significant Hazard
- Low Hazard
- N/A

- Roads
- High Slope (15% and above)
- Water Bodies
- Streams

FEMA National Flood Hazard Layer
- 100-year Flood Area
- 500-year Flood Area

Evacuation Routes
- Highway
- Primary
- Secondary
- Tertiary

Add → Env Map
Forest / Farmland
21E (including ... small ...) (include Hills, ... Rd)
Z-soil sites
Zone 1 + 2s / Wells
State Parks
Open Space
Cold Water Fisheries
Pr. hab / E hab
Water Features (BVW, etc)

N
W E
S

C M R P C
Central Massachusetts Regional Planning Commission

Miles
0 0.210.42 0.84 1.26

Produced by the Central Massachusetts Regional Planning Commission.
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

Date: 9/24/2018


Municipal Vulnerability Preparedness (MVP) Workshop
Uxbridge Table Map
Legend
Town Halls
EOC
Local Police
Fire Station
DPW Building
Wastewater Treatment Facility
Schools (Pre-K through High School)
Shelters
Dams
High Hazard
Significant Hazard
Low Hazard
N/A
Roads
High Slope (15% and above)
Water Bodies
Streams
FEMA National Flood Hazard Layer
100-year Flood Area
500-year Flood Area
Evacuation Routes
Highway
Primary
Secondary
Tertiary
SUTTON
NORTHBRIDGE
MENDON
DOUGLAS
MILLVILLE
C M R P C
Central Massachusetts Regional Planning Commission
Miles
0 0.210.42 0.84 1.26
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.
Produced by the Central Massachusetts Regional Planning Commission
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org
Date: 9/24/2018

Municipal Vulnerability Preparedness (MVP) Workshop

Uxbridge Table Map

Legend

- Town Halls
- EOC
- Local Police
- Fire Station
- DPW Building
- Wastewater Treatment Facility
- Schools (Pre-K through High School)
- Shelters

Dams

- High Hazard
- Significant Hazard
- Low Hazard
- N/A

- Roads
- High Slope (15% and above)
- Water Bodies
- Streams

FEMA National Flood Hazard Layer

- 100-year Flood Area
- 500-year Flood Area

Evacuation Routes

- Highway
- Primary
- Secondary
- Tertiary

N
W E
S

C M R P C
Central Massachusetts Regional Planning Commission

Miles

0 0.210.42 0.84 1.26

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission

Municipal Vulnerability Preparedness (MVP) Workshop

Uxbridge Table Map

Legend

- Town Halls
- EOC
- Local Police
- Fire Station
- DPW Building
- Wastewater Treatment Facility
- Schools (Pre-K through High School)
- Shelters

Dams
- High Hazard
- Significant Hazard
- Low Hazard
- N/A

- Roads
- High Slope (15% and above)
- Water Bodies
- Streams

FEMA National Flood Hazard Layer
- 100-year Flood Area
- 500-year Flood Area

Evacuation Routes
- Highway
- Primary
- Secondary
- Tertiary

CMRPC
Central Massachusetts Regional Planning Commission

Miles
0 0.21 0.42 0.84 1.26

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

Date: 9/24/2018

Municipal Vulnerability Preparedness (MVP) Workshop: Uxbridge

Wellheads, Public Water Supplies & Private Wells

Legend

- Community Groundwater Source
- Non-Community Groundwater Source
- Water Network Structure
- Uxbridge Water Lines
- Roads
- Structures Without Public Water Supply
- Massachusetts Towns
- DEP Approved Zone I
- DEP Approved Zone II
- Private Well Supplied Parcels
- Public Water Supplied Parcels
- 100-year Flood Area
- 500-year Flood Area
- Water Bodies
- Streams

N
W E
S

CMRPC
Central Massachusetts Regional Planning Commission

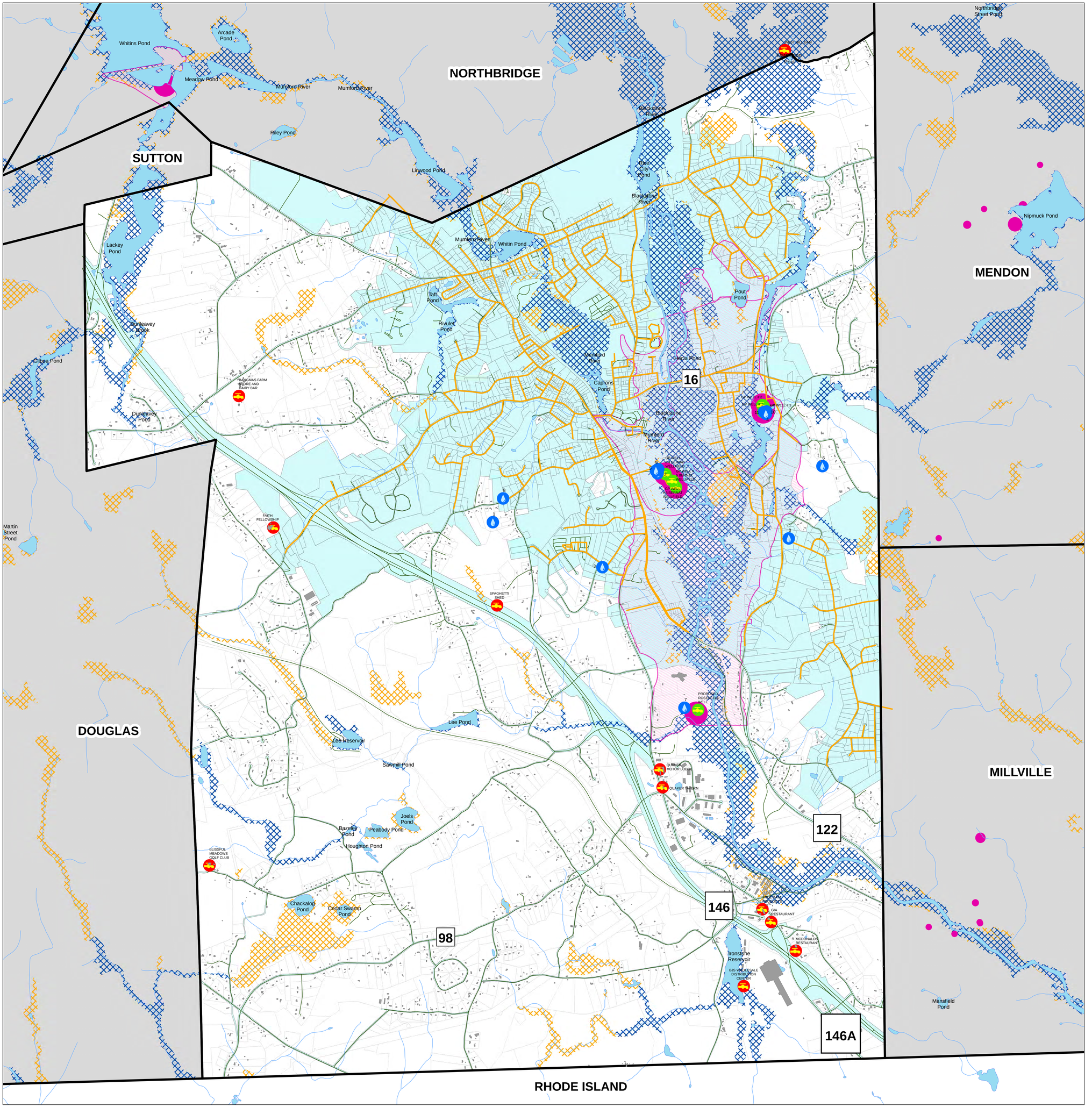
0 0.3 0.6 1.2 Miles

Flooding data source: FEMA's Digital Flood Insurance Rate maps(DFIRM).
Other data sources include: MassGIS, MassDOT, and CMRPC
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

R:\Pre-Disaster Mitigation\MVP

Date: 9/12/2018



Municipal Vulnerability Preparedness (MVP) Workshop: Uxbridge

Reference Map: Zoning

Legend

- Massachusetts Towns
- Roads
- Tax Parcels (M304)

UxbridgeZoning

- COMMERCIAL
- INDUSTRIAL
- OTHER
- RESIDENTIAL
- Water Bodies
- Streams

N
W E
S

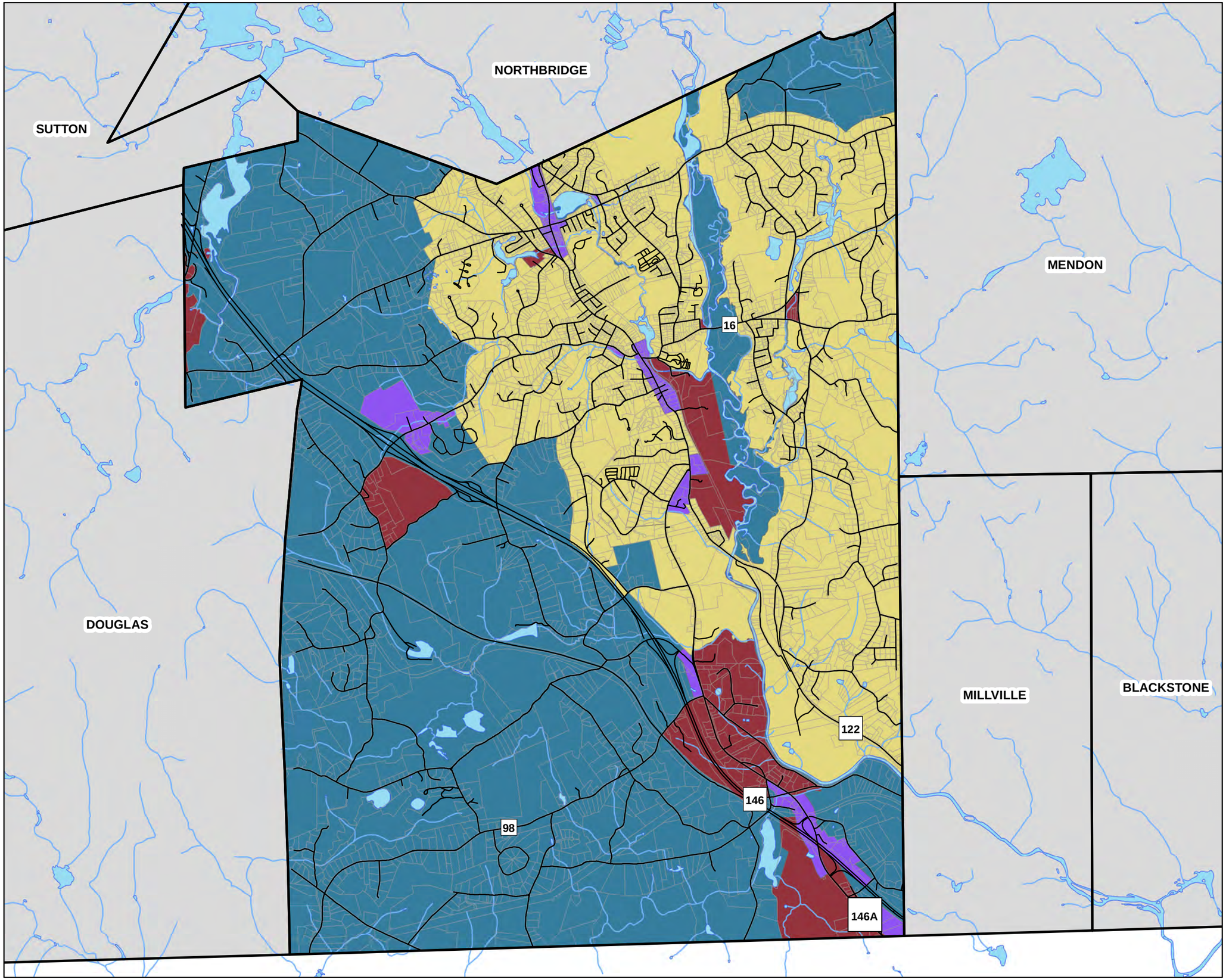
CMRPC
Central Massachusetts Regional Planning Commission

0 0.325 0.65 1.3 Miles

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

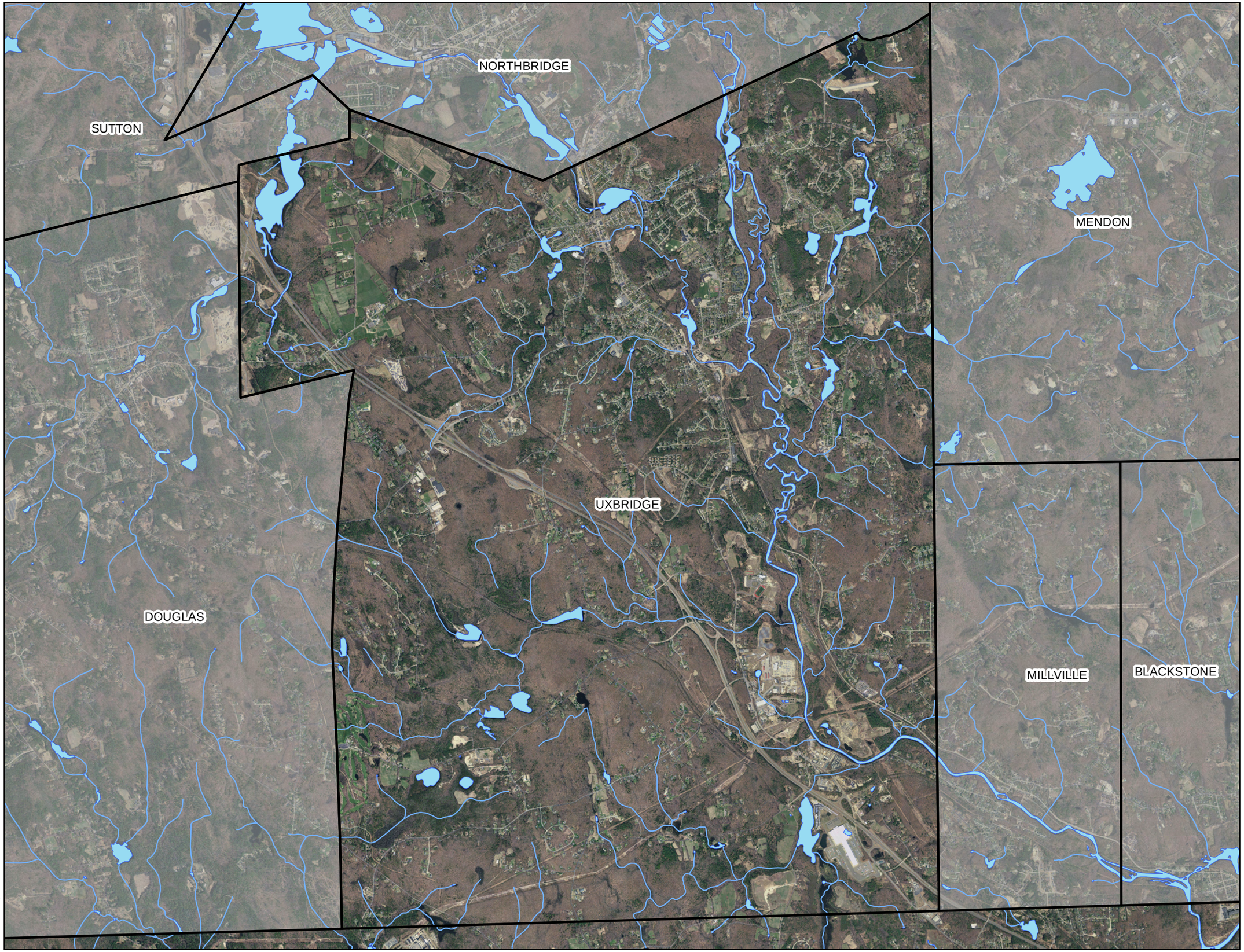
Produced by the Central Massachusetts Regional Planning Commission.
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

R:\Pre-Disaster Mitigation\MVP Date: 9/12/2018



Municipal Vulnerability Preparedness (MVP) Workshop: Uxbridge

Reference Map: Ortho



Legend

- Massachusetts Towns
- Major Roads
- Local Roads
- Water Bodies
- Streams

N
W E
S

C M R P C
Central Massachusetts Regional Planning Commission

0 0.35 0.7 1.4 Miles

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

R:\Pre-Disaster Mitigation\MVP

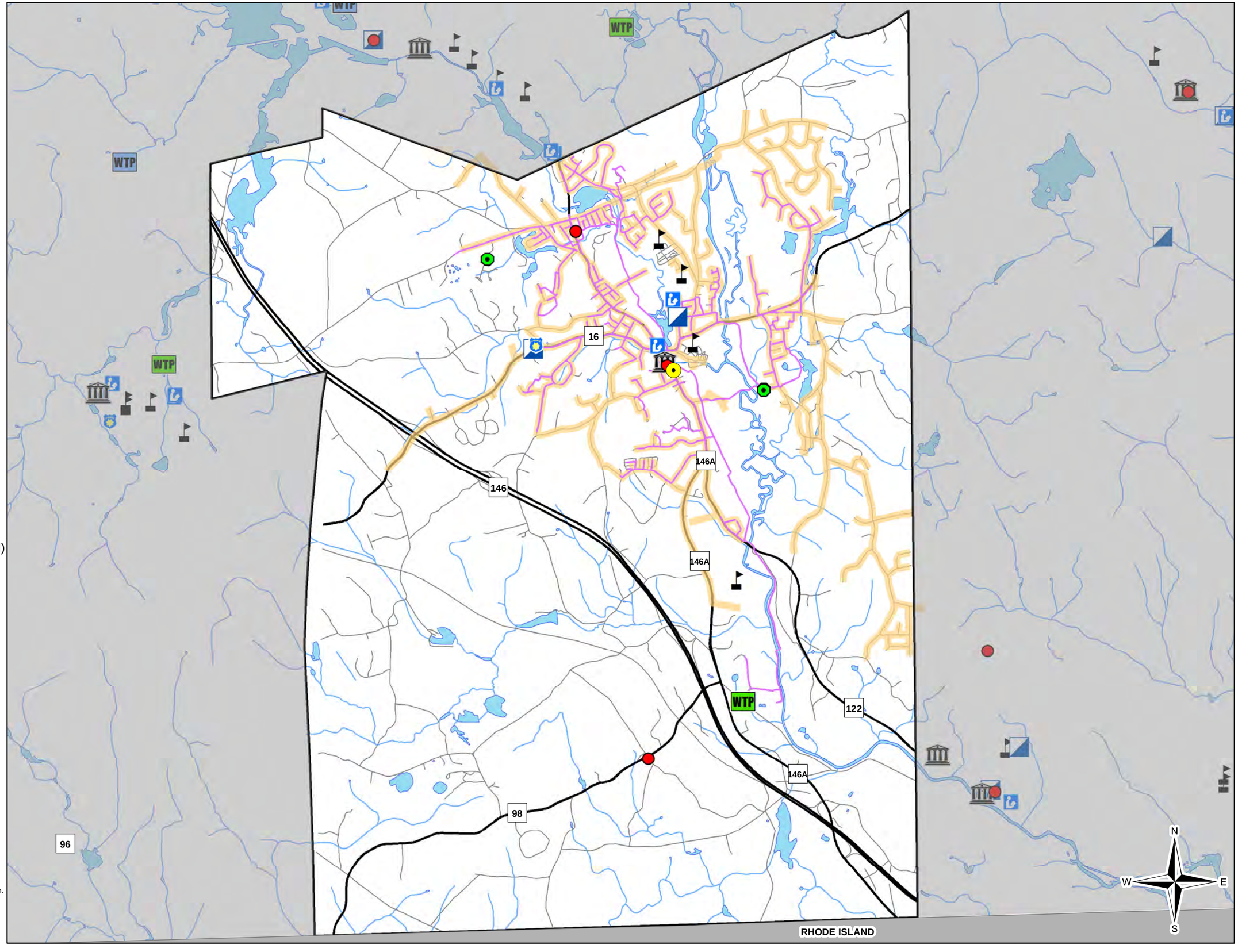
Date: 9/12/2018

Municipal Vulnerability Preparedness (MVP) Workshop: Uxbridge

Reference Map: Town Facilities

Legend

- Massachusetts Towns
- Water Bodies
- Streams
- State Route
- Local Roads
- Sewer Pipe Line Network
- Water Line Network
- Town Halls
- Fire Station
- Local Police
- Sewer Pump Station
- Emergency Operating Center
- Water Treatment Plant
- Waste Water Treatment Plant
- Schools (Pre-K through High School)
- Libraries
- Senior Center



CMRPC
Central Massachusetts Regional Planning Commission

0 0.35 0.7 1.4 Miles

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
1 Mercantile Street, Suite 520, Worcester, MA 01608
Visit us on-line at - http://www.cmrpc.org

R:\Pre-Disaster Mitigation\MVP

Date: 9/24/2018

Municipal Vulnerability Preparedness (MVP)

Uxbridge Workshop
September 25, 2018

AGENDA

1. Welcome
2. Introductions - What has drawn you to this meeting? What is your connection?
3. Workshop Overview
4. Climate Change Projections, Impacts & Mitigation, Nature Based Solutions Adam Menard (CMRPC)
5. Profile of Natural Hazards & Critical Infrastructure, Andrew Loew, (CMRPC)
6. Small Team Exercises Part 1

   LUNCH
7. Small Team Exercises Part 2
8. Small Teams Report Back
9. Wrap Up, Next Steps, Closing Remarks

Municipal Vulnerability Preparedness

- The Municipal Vulnerability Preparedness grant program (MVP) provides support for cities and towns in Massachusetts to begin the process of planning for climate resiliency. Communities who complete the MVP program become certified as an MVP community and are eligible for follow-up grant funding and other opportunities to assist in implementing strategies
- Based on Community Resilience Building Program as developed by Adam Welchel of the Nature Conservancy and National Oceanic and Atmospheric Administration (NOAA)

Be Prepared, Mitigate the Costs!!

- Climate Preparedness Week -
  - September 24- September 30 (nice coincidence!)
- US Natural Disasters in 2017 cost $306 Billion, the most expensive year since NOAA started keeping track in 1980

Hazard Mitigation Planning

- Excellent synergy with Hazard Mitigation Planning, but MVP is more focused on climate change in the long term
- Uxbridge's Hazard Mitigation in progress.
- 5-year plans reviewed and approved by MEMA and FEMA with very specific requirements that make municipalities eligible for mitigation grants if and when there is a disaster declaration.

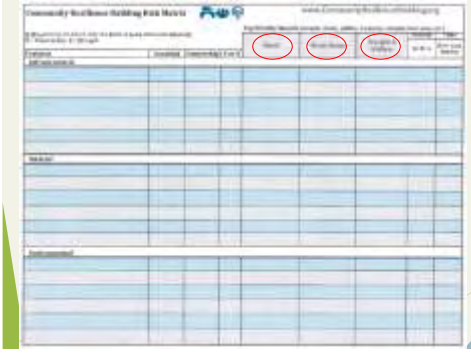
Workshop Objectives!

- Review extreme weather, natural and climate-related hazards
- Identify existing and future vulnerabilities and strengths
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience

Time to Get to Work!!!

First Hazard Identification….

- Winter Storms
- Snow
- Ice
- Flooding
- Tsunami
- Hurricanes
- Wind Events
- Tornadoes
- Drought
- Earthquakes
- Riverine Flooding
- Street Flooding
- Dust Storms
- Wild Fires
- Landslides, Mud Slides
- Coastal Flooding



The Matrix (no, not the movie)

At the Tables…..

- Tables of 6-8 individuals
- One table each for
  - Societal,
  - Infrastructure,
  - Environmental and
  - One Mixed (all 3)
- (If we need to balance the tables we may ask you to join another table.)
- Tools and Resources
  - Matrix, Maps, Markers, Dots, & Each Other.

Who

- Table Facilitator directs the discussion and keeps the dialogue moving
- Scribes filling in matrix
- CMRPC resource person
- Participants
- ID Table spokesperson for Report Out

BREAK OUT GROUP Instructions

- Part 1 (Before Lunch)- For each Feature
  - ID category (Environmental, Societal, or Infrastructure)
  - Identify key features - (For Example, Dams, Railroads, Vulnerable Neighborhoods, etc.)
  - Consider ownership

- Part 2 (After Lunch) - For each Feature
  - Identify and Develop Priority Actions
  - ID Priority and Time

The Assignment

- Identify Hazards (For Example - Flooding, Winter Storms and Drought)
- Under sector, decide infrastructure, societal, or environmental,
- Identify location/attribute (nursing home, wetland, airport, public safety building, mill, bridge, communications center)
- Identify ownership (Public or Private or other)
- Assess whether the feature is a vulnerability or a strength.
- Indicate on Base Map
- Focus mainly on town specific major issues
- Develop and prioritize action.


Community Resilience Building Workshop Risk Matrix

Report Outs

- Areas of agreement
- Areas of unique perspectives

Summary Discussion

Next Steps

- Summary Public "Listening" session with Board of Selectmen Presentations
- Report
- Develop resources and Implement actions.

Questions or Comments on the Workshop

Questions - Contact Us

- Uxbridge Board of Selectmen - Susan Franz, sfranz@uxbridge-ma.gov
- CMRPC - Adam Menard, amenard@cmrpc.org
- Mass Audubon- Stefanie Covino, scovino@massaudubon.org
- Executive Office of Energy and Environmental Affairs - Katie Theoharides, kathleen.theoharides@state.ma.us

Thank You

Municipal Vulnerability Preparedness Program

Uxbridge

Climate Change Projections

Adam Menard, CMRPC

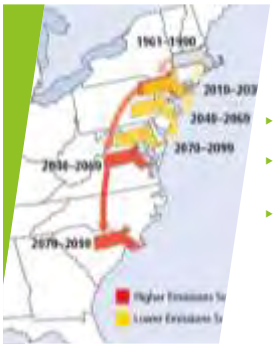
Northeast Climate Science Center UMass Amherst

- Climate Models from the IPCC Fifth Assessment Report
- The Historical Data 1971-2000
- Medium and High Emission Scenarios were Chosen
- Medium Scenario Assumes Emissions Peak at Mid-Century
- High Scenario Assumes a Continuing Emission Trajectory

Blackstone River Basin

Our Climate is Already Changing

- Temperature: 2.9°F Since 1895
- Growing Season: 11 Days Since 1950
- Sea Level Rise: 11 inches Since 1922
- Strong Storms: 55% Since 1958



Blackstone River Basin Annual Average Increased Temperature Projections

- Historical Annual Average 48.2°F
- Projected Change Mid-Century 51.08-54.49°F
- Projected Change End of Century 51.98-59.26°F

Increased Temperatures Will Mean

- Longer Growing Season
- Shorter Winter with less snow but, more rain/freezing rain
- Increase in disease carrying insects Ticks/Mosquitos
- Allergies
- More Poison Ivy & More Allergenic

Blackstone River Basin Annual # Days with Temperature of 90˚F

- Historical Annual # of days 4.69
- Projected # Mid-Century 12.49-33.58 days
- Projected # End of Century 16.92-75.05 days

The Effects of Hotter Weather

- Drought Conditions Will be More Likely
- Increased Risk for Wildfires
- Heat Related Illnesses
- More Energy Needed for Air Conditioning
- Increased Water Temperature, Impact Native Species - ex. Trout

Blackstone River Basin Annual # Days Below 32˚F

- Historical Annual # Days 145.52
- Projected # Days Mid-Century 127.92-106.76
- Projected # Days End of Century 119.68-76.97

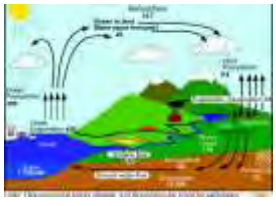
The Effects of Fewer Cold Days

- Less Snow
- Less Energy to Heat the Home
- Native Species Loss - More Invasive Species
- Loss of Business Related to Snow - Snow Sports/Snow Plow Operators
- Longer Growing Season

Blackstone River Basin Annual Precipitation

- Historical Annual Precipitation 47.13 Inches
- Projected Mid-Century 48.48-53.92 Inches
- Projected End of Century 48.75-55.84 Inches

Effects of Increased Precipitation



- More Flooding where it already floods
- Increase number of extreme rainfall events
- Drainage and Sewer Systems may not be able handle increased flow
- Ground Saturation

Cumulative Impacts

- Septic Systems
- Forests
- River Erosion
- Water Resources

Nature Base Solutions

Natural systems, mimic natural processes, or work in tandem with traditional approaches

Integrate low impact development (LID) designs into new development at neighborhood scales

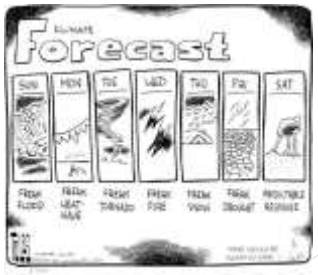
Return on Investment Studies in MA

Dept. Ecological Restoration

Traditional Culvert

Modern Nature Based Culvert

Questions?



Uxbridge: Natural Hazards, Critical Infrastructure and Facilities, and Vulnerable Populations

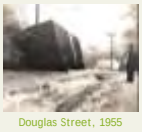
- Natural hazards
- (Critical infrastructure and facilities)
- Vulnerable populations

Natural Hazards

- Flooding (all types)
- Droughts and wildfires
- Winter storms
- Severe thunderstorms/hurricanes/wind/tornadoes
- Extreme temperatures
- Landslides
- Earthquakes

Natural Hazards: Flood Risks

Photos courtesy Wikimedia Commons, Worcester T&G



Douglas Street, 1955

North Main Street, 1955

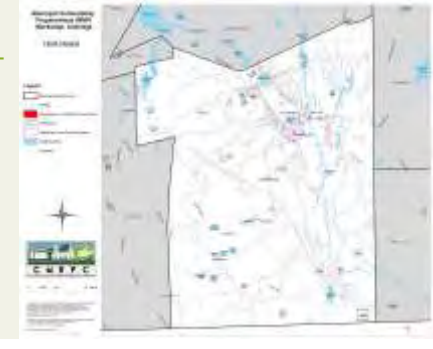
Uxbridge Center, 1955

West Hill Dam, 2005

Natural Hazards: Flood Risks

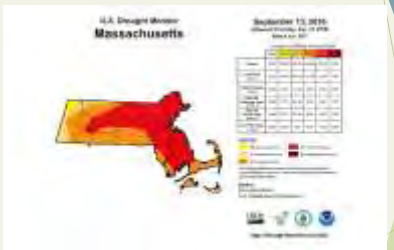
Natural Hazards: Dam Failure Risk

Natural Hazards: Flood Impacts



Natural Hazards: Droughts & Water Systems

Natural Hazards: 2016 Drought

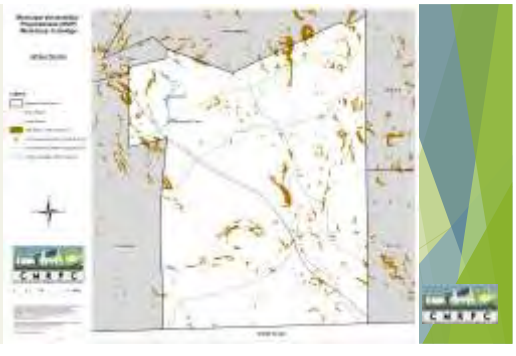


Natural Hazards: Wildfires

Natural Hazards: Wildland/Urban Interface

Natural Hazards: Wildfires & New Development

Natural Hazards: Winter Storms



Natural Hazards: Extreme Storms

Critical Infrastructure & Facilities

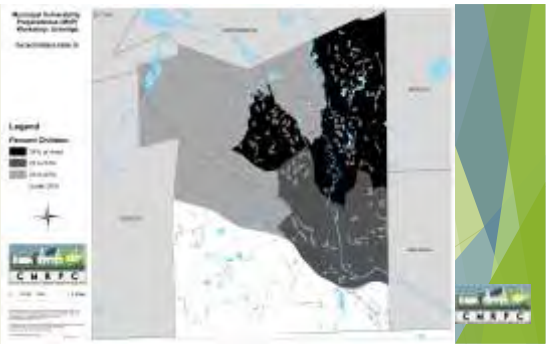
- What infrastructure and facilities are critical to the region and its residents? Which do we most need or desire to protect from hazards?
  - Those needed to respond to hazard events or which would exacerbate hazard scenarios, if affected
  - Those needed to perform day-to-day municipal operations and to support basic services and economic activity
  - Major employers and institutions, natural and cultural resources, recreational and historic sites, etc…

Vulnerable Populations

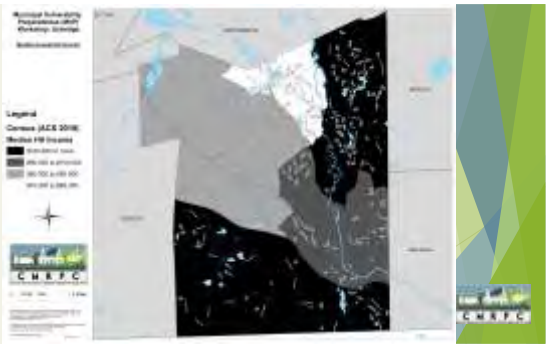
- Vulnerability is not just about utilities, facilities, or businesses
  - Disproportionate populations of potentially vulnerable demographic groups (elderly, children, etc.) or socioeconomic groups (low income households, etc.) living/working in high-risk areas
  - Can be on neighborhood scale, or at specific locations
  - Cultural vulnerability (cultural or language isolation)
  - These will evolve over time, as climate and populations change

Vulnerable Populations: Seniors

Vulnerable Populations: Children



Vulnerable Populations: Median Income



Vulnerable Populations: Renter-Occupied Housing

Questions?

Andrew Loew
Central Massachusetts Regional Planning Commission
Phone: (508) 459-3339
aloew@cmrpc.org

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S					Priority	Time	VOTE
								H - **M** - **L**	**S**hort **L**ong **O**ngoing	
INFRASTRUCTURAL										

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flooding	Winter + Ice Storms	Droughts + Wildfires	Hurricanes Heavy Wind Rain Events	Priority H - M - L	Time Short Long Ongoing	VOTE
SOCIETAL										
Flooding-Sheltering Facility (upgrades)	town	town	V	conduct feasibility, meet safety codes, find shelters with power back-ups, bedding				H	O	
Private Shelters (church base, Polish Hall, Italian club) (Shops in malls and in center of town)	town	private	S	meet safety codes, making people aware that is an active shelter, contact them, having resources ready and available, bedding				H	O	
Elderly Population (nursing home) (canal way, crown and eagle, Lydia Taft) ▶low income	multiple	private/public (Lydia taft)	V	find people who need the most assistance, mobility preparation (power), financial assistance for cooling in summer, cooling stations, distribute booklets, educated on drills instead performing them (help from fire department)				H	O	
Low Income (Blanchard, Good Shepard, VFW)	mixed	mixed	V	transportation, communication (no technology), finding volunteers to help single parents, making assistance more available, representative to hold people's data, distribute booklets				H	O	
Churches (possible shelters)	multiple	private	V	transmit info, find volunteers, having contact people, support groups, bedding				M	S	
Schools (public + OLV)	multiple	town	S	food, ADA access, generators, parking, busses, shower facility, bedding				H	L	
Food Pantry	town	town	S	access to roadways, find inventory and capacity, more communication material, guidance on what people need, (+ pets)				M	S	
Library/senior center	town	town	S	logistic center, temporary shelter (no food or water), warming + cooling center, reaching out to other towns assistance, information (written)				M	S/L	
Health Facility (Tri-River) (minute clinic)	town	private	S/V	having people onsite with a plan, communicate with them, make sure they have medic education,				M	S/L	
Volunteers	multiple (regional)	public	V/S	getting in town and out of town contacts, conduct exercises to prepare volunteers + readiness				H	O	
Municipal Event Planning	town	private	S	help with logistics, food distribution, help w/ organization,				M	L	
Code Red	town	town	V	connected with municipal groups?, ~~help with hygiene~~, give more education, valuable for public buildings (one call now), developing a reliable system for the town, making it easier to use,				H	S	
Evacuation	regional/state		V	busses, foxy travel, maps, signage, communicate w/ people on where to go, importance of evacuation,				H	S	
Community of caring	town	town (schools?)	V	re establish in schools, network volunteers, highschool students,				M/L	O	
Data Base	town	town	V	specific materials, how to activate the National Gaurd, emergency preparedness plan, contact info (all town departments, other shelters) be able to update it, volunteers, categorize people, people to help with livestock				H	O	
Floodzone Residents	town	private	V	make people aware w/ info sessions, map + contact the town Hall to make a mailing list, (phone #'s), create a website,				M	S	
Emergency communication	town	town	V	signage, website, coordinate them, getting stakeholders involved, networking with outside towns (pulling resources together to save $), emergency preparedness plan				H	O	
Private wells	town	Private	V/S	educate people to test their water, septics information, discuss water conservation				L	S/L	
Preschool/Daycare	town	town/private	V	creating a database, parent contact, info on town website, contact larger daycares,				H	S	
Evacuation Plan (Pets)	town	Private	S	find vets, rescue homes, dog officers, grooming facilities, establish a plan, dog park, ASPCA, 4H group				M	S	
Evacuation Plan (Livestock)	town	Private	S	establish a plan, find people with barns/shelters,				M	L	
Local Restraunts/Business Network	town	Private	S	database, find what materials they can provide, communication				M	S	
Habitat/Community Centers/motels	multiple	private	S	Temp emergency shelters (if willing)				M	S	

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	FLOODING	WINTER / ICE STORMS	DROUGHT / WILDFIRES	HURRICANES, HEAVY WIND, RAIN	Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL										
Electrical System										
• Sub Station	1	national grid	V	flooding / ice storm contact national grid				H	S/L	
• Utility lines	town wide	national grid	V	tree trimming program – storms				H	O	
Water System		town								
• capacity	map		V	Drought investigate opportunities to install new wells/existing well fields				M/H	L	
• new water tanks			S							
• wells										
• East Street Pump Station			V	expansion of capacity				M/L	L	
• Water Main network			S/V	replace aging/unaersized mains - develop plans				M	O	
~~• Generators?~~				~~confirm~~						
Sewer										
• new treatment plant			S							
• improvements to intercept			S							
• pump station generator & relocation			S							
Municipal Buildings										
DPW facilities in floodzone	map		V	develop plans to relocate - install generator				H	L	
Unreinforced masonry structures (town hall, schools, etc)			V	develop plan for reinforcement / replacement				M	L	
high school access road				ice better treatment / maintainence				L	S	
~~elementary~~ / middle schools				snow / winter storm develop procedure for snow removal				L	O	

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

FLOODING	WINTER ICE STORMS	DROUGHT WILDFIRES	HURRICANES HEAVY RAIN WIND

Features	Location	Ownership	V or S		Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL							
Police Station?		town	V	Severe/winter storms review/assess structural issues	H	L	
Shelters		town	V	all hazards develop + implement shelter plans	H	S	
Drainage		town					
river flooding	See map	town	V	See map | review subdivision regulation & by laws review storm water fee	on map		
Rail Roads		P+W					
bridge in center of town			S	enhance coordination			
Dams		Varies	S/V	coordinate w/ owners + DDS to monitor maintenance	M	O	
Iron Stone			V	coordinate with dam owners/conservation DDS	H	O	
Whitin Pond(s)?			V	seek to indentify dam owner in coordination w/ DDS	M	S	
Fire fighting assets		towns		enhance staffing of South Station	H	O	
cisterns		private/town	V	coordinate w/ planning board on sub division regulations	M	S	
communications		town					
interdepartmental system		town	S	develop IT plan (municipal) finish short term system, but prepare for regional system	M	O	
Richardson Tower	See map	town	V	rationalize town IT centers	M	O/L	
Evacuation Routes		town/State	V	review/update routes: Aldrich Street	L	O	

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

Flooding	Winter / Ice Storms	Droughts / Wild Fires	Hurricanes + Heavy Rain / Wind Events

Features	Location	Ownership	V or S		Priority H-M-L	Time Short Long Ongoing	VOTE
ENVIRONMENTAL							
Railroad	North Uxbridge South Uxbridge Downtown		V	communicate any problems flooding.			
Drabble-Tail Brook	Downtown		V	new culvert			●
[redacted] Culvert	By Koopman Blackstone St		V	-assess the culverts -repair if necessary -upgrade to nature-based			● ●
Canal Multiple Ownerships	Within Pond		V	-funding for small land owners			
21 East Sites poss contamination	Near Aquifer, Flood Zone		V	-expand town water supply -monitor Kempton Plume -assessment on soil dump sites -water tower on East St -new bylaw			● ●
River Sediments	Flood Zones		V	-education / sensitivity for con-com			
Fire-Buffer	Forrested areas		V	-change zoning Law -Enforce zoning laws			●
Lots of Land	Out of Flood zones		S	-accomodate land with water -move infrastructure to land -master-plan forest land → zoning change			
Rivers			S	-town wetland bi-law -Promote recreational use -river festival			

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Top Priority Hazards	Priority (H - M - L)	Time (Short Long Ongoing)	VOTE
SOCIETAL							
New Development Fire Risk				bi-law → 200ft Buffer			
Crown and Eagle			V	-redundancy -outside elevator			
Culverts			V	-~~[illegible]~~ environmental -No trucks on Blackstone ~~[illegible]~~ Street enforce trucking weight limits (portable scales/vehicle) weigh station → state police on 146 / garbage centers → recreational			
Dams many owners		private	V	-coordination -resolution plan -inventory ~~eminent domain~~ eminent domain			
Mutual Aid fire emergency			S	-expand to non-emergency -expand to other organizations (health/town halls) -regional organization			
Emergency Preparedness Plan Lack			V	-access to updated paper copies (overall storage and access) -develop a plan -process to update citizens -TTE -robo-call to apartment buildings			
Public Education/Communication			V	Police electronic signs, -Statewide Standard -look at ~~[illegible]~~ model of a tourist town -Vet capabilities of Code-Red -Utilize social media -Regional Standard -Informational Coordinator needed (PIO)			
Town Webpage outdated			V	-develop new website -hire consultant			
Inter-Departmental Town Official Coordination			V	Schedule Meetings (Friday Lunches) -Regular Department Head meetings (at least 1 a month) -Workshop involving all departments (2 times a year)			
Non-Resident ~~Absent~~ Landlords				-notice w/ tax bill/utility bill -tenant education			
Disease Outbreak (mosquitos/ticks)	Stagnant water		V	-Communication (PIO/Social Media/Signs) -Public Health Communication Strategy (public and professional)			
Shelters			V	-designating shelters -fix trailer -getting supplies -develop shelter plan			
Increased Population displaced people							
Evacuation Routes			V	get copies of maps -include in plan -signage -public education			
Health Providers location	Flood zones		V	-make them have a plan -priority zoning for health facilities			
Pet/Animal Shelters			V/S	-farms/McClosky -include in emergency plan			
Financial Models/Grants			V	-organizational focus -new revenue stems new growth			
Deep Pool Of Talents			S	-training -education on town government -adult education system ↓			
Volunteers/Training			V				

S -use more

CMRPC

5-Topic Gray

Adam

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL										
Public Safety Buildings	Central		V/S							●
Drinking Water Infrastructure/Conservation	East stretched South/West lack of		V	-Extend water services (fire fighting/clean water) -master plan (designate priority/underserved) -engineering design						
Fire Protection (Lack of)	Southern		V	Extend water services, gray water reuse						
Septic Systems/Well Systems	East/West/Southern		V	-map at risk/notify homeowners						
Water Treatment Plant next to river			V	Assess risk of flooding, assess power supply						
Aquifer	Center		S	Bylaw to move risky uses away						● ●
Railroad	North Uxbridge/Downtown		V	see page 1						●
Town Wells	Flood Plane		V	Develop new town wells & plans to mitigate risks.						
Culverts			V	see page 1						● ●
Dams Within aging, private				inventory see page 1						●
Energy Substation	In flood zone		V	Discussion of National Grid, develop mitigation plans, generators + generator safety training						●
Redundant Water System			S							
Fire Station	Downtown		S							
Power Delivery electrical, gas/generators			V	Survey gas stations to see which ones have generators (and town pumps); assess climate change impacts on electric cars; assess local energy/power generation						
Road Connections/Highways			S							

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flooding	Winter / Ice Storms	Drought and Wildfires	Hurricanes Heavy rain/winds	Priority H-M-L	Time Short Long Ongoing	VOTE
ENVIRONMENTAL										
Dams	multiple	C and Private	V/S	working with office of dam safety ensure monitoring and assessment is completed and incorporated work to educate Dam owners				H	O	
Forests	town-wide	town, state, private	V/S	encourage planting		maintain forest management fire breaks	assess a removal of dead trees	M	L	
Public Water Supply - Zone 1, Zone 2	Specific	town	V/S	continue to review ground water regulations and mapping		improve infrastructure impliment water bans expand water districts to farms		H	O	
Private wells	town-wide	private	V			drop in ground water expand service area of public water supply	work with utilities to minimize down lines	H	O	
Mills	specific	private	V	Monoriting of mill and river infrastruc possible removal of contamination		encourage re-development green		M	L	
State Parks	specific	State	S	Maintain Dam infrastructure maintain flood plane				L	O	
Pests (ticks, catipillars)	town-wide		V	encourage surveys, assessments and management / education				M/H	O	
Wildlife / fisheries	town-wide		V/S	seek state federal funding to improve habitat (ex: Dam removal project)				M	L	
21 E Sites/potential hazardous release sites	multiple	private	V	monitor of sites for dispersement / Incorporate into / seek funds for clean-up emergency plans				H	O	
Gravel removal/soil importation	within aquifer basin			continue to monitor ground water quality				H	O	
farms	multiple	private	S	emergency plan for livestock		have a emergency response plan with fire department		L	L	
Open space	multiple	town, state, private, federal?	S	continue to expand open space through local/federal funding and land restrictions by private owners. Encourage open space development. Develop open space plan				M	L	
private septic systems	multiple	private	V	continue to expand waste fluid treatment infrastructure. Educate private system owners on proper maitence				L	O	
water bodies (rivers, ponds) - BRW	town-wide	multiple - town state, private	V/S	Maintain and protect flood storage, continue to improve conservation by law enforces				M	O	
Storm water/treatment	town-wide	various	V/S	encourage nature-based solutions. Changes to design standards* Assess infrastructure impliment storm water utility. seek State funds to improve storm water infrastructure/treatment federal/local				H	S-L	
flood plane	town-wide	private, state, town	V/S	Continue to protect and expand flood plains. Identify critical infrastructure in FP and incorporate emergency planning				L	O	
Air quality	life-wide			Improve emergency communications and monitoring of air quality				L	O-S	
Solar farms / gas lines / high tension electric wires				monitor erosion						