Norton, MA

Municipal Vulnerability Preparedness (MVP) and Community Resilience Building Workshop Summary of Findings

November 2018

Submitted by:

Resilient Taunton Watershed Network (RTWN)

SRPEDD

The Nature Conservancy

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Overview

Norton is a town of about 20,000 residents in Bristol County, MA. It's located in the southeast of the Commonwealth in the Atlantic Coastal Plain, with over 50% of its land mass consisting of wetlands and streams. Five major rivers and a regional aquifer are just a few of the natural resources Norton shares with neighboring towns of Easton, Taunton, Attleboro, Rehoboth, Mansfield, Foxborough and Sharon. This inland community has collaborated extensively with its neighbors to maintain shared environmental assets like the Great Woods, the Hemlock Swamp and Islands, and the Canoe River aquifer, as well historical and cultural assets like the Three-Mile River Area of Critical Environmental Concern (ACEC) as the town continues to develop.

Much of Norton is low-lying, and its proximity to critical water bodies like the Canoe River and Wading River makes household and municipal water management systems important. **Flooding** from precipitation events at municipal and private buildings alike is of concern to many residents. Regionally unique ecosystems like the Hemlock Swamp, and the Great Woods offer multiple benefits to the surrounding community and must be actively preserved against climate hazards. In addition to flooding, **high wind, extreme temperatures, and changing seasonality and storms** have severely impacted Norton's various assets. The town sees collaborative planning as the most effective way to ensure future safety of town residents, and sustain critical shared resources.

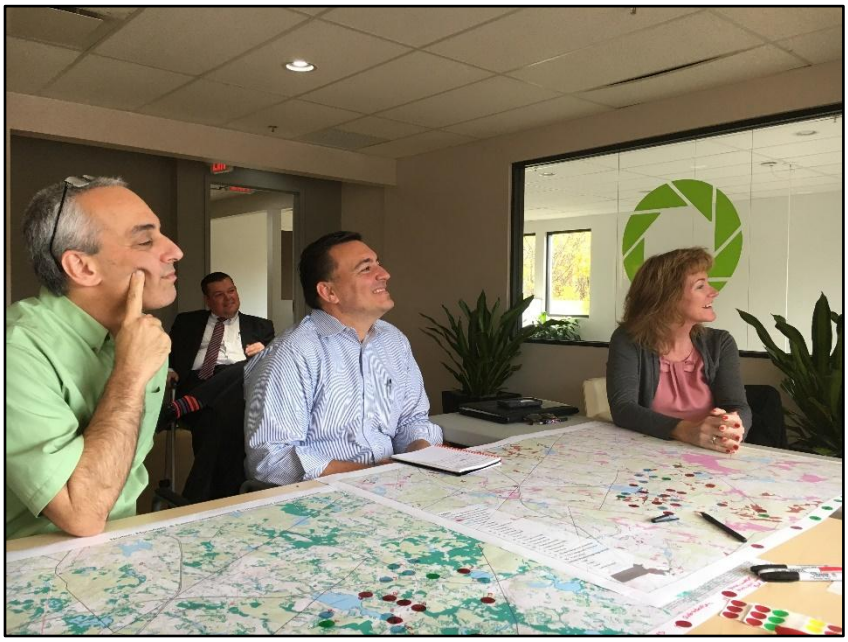
To help the town consider and prioritize actions to improve its climate resilience**,** the Town of Norton applied for and received a grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) to become a Certified Municipal Vulnerability Preparedness (MVP) Community. Core members of the Resilient Taunton Watershed Network (RTWN) were critical for coordinating the workshop, specifically the Southeast Regional Planning and Economic Development Division (SRPEDD), who acted as Norton's MVP Provider. Staff from The Nature Conservancy, Manomet, and Mass Audubon supported the Community Resilience Building (CRB) workshop process as certified MVP providers and members of RTWN. These planning workshops took place on two consecutive Thursdays, on November 1 and 8, 2018 at the Norton Media Center.

Stakeholders from Norton were present as workshop participants, including members of the Conservation Commission, Highway Department, Water and Sewer, Board of Health, National Grid, Town of Norton Schools, Building Department, Norton Fire/EMA, Human Services, Norton Senior Center, Alnylam, Norton Police, and the Board of Selectmen. Attendees were divided into two distinct groups that remained consistent in both workshops. Each group visually identified vulnerable and significant asset features in Norton by drawing the locations on a map (Appendix A), and verbally identified those same features on a white-board matrix (Appendix B). Each feature was related to hazards that the town is concerned about and participants determined whether a particular feature was considered vulnerable to those hazards or a strength that helps Norton mitigate them. Each item listed on a group's matrix was numbered, and corresponded to a numbered dot they

placed on their map. Three colors were used on the map to visually represent the different categories of infrastructural (red), environmental (green), and social (blue).

Through facilitated discussion, workshop attendees:

- Defined top natural and hazards of concern locally, discussed relationship to climate change
- Identified Norton's existing strengths impacted by natural hazards
- Identify Norton's vulnerabilities that are impacted by the specified natural hazards
- Developed prioritized actions for the community;
- Identified immediate opportunities to collaboratively advance actions to increase resilience.



Four striking themes that emerged from the working groups were the need for a multi-hazard mitigation plan, improving communications within and across town, managing stormwater, and institutionalizing low-impact development goals in town bylaws. An important conclusion from the workshops was discovering the need for ongoing comprehensive planning to make the most of local knowledge. Public education on multiple topics was identified as an imperative to ensure effective implementation. Overall, relationship maintenance within Norton was identified as a basis for a stronger community and region.

Top Hazards and Vulnerable Areas

Participants discussed past hazards they've experienced and reached a consensus to name these four natural hazards within their community. Hazards of highest concern include:

- Flooding
- High Wind
- Drought, Fire, Extreme Temperatures
- Changing Seasonality

Flooding was a category identified to describe concerns about increased volume of precipitation and associated management challenges. Currently, flooding strains multiple undersized culverts (listed below). Networks of main roadways are flooded, such as Richardson Ave, southwest through Walker Street and throughout Route 123. Residents cite more frequent flooding than in the past for some residential and public buildings.

High Wind is a concern because trees frequently fall and limit road access for residents and emergency personnel. High wind also threatens existing power infrastructure through damage to above-ground powerlines, and Norton has recent experience with prolonged power outages after storms.

Drought, Fire, Extreme Temperatures is a broad category that encompasses limited public water availability during droughts, damage to native habitat from fire, and the strain on populations with limited access to seasonal heating/cooling locations during extreme cold and extreme heat.

Photograph by Jennifer Carlino

Changing Seasonality refers to an observed shift in the times of year that seasons change, and increasing number of days over 90 degrees. Norton's aging population, homeless population, and households that cannot afford sufficient heating/cooling are particularly at risk to this hazard. Winter weather has also shifted and in the past few years, spring has come later in the calendar year.

Areas of Concern

Several locations in town were identified as important strengths, notable vulnerabilities, and some could be considered a little of each. The four natural hazards identified by Norton workshop attendees included flooding, high wind, drought/fire/extreme temperatures, and changing seasonality. Infrastructure and resource disruptions are the outcomes attendees are most concerned about, especially considering the dependency on the Canoe River

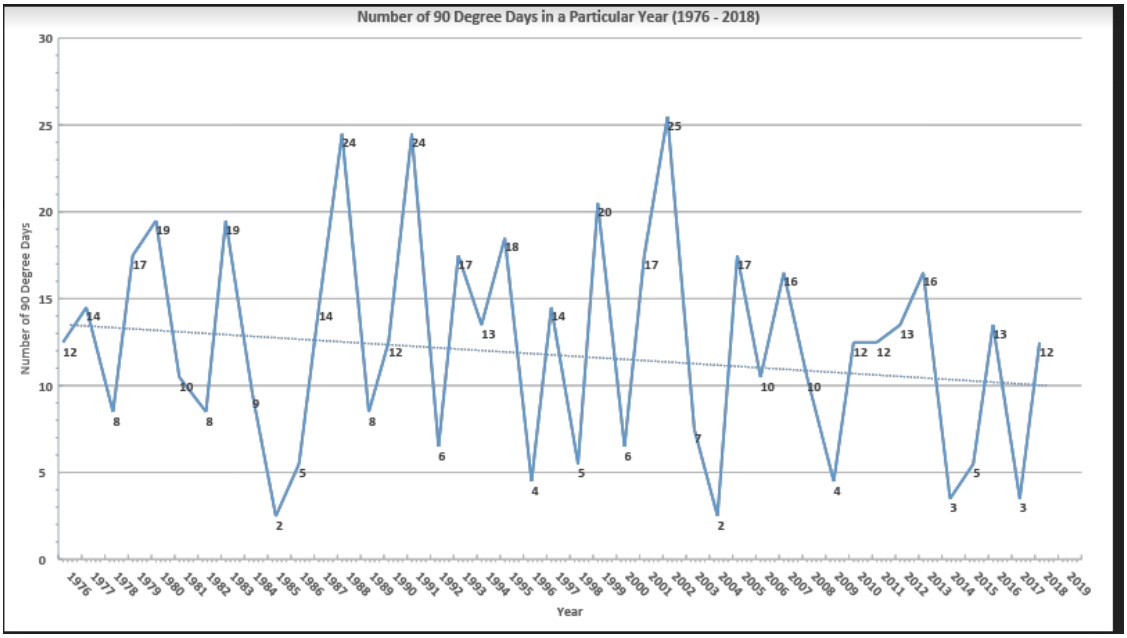


Chart of days with temperatures over 90 degrees Fahrenheit in Norton, MA.

Aquifer, the drinking water source for the five municipalities of Sharon, Foxborough, Mansfield, Easton and Norton. The Canoe River Aquifer is a Federally-designated Sole Source Aquifer due to its capacity to supply more than 50% of the drinking water consumed in the area, or approximately 50,000 residents. In total, the aquifer is 16 miles long and recharges the network of smaller aquifers that comprise the Canoe River sub watershed.

Prioritization (high, medium, low) and time anticipated to complete each action is indicated in the digitized matrices (*Appendix C*)

Infrastructure concerns were broad and deeply interconnected. Most items related back to one or more of the following: water quality and quantity management, backup power systems, municipal/community buildings at risk of flooding, and issues surrounding the two main access routes (Route 123 and Route 140) through town. Specific features in these categories are named below:

- Vulnerability of existing infrastructure (e.g., telecommunication buildings, pump stations, Norton Housing Authority) to power outages.
- Walker Street, North Worcester Street, Plain Street, East Hodges Street culverts
- Barrowsville, Chartley, and Norton Reservoir Dams
- Neighborhoods vulnerable to power outages; Bay Road, homes around Winnecunnet Pond, 274 East Main Apartments, and Mobile Homes
- Water and sewer pump stations
- Municipal buildings, specifically Town Hall and all schools

Walkability of Route 123 and Route 140, current lack of pedestrian safety Both group's discussions touched on a larger theme of infrastructure assessment needed for future adaptation, based on past challenges. The substation near the Norton Senior Center and other power infrastructure has proven vulnerable to wind and storm events, which disrupted some families for a week in the winter of 2017-18.

Culverts were discussed as existing stormwater management infrastructure that needs assessment and upgrades. Multiple culverts need replacement to adequately manage the volume of water that frequently flows through them, and to avoid future damages to roads that are built over them.

Dams were identified as concerns for the downstream flooding and potential loss of life or property damage if they fail. They are not built to accommodate current water levels, and cannot be upgraded or removed without evaluating downstream impacts of different scenarios.

The Senior Center could alleviate the town's need for more emergency shelters if it is made more resilient with a backup generator and flooding in the parking lot is mitigated. An option for flood management could be the installation of small bioretention areas- areas of green space and engineered soil layers to drain water – throughout the lot. With a backup generator for power outages, and new shingles to correct roof damage from previous storms, the Senior Center could be a reliable additional emergency shelter for Norton residents. Additionally, removing or leveling the back parking lot would allow for additional and safer parking during winter storms, and would be safer for pedestrians year-round.

Environmental concerns frequently related back to themes of either water quality or preservation of ecosystems and their services. The opportunity to review municipal bylaws and institutionalize Norton's resilient development goals was also highlighted. Top environmental concerns include:

- Wetlands and floodplain
- Aquifer recharge and water quality maintenance
- Forest management
- Prioritizing resiliency to climate change while balancing new development
- Siting solar developments on existing impervious surface

Large-scale solar is a compelling example of a simultaneous strength and vulnerability. Participants cited concerns about the capacity for ensuring minimal tree cutting for solar siting, and do not want solar developments to be sited on forested lands for fear of compromising the many benefits forests provide. A prioritization of existing-impervious surfaces for new solar field developments was suggested.

Norton's recent Large-Scale Ground-Mounted, Solar bylaw begins to address some of the above concerns and is an essential building block of the MVP Planning conversation. Participants recognized the importance of pairing an opportunistic application of Low Impact Development (LID) to manage stormwater on site as new projects and retrofits arise with the long-term approach of institutionalizing hazard-conscious zoning/design.

Existing solar farm sites experience flooding from runoff and consequential erosion, especially where trees have been cleared. The existing Large-Scale Ground-Mounted Solar bylaw requires a storm water pollution prevention plan and specifies clearing 'limited to what is necessary for construction'.

Societal concerns had breadth that included policy suggestions, vulnerable buildings, and capacity changes to the town. Societal items that participants brought attention to included:

- Adopt Community Preservation Act (CPA)
- Transportation in emergencies
- Communications within Norton
- Information Technology capacity of the town
- Multi-hazard Mitigation planning
- Council on Aging
- Wheaton College
- Large dense housing area could lose cooling/warming without power, sewer injectors can go down also

Bill Napolitano (SRPEDD) and Sara Burns (The Nature Conservancy) facilitate final prioritization of action items

Current Strengths and Assets

All of those in attendance generally agreed that recent changes to zoning bylaws to encourage Low Impact Development (LID) were a strength in Norton. Local and regional conservation efforts have been steadfast in Norton over the years, and participants intend to continue the community's track record. Ecosystem integrity is an imperative even as development evolves over time.

The town's middle school was recognized as an invaluable asset, as it's the only officially designated shelter. It is not located in areas vulnerable to flooding, and has a back-up generator. A secure public building and sound emergency management plan is crucial for any resilient community.

Many environmental features in Norton were named as strengths, and overlap with social assets:

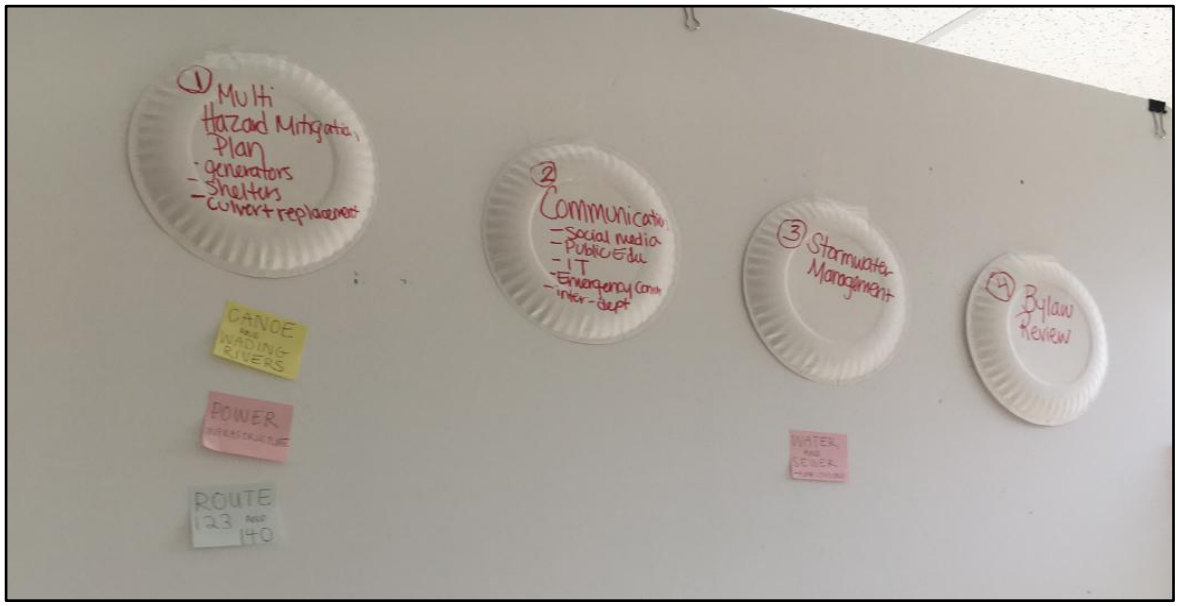
- Areas of Critical Environmental Concern, both the physical areas and the official designations
- The Great Woods Conservation Area
- Record of preservation of conservation and historic open space
- Recent changes to zoning bylaws that favor LID and local water conservation
- Land Preservation Society of Norton for its environmental stewardship and leadership in maintaining public open space

Social services and community organizations are assets to Norton as well. Gathering places are critical for creating a sense of connectedness between residents, creating better quality of life and stronger support networks in times of crisis. Social assets named by participants included:

- St Mary/ St Vincent De Paul and their resources
- YMCA as partner in public education, community space
- Senior Center in its staff, connections, potential partner in public education and as a gathering space

A complete list of strengths and assets can be found in *Appendix C* in the digitized feature matrices.

Top Recommendations to Improve Resilience



Two days' worth of discussion was whittled down into four thematic priorities that workshop participants agreed were urgent for Norton's resilience (pictured above). Once actions were generated related to the list of strengths and vulnerabilities, each of the two groups identified their top three actions with their facilitator. The two groups then shared their top themes, which overlapped organically. Facilitators then lead a discussion with all attendees to best incorporate each group's suggestions into common themes.

Participants were encouraged to consider action items that mitigated hazards through strengthening natural systems and processes, and to complement technological or built fixes. An action that limits damage of natural hazards through conserving existing lands, integrating benefits of nature where they're critically needed (e.g. flood storage, air quality improvement) into ongoing construction, or restoring an ecosystem where it has been disrupted is referred to as a Nature-based solution**.** Nature-based solutions (NBS) are a category of emerging strategies in climate adaptation and their exploration is of interest to the Commonwealth of Massachusetts as a national leader in comprehensive hazard mitigation. Effectively implementing NBS means designing a community whose built infrastructure is reinforced by its natural environment and vice versa.

The workshops' four emergent themes included multi-hazard mitigation planning, communications, stormwater management, and review of local bylaws. Ultimately the group named specific themes that need to be addressed through many incremental actions. These are the actions that participants rated as most urgent, and that the town anticipates executing as soon as possible:

Multi-Hazard Mitigation Planning

- Add generators to the Norton Senior Center, St Mary's, 120 West Main Apartment units, and homes around Winnecunnet Pond (or install adaptors on each Winnecunnet Pond home, so that a mobile generator can be used to service all the homes)
- Designate additional emergency shelters**,** likely the Senior Center
- Culvert replacement/upgrade at Walker, Plain, and East Hodges Streets
- Assess all dams for, removal, maintenance costs/benefits
- Stormwater Management retrofits and mitigation plans for Routes 123 and 140
- Prioritize resiliency of Canoe River and Wading River, through improving infiltration, appropriate culvert replacement, and dam removal
- Assess resilience of existing power infrastructure to treefall**;** coordinate with National Grid on their Vegetation Management Plan.

Communications

- Create and distribute public education materials on local environmental resources and vulnerabilities
- Create an Information Technology department Collectively decide on/create a central social media account that will manage all communications to town – expand on school alerts and police notifications
- Increase interdepartmental communication by collecting and sharing information

Stormwater Management

- Incorporate LID in senior center parking lot
- Keep local water local by improving infiltration and managing stormwater on-site

Bylaw Review

- Revisit zoning, open space, subdivision bylaws to ensure nature-based solutions are being encouraged to their full capacity
- Revisit Large-Scale Ground-Mounted Solar bylaw to encourage use of renewables while maintaining land conservation priorities

In making these recommendations, this cohort generated an array of potential actions that related back to the themes identified by facilitators. A complete list of actions generated by the groups, along with their prioritization can be found in *Appendix C*. Many action items, both priority and general, were in alignment with the Norton Resiliency Roundtable Report completed in partnership with RTWN in 2016.

CRB Workshop Participants

Name	Affiliation
Brad Bramwell	Selectman
Jennifer Carlino	Conservation Commission, Director
Keith Silver	Highway Department, Superintendent
John Kyranos	Alnylam
Stephen Desfosses	Norton Police
Ray Cord	Norton Emergency Management Agency
Bernie Marshall	Norton Water and Sewer Superintendent
Chris Zahner	Norton Board of Health, Agent
Donna Palmer	Norton Board of Health, Public Health Nurse
Ann Malley	National Grid
Wade Lizotte	Town of Norton Schools
Joseph Baeta	Town of Norton Schools, Superintendent
Michael Yunits	Town of Norton, Town Manager
Paul DiGiuseppe	Town of Norton Director of Planning and Economic Development
Chris Carmichael	Building Department, Building Inspector
Paul J. Schleicher	Norton Fire Chief/EMA
Beth Rossi	Human Services/Senior Center, Director

Citation

Town of Norton (2018) Community Resilience Building Workshop Summary of Findings. Resilient Taunton Watershed Network. Norton, MA

Acknowledgements

The Norton Core Team and Facilitation Team would like to thank the following for their contributions to the MVP Workshop process: staff of the Norton Media Center for providing a wonderful meeting space, assistance with room set-up, and tech support; the Commonwealth of Massachusetts, EEA, Municipal Vulnerability Preparedness Program for their funding

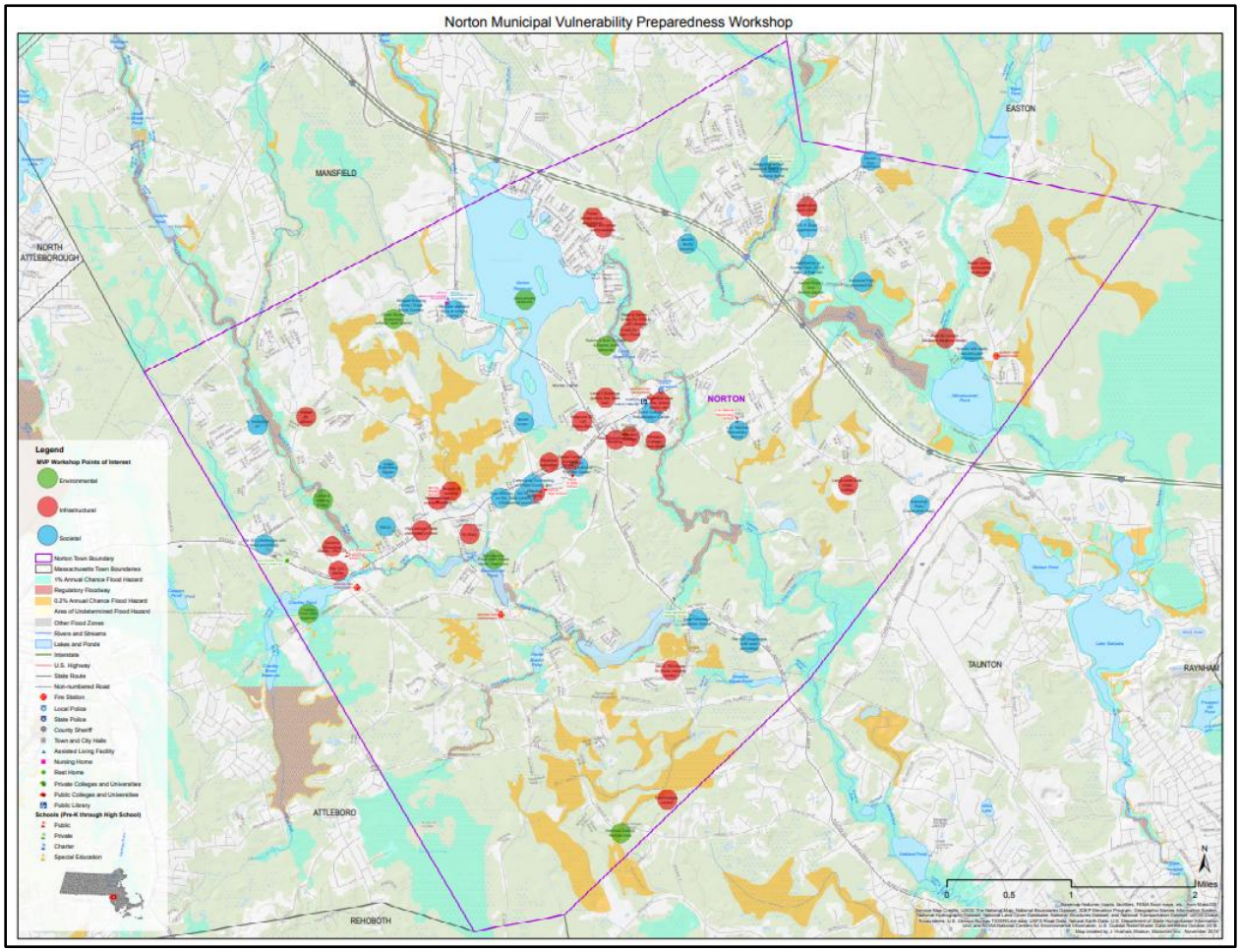
support for these workshops, and; all of those who participated in the workshops and contributed to the plan resulting from these workshops.

Appendices *show different methods of recording the same vulnerabilities and strengths named by workshop participants through mapping and prioritized lists. Small groups recorded infrastructural, environmental, and societal features in Norton and the hazard(s) they to which relate. Each feature category (infrastructure, environment, society) was documented on a separate matrix (see Appendix B and C for complete lists). On these short lists, or matrices, action items were identified corresponding to each feature that was named. Each action was then assigned a high, medium, or low priority value and expected short-term, long-term, or ongoing time frame to complete.*

To account for spatial relationships between features, participants simultaneously placed points on a map that corresponded to items they named on the different matrices. Infrastructural features are indicated with a red point, environmental with a green point, and societal with a blue point. Items on the map are also labeled for what they represent from the written list, but do not represent prioritization or associated action(s).

Appendix A

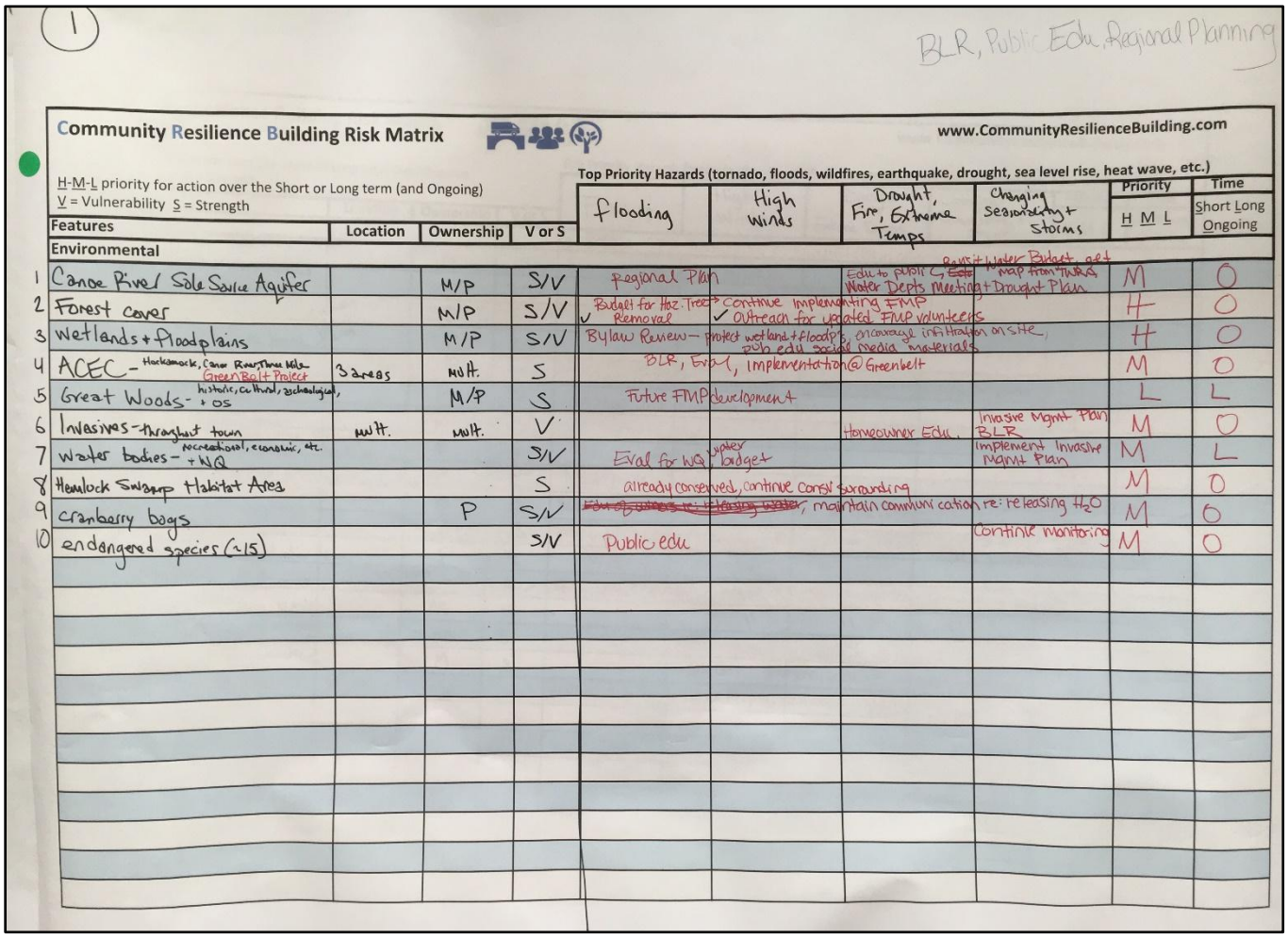
Map of Norton collectively marked by both working groups with red dots indicating infrastructural features, green dots indicating environmental, and blue dots indicating societal features .



Appendix B

Photos of matrices used by each group to list features in town that are impacted by natural hazards. Natural hazards of concern are listed across the top, on the right side of the matrix. Feature names and details are written in black ink. Action items and their prioritization are written in red ink.

Group 1, Environmental



1

BLR, Public Edu, Regional Planning

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

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

	Features	Location	Ownership	V or S	flooding	High Winds	Drought, Fire, Extreme Temps	Changing Seasonality + Storms	Priority H M L	Time Short Long Ongoing
	Environmental									
1	Canoe River / Sole Source Aquifer		M/P	S/V	Regional Plan		Edu to public, ~~Edu~~ Water Depts Meeting + Drought Plan	Rust + Water Budget, get map from TWRA	M	O
2	Forest cover		M/P	S/V	✓ Budget for Haz. Tree Removal	✓ Continue implementing FMP outreach for updated FMP volunteers			H	O
3	wetlands + floodplains		M/P	S/V	Bylaw Review – protect wetland + floodp's, encourage infiltration on site, pub edu social media materials				H	O
4	ACEC – Hacksmack, Canoe River, Three Mile – Green Belt Project	3 areas	Mult.	S	BLR, Eval, implementation @ Greenbelt				M	O
5	Great Woods – historic, cultural, archaeological, + OS		M/P	S	Future FMP development				L	L
6	Invasives – throughout town	Mult.	Mult.	V			Homeowner Edu.	Invasive Mgmt Plan BLR	M	O
7	Water bodies – recreational, economic, etc. + WQ			S/V	Eval for WQ	supply budget		Implement Invasive Mgmt Plan	M	L
8	Hemlock Swamp Habitat Area			S	already conserved, continue consv surrounding				M	O
9	cranberry bags		P	S/V	~~Edu of farmers re: releasing water~~, maintain communication re: releasing H_2O				M	O
10	endangered species (~15)			S/V	Public edu			Continue monitoring	M	O

Group 1, Infrastructural Features

1

Stakeholders (Multi Haz Mit)
SW mgmt, Culverts, Generators, Shelters

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength
M - Multi F - fed
S - state P - private

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

	Features Infrastructural	Location	Ownership	V or S	Flooding	High Wind	Drought + Fire Extreme Temps	Changing Seasonality + Storms	Priority H M L	Time Short Long Ongoing
1	Middle school - current shelter		M	S	N/A	N/A	add AC to 3rd fl Cafgym	Look into #5 as a cool shelter	M	L
2	Senior center - potential shelter		M	V	Need SW mgmt LID bylaw review	BUY Generator & new roof resistant (wind)	level + remove garage, use for parking		H	S
3	Municipal area - fire, police, hwy, library, town hall		M	S/V	Maintain buffer to river front area, no fixed plan Municipal River evaluation	Need generator @ town hall Plans	Tornado warning maintenance - add field check to checklist + school weather/radio		H	S
4	drinking water wells + pump stations (5)		M	S/V		Implement forest mgmt/Steward Plan	Edu on water conserv + drought resist plants	Regional flood/hydrology plan - master w/ CRAC	M	L
5	Wheaton College - incl. cleaning thoughts		P	S/V	Maintain/improve communication				L	0
6	St Mary		P	Potential S//V	add generator				L	0
7	Walker St Culvert		M	V	eval + update + enlarge, secure funding to make 1 big out of 2 existing				H	S
8	Transmission lines	MU H. Elec Gas Water	P Not Gas	S/V		education of landowners continue trimming			H	0
9	Substation (4kV → 13?)		P	V	N/A					
10	Plain St Culvert - Mulberry Meadow brook		M	V	Upgrade + enlarge	~~SW mgmt culvert, heat/slow flow~~			M	L
11	East Hodges culvert		M	V	upgrade				M	L
12	Dams - incl. Norton River, Chartley, Barnardville, cross St	MU H.	M/P	V	Potential (evaluate) removal + restoration @ Chartley Barnardville	continue maintenance			H	S
13	lg scale solar (clear cutting)	MU H.	M/P	S/V	Keep ~~growing~~ water mgmt in solar bylaws, encourage new solar on already paved sites				M	S
14	stormwater system, esp. Wilmecumet, etc., water bodies	Non ponds + SW systems (MUH)	M	V	(future?) eval existing infra + roads, incorporate SW mgmt				M	0
15	380 S. Worcester St - Mass Corsig (Hockey) storage facility	MOU w/ town	P	S	Communicate w/ new owners				L	0
16	Rt. 123 - lifeline			S/V	SW mgmt ✓ - general		Multi haz Mit Plan		H	S

*Chris
Jen
Beth
Paul
John
Ann
Wade
Mike

Group 1, Societal Features

1

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
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Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.)

	Features	Location	Ownership	V or S	Flooding	High Winds	Drought Fire Extreme Temps	Changing Seasonality + Storms	Priority H M L	Time Short Long Ongoing
	Societal				Re: CPA possibility, ID successful CPA in other towns, ID partners				H	S
1	Land trust		P	S	continue cooperation				H	O
2	120 W Main St-wln.popl (elderly + disabled)		S	S/V	need unit generators - electric heat, Need A/C				M	L
3	Jacobs-family housing		S	S/V	transp/GATRA				M	O
4	Daggett Crandall-nursing home (Physically disabled)		P	S/V					L	O
5	homes w/wells around Lake Winnecunnet + sewering		P	V	Edu of homeowners for emergencies; multi Haz Mit - need adopter for each house, for emergency sewage pumping				H	S
6	Norton Glen Apts.		P	V	continue communication w/ GATRA				M	O
7	2N E Main Apts - all pressed		P	V	transp - GATRA				M	O
8	3 mobile homes water park - 2 Mansfield + 1 Smith st		P	V	GATRA				L	O
9	Nin Gate assisted living + nursing home		P	V	follow up MOU - make official alternative to hospital				H	S
10	Senior center		M	S	help develop edu materials, use as host of edu events				M	O
11	YMCA		P	S	partner w/ summer camp for educ + facility (soccer field) use, upgrade access road, LID + WQ improvement +				H/M	O
12	St Vincent DePaul Society + Salvation Army		P	S	N/A				—	—
13	Inter-organizational/dept communication - esp. Seniors & schools		Mult.	S/V	Hire GIS, IT people	Revise 911 system	Improve Senior Ctr + EMS comm. Edu + outreach to vulnerable pops re: emergencies		H	S
14	local notification system RAVE		M	S		"	"	"		
15	Senior database (who on medical devices + medications)		M	S			↑ capacity to reach all seniors + update regularly			
16	Social media + emergency communications		M	S		create central emergency page — centralize notifications				
	HS + Wharton tech + design				develop edu materials + help w/ outreach, model after Easton's Water-Q project, check it				M	O

CPA
IT + Townwide Em Comm
Evol of WQ + SWC
Wind Connect
Grants in general

CPA
Transports
Em. Comm
Multi Haz

Group 2, Environmental Features

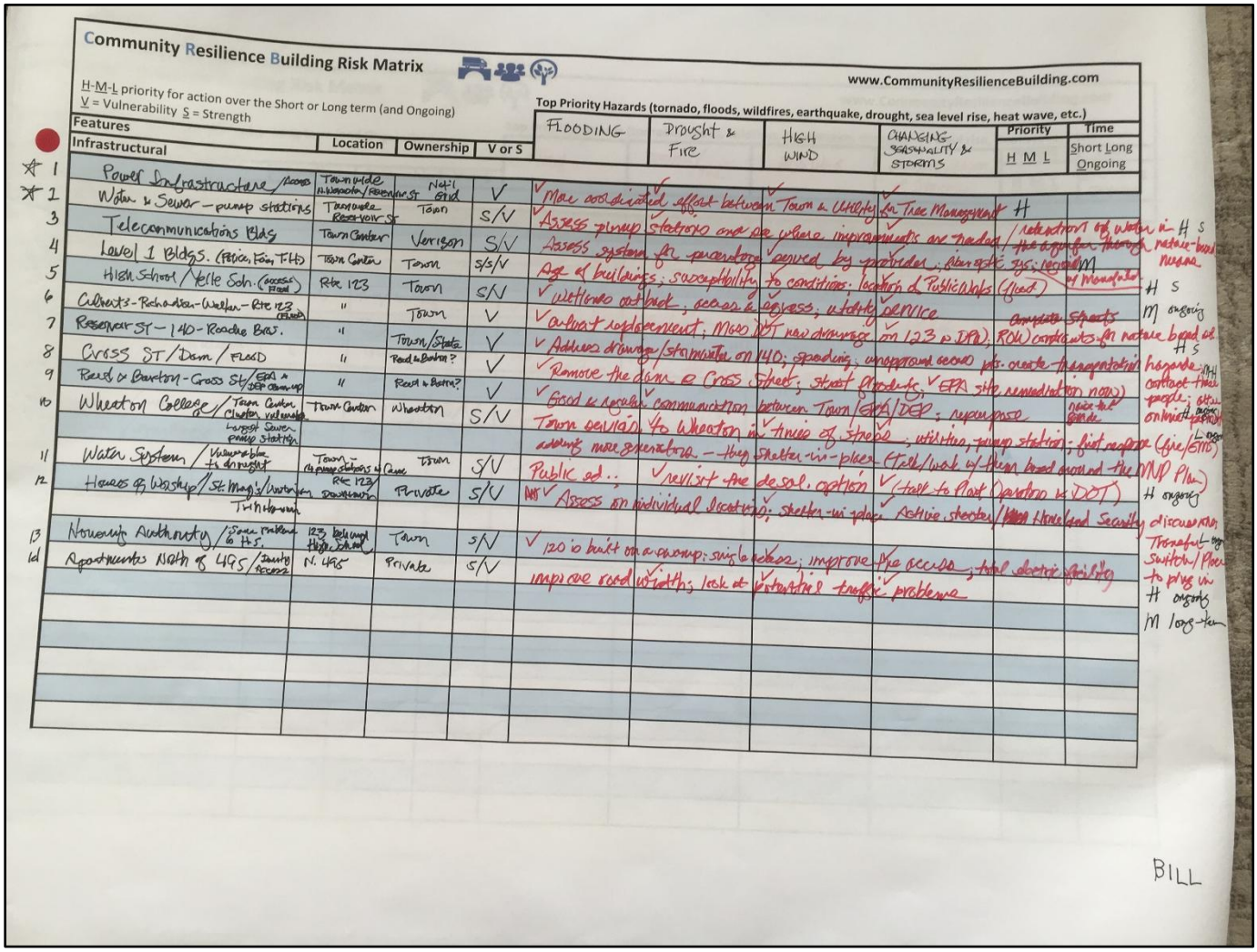
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.): Flood; Drought/Fire; High Wind; Changing Season of Storms

	Features: Environmental	Location	Ownership	V or S	Flood	Drought/Fire	High Wind	Changing Season of Storms	Priority H M L	Time Short Long Ongoing
*1	Canoe x Wading Rivers	"	–	S/V	✓ Culvert replacement on Wading;	✓	✓	✓		
	Old neighborhoods along the Wading Flood				look @ stream	cleaning/maint. w/ on overall	permitting process			H S
1	Rumford River @ Reed & Barton (dam removed)	Cross St	Reed & Barton	V	✓ Bat net of the dam; raise the grade @ Cross St.					H S
3	Conservation Pathways	Townwide	Town/Non-Profit	S	✓ Freshtrees management plan; improve public access/awareness; maintenance will be an issue; staffing					" "
4	Forest-Wildland interface / diseased trees	Townwide	Town-Non-Profit-Private	S/V	✓ Remove dead/fall; bring in all potentially impacted parties for large veg. management plan;					M ongoing
5	Borrowsville / Dam in ill repair, threatened by beavers	"	Town	S/V	✓ Remove dam; retain the veg. management plan					M long-term
6	Chardlazy / Dam repaired	"	Town	S/V	"	"	"			M ongoing
7	Reservoir / area around	Reservoir St	Town	S/V	Bat-remap of adequate parking;	✓	✓	✓		L ongoing
8	Groundwater / open & management	Townwide	Town	V	Manage stormwater and look to keep local water		management plan	to address vac, veg management, safety		H long-term
					Improved code enforcement			local where able		H ongoing

Group 2, Infrastructural Features



Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
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Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.)

	Features: Infrastructural	Location	Ownership	V or S	FLOODING	Drought & Fire	HIGH WIND	CHANGING SEASONALITY & STORMS	Priority H M L	Time Short Long Ongoing
☆ 1	Power Infrastructure / Access	Town wide H-Wheaton/Reservoir St	Nat'l Grid	V	✓ More coordinated effort between Town & Utility	✓	✓	✓ for Tree Management	H	
☆ 2	Water & Sewer – pump stations	Town wide Reservoir St	Town	S/V	✓ Assess pump stations and see where improvements are needed	✓	✓	✓		
3	Telecommunications Bldg	Town Center	Verizon	S/V	Assess systems for redundancy, power provided by provider, fiber optic sys; regional				M	
4	Level 1 Bldgs. (Police, Fire, T-Hall)	Town Center	Town	S/S/V	Age of buildings; susceptibility to conditions; location of Public Wks (flood)					
5	High School / Kelly Sch. (access flood)	Rte 123	Town	S/V	✓ wetlands outlook, access & egress; utility service					
6	Culverts – Rehoboth – Walpole – Rte 123 (flooding)	"	Town	V	✓ culvert replacement; MassDOT has drainage on 123 to DPW;			Complete Streets ROW contractors for nature based sol.		
7	Reservoir St – I-40 – Roadside Bios.	"	Town/State	V	✓ Address drainage/stormwater on I-40; speeding; underground sewer pts. create transportation hazards					
8	Cross St / Dam / FLOOD	"	Road to Boston?	V	✓ Remove the dam @ Cross Street; street flooding; ✓ EPA site remediation now)					
9	Road & Boston – Cross St / EPA & DEP clean-up	"	Road to Boston?	V	✓ Good & regular communication between Town/EPA/DEP; response					
10	Wheaton College / Town Center, Cheaton, vulnerable, largest sewer pump station	Town Center	Wheaton	S/V	Town deviation to Wheaton in times of stress; utilities, pump station; first response (fire/EMT)					
11	Water System / Vulnerable to drought	Town – (4 pump stations & Cane)	Town	S/V	adding more generators. – they shelter-in-place. (Talk/work w/ them based upon and the MNP Plan)					
12	Houses of Worship / St. Mary's / Unitarian Universalist	Rte 123 / Downtown	Private	S/V	Public ed.; ✓ revisit the de-sal. option ✓ (talk to Plant Operation w/ DOT)					
					✓ Assess on individual location; shelter-in-place. Active shooter / Home Security discussion					
13	Housing Authority / Some problems & Hs.	123, behind High School	Town	S/V	✓ 120 is built on a swamp; single access; improve fire access; total electric facility					
14	Apartments North of 495 / Family Access	N. 495	Private	S/V	improve road width; look at potential traffic problems					

H S
M ongoing
H S
M ongoing
H S
M long-term
H ongoing

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Group 2, Societal Features

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.): Flood; Drought/Fire; High Wind; Changes Seasonality/Storm

Features Societal	Location	Ownership	V or S	Flood	Drought/Fire	High Wind	Changes Seasonality/Storm	Priority H M L	Time Short Long Ongoing
1 Route 123 (state permitting is a snag)	"	State	S/V	Look at signalization; crosswalks; accessibility + Complete Streets	"	"	"		H ongoing
2 Route 140 (")	"	State	S/V						
3 Wingate/Norton Glen/Z74	Townwide	Town/Private	S/V						
St. Center/120 West Main/Red Mill			S/V	Bring resiliency education to these facilities; employ ACT team more widely to promote public safety (make sure you adequate staff & budget)					L-M ongoing
Great Brook/Doggett-Crandall			S/V						
4 4 schools on Rte 123	"	Town	S/V	All have special needs populations; Your school in particular; we have to address our ability to meet the needs; disaster etc; work w/ State Reps on this					H S&T ongoing
(All on West Main)	"	Town	S/V						
1 on Rte 140 Lasting Christian	"	Private	S/V						
1 L.G. Nose on Plain St.	"	Town	S/V						
5 North Cottage (rehab & prison)	access from Town Road	DPH	S/V	"	"	"	"	"	H S&T ongoing
Judge Rottenberg Cntr. (2)	Shelby Rd, by 4th entrance	Private	S/V	KNOW WHERE THESE POPULATIONS ARE					
N. Worcester St.	"	"	S/V						
CCBC	West Main	"	S/V						
6 Industrial Park	Commerce Drive/Way	"		Look at the layout; accessibility (ADA issues); traffic issues; first responder issues					M-S
"	Leonard St	"							
7 Constantly work together to review bylaws/regs/policies	—	Town	S	Retain this approach					H-ongoing
8 First response calls to schools & Wheaton (big increase in past several years)	Townwide	Varies	S/V	Keep good lines of communication & training open					M-ongoing

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Appendix C

These tables are identical to matrices photographed in Appendix B and are reformatted for convenient data entry. Features are characterized as a vulnerability (V), strength (S), or both (V/S).

Digitized feature matrices, Group 1

Features	**Location**	**Owner-ship**	**V or S**	**Flooding**	**High Wind**	**Drought/Fire /Extreme Temperatures**	**Changing Seasonality & Storms**	**Priority**	**Time**
Infrastructural								HML (high, med, low)	SLO (short, long, ongoing)
Middle school - current shelter	West Main Street	Municipal	S	N/A	N/A	Add AC to 3rd floor cafeteria, gym	Look into HS as additional shelter	M	L
Senior center - potential shelter	West Main Street	Municipal	V	Need SW mgmt, LID bylaw review	Buy generator & new roof	Resilient design	Level and remove garage, use for parking	H	S
Municipal area, fire, police, hwy, library, town hall	East Main Street, West Main Street	Municipal	S/V	Maintain buffer to riverfront area, in flood plain; Rumford River evaluation	Need generator at highway department; update generator at town hall		Plan town-wide monthly maintenance - add mold checks to maintenance checklist in town buildings; upgrade heating/cooling	H	S
Drinking water, wells, and pump stations	Town-wide	Municipal	S/V	Implement forest management/stewardship plan		Increase education on water conservation and drought resistant plants	Create regional flood/hydrology plan - maybe with CRAAC - ongoing monitoring plan	M	L
Wheaton College	East Main Street	Private	S/V	maintain/improve communication				L	O
St. Mary	Power Street	Private	potential S/V	add generator				L	O
Walker St. Culvert	Walker Street	Municipal	V	Evaluate, update and enlarge, secure funding to make 1 big culvert out of the 2 existing culverts				H	S
transmission lines	Multiple (see black lines on map)	Private (National Grid)	S/V	Increase education of landowners; continue trimming				H	O

Substation (4kv - >13?)		Private	V	N/A					
Plain St. culvert – Mulberry Meadow Brook	Plain Street	Municipal	V	upgrade and enlarge culvert to manage stormwater on road, treat water and slow flow				M	L
East Hodges culvert	East Hodges Street	Municipal	V	upgrade -> SW mgmt on road, treat/slow flow				M	L
Dams (incl. Norton River & Cross St., Chartley, Barrowsville)	Multiple	Municipal /Private	V	Potential (evaluate) removal and restoration @ Barrowsville & Chartley, continue maintenance				H	S
Lg. scale solar (clear cutting)	Multiple	Municipal /Private	S/V	Keep water management in solar bylaws, encourage new solar on already paved sites to protect forests				M	S
Stormwater system, esp. Winnecunnet, etc. water bodies, Chartley	Muni ponds and SW systems (multiple)	Municipal	V	Update relevant bylaws. Evaluate existing infra and roads, incorporate stormwater management				M	O
380 S. Worcester St. - Mass casualty storage facility	MOU with town	Private	S	Communicate with new owners				L	O
Route 123 - lifeline	Route 123	State	S/V	General stormwater management		Multi-Hazard Mitigation plan		H	S
Environmental									
Canoe River Sole Source Aquifer	Regional	Multiple Municipal Owner-ship	S/V	Regional Plan	Education for the public; revisit water budget; get Water Department Meeting and Drought Plan			M	O
Forest Cover	Town-wide	Municipal /Private	S/V	Budget for Hazard Tree removal	Continue Implementing Forest Management Plan; Outreach for updated Forest Management Plan volunteers			H	O
Wetlands and floodplains	Town-wide	Municipal /Private	S/V	Bylaw review - protect wetlands and floodplains, encourage infiltration on site, public education via social media materials				H	O
ACEC - Hockomock, Canoe River, Three Mile, Greenbelt project	Multiple	Municipal /State	S	Bylaw Review to protect open space, evaluate existing open space, continue Open Space Plan implementation and Greenbelt plans				M	O
Great Woods - historic, cultural, archaeological, and OS	Great Woods	Municipal /State	S	Develop Forest Management Plan and include these features				L	L

Invasives - throughout town	Multiple	Multiple	V	Increase homeowner education on identification and maintenance	Invasive Management Plan and/or include in Forest Management Plan, Bylaw Review	M	O
Water bodies - recreational economic, etc. + Water Quality	Multiple	Municipal /State	V/S	Eval for WQ, water budget	Implement invasive mgmt plan	M	L
Hemlock Swamp Habitat Area	Hemlock Swamp	State	S	already conserved- continue to conserve surround-ing area		M	O
Cranberry bogs	Multiple	Private	V/S	maintain communication re: releasing H2O		M	O
Endangered species (~15)	Multiple		V/S	Public education	continue monitoring	M	O
Societal				(Re: introduce possibility of Community Preservation Act adoption, identify successful CPA in other towns, identify possible partners for related projects		H	S
Land trust	Town-wide	Private	S	continue cooperation		H	O
120 W Main St. - vulnerable population (elderly and disabled)	West Main Street	State	V/S	need unit generators - electric, heat, need AC		M	L
Jacobs - family housing (heavily tread area)	Jacobs Way	State	V/S	Transportation – Greater Attleboro Taunton Regional Transit Authority (GATRA)		M	O
Daggett Crandall - nursing home (heavily tread area)	Newland Street	Private	V/S	Improve transportation access - GATRA		L	O
homes w/wells + sewering around Winnecunet Pond	Winnecunet Pond area	Private	V	Educate homeowners for emergencies; Multi-Hazard Mitigation Plan - need adapter for each house, for emergency sewage pumping		H	S
Norton Glen Apartments	Norton Glen Road	Private	V	continue communication with GATRA		M	O
274 E Main St. Apartments - all powered	East Main Street	Private	V	Improve transportation access - GATRA		M	O
3 mobile home trailer parks - 2 Mansfield + 1 Smith St.	Mansfield and Smith Streets	Private	V	Improve GATRA access		L	O
Wingate assisted living + nursing home	Mansfield Avenue	Private	V	follow-up Memorandum of Understanding (MOU) – make this site official alternative to hospital		H	S

Senior center	Town Center	Municipal	S	help develop educational materials, use as host of educational events	M	O
YMCA		Private	S	partner with summer camps for education + facility (soccer field) use, upgrade access road, Low Impact Development + Water Quality improvement	H/M	O
St. Vincent DePaul Society + Salvation Army	Power Street + Attleboro	Private	S	N/A		
Inter-organizational/ department communication - especially seniors and schools	West Main Street	Municipal	S/V	Hire GIS, IT people, reverse 911 system, improve senior center + EMS comm., pops re: emergencies education + outreach to vulnerable	H	S
Local notification system RAVE		Municipal	S	Reverse 911 system, improve senior center + EMS comm., education, outreach to vulnerable populations in emergencies	H	S
Senior database (info on medical devices + medications		Municipal	S	Reverse 911 system, improve senior center + EMS comm., edu+ outreach to vulnerable pops re: emergencies; Increase capacity to reach all seniors + update regularly	H	S
Social media + emergency communication	Town-wide	Municipal	S	Create central emergency page - centralize notifications	H	S
HS + Wheaton tech + design	Respective schools			develop edu materials + help w/ outreach, model after Easton's water Q poster contest	M	O

Digitized Feature Matrices, Group 2

Features	Location	Owner-ship	V or S	Flooding, Drought & Fire, High Wind, Changing Seasonality & Storms	Priority	Time
Infrastructural					HML (high, med, low)	SLO (short, long, ongoing)
Power infrastructure/access	Town-wide: N. Worcester/Reservoir St.	Nat'l Grid	V	Moore coordinated effort between town and utility for tree management	H	
Water and sewer - pump stations	Town-wide: Reservoir St.	Town	S/V	Assess pump stations and see where improvements are needed/retention of water in the aquifer through nature-based means	H	S
Telecommunications Building	Town Center	Verizon	S/V	Assess system for percentage served by provider; fiber optic sys.; regional w/ Mansfield	M	
Level 1 Buildings (police, fire, T.H.)	Town Center	Town	V/S	Age of buildings; susceptibility to conditions; location of Public Works (flood)	H	S
High school/Yelle School (access field)	Route 123	Town	V/S	Wetlands out back; access and egress; utility service	M	O
Culverts - Richardson - Walker - Route 123 (flood)	Route 123 at Richardson Street, Route 123 at Walker Street	Town	V	culvert replacement; MassDOT new drainage on 123 @ DPW; ROW constraints for nature-based solutions; complete streets	H	S
Reservoir St - 140 - Roche Bros.	Reservoir Street	Town/state	V	Address drainage/stormwater on 140; speeding; unimproved access points create transportation hazards; contact these people; alter online/print	M-H	L
Cross Street Dam/Flood area	Cross Street	Reed & Barton	V	Remove the dam @ Cross Street; street flooding; EPA site remediation now	H	S
Reed & Barton - Cross St/EPA + DEP clean-up	Cross Street	Reed & Barton	V	Good & regular communication between Town/EPA/DEP; repurpose	H	O
Wheaton College/Town Center; cluster vulnerable largest sewer pump station	Town center	Wheaton	V/S	Communicate MVP Plan to Wheaton. Town deviates to Wheaton in times of stress; utilities, pump station; first responder (fire/EMS) adding more generators - they shelter-in-place	L	O
Water system - vulnerable to drought	Town - 4 pump stations	Town	V/S	Public ed.; revisit the desalination option; (talk to plant operators + DOT)	H	O

Houses of worship/St. Mary's/Unitarian/ Trinitarian	Rte 123/downtown	Private	S/ V	Assess on individual locations; shelter-in-place active shooter/Homeland Security discussions	L	ongoing
Housing Authority/some problems @ HS	123 behind high school	Town	S/ V	120 is built on a swamp; single access; improve the access; total electric facility; transfer switch/place to plug in	H	ongoing
Apartments north of 495	N.495	Private	S/ V	improve road widths; look at potential traffic problems	M	Long-term
Environmental						
Canoe + Wading Rivers (old neighborhoods around the Wading flood)			S/ V	culvert replacement on Wading; work with nature to help keep local water local; look at stream clearing/maint. in overall permitting process	H	S
Rumford River @ Reed & Barton (dam removal)	Cross St.	Reed & Barton	V	Get rid of the dam; raise the grade @ Cross St.	H	S
Conservation portfolio	Townwide	Town/nonprofits	S	Forestry management plan; improve public access/awareness; maintenance will be an issue; staffing	M	ongoing
Forest-wildland interface/deadwood, disease	Townwide	Town/nonprofits	S/ V	Remove deadfall; bring in all potentially impacted parties for large veg. mgmt plan; scouts as volunteers for smaller "adopt a site" program	M	Long-term
Barrowsville/dam in ill repair, treated for invasives	Townwide	Town	S/ V	Remove dam; retain the veg. mgmt plan	M	ongoing
Chartley/dam repaired	Townwide	Town	S/ V	Remove dam; retain the veg. mgmt plan	L	ongoing
Reservoir/area around	Reservoir St.	Town	S/ V	Boat ramp w/ adequate parking; management plan to address use, veg mgmt, safety	H	Long-term
Groundwater	Townwide	Town	V	Manage stormwater and look to keep local water local where able; improved code enforcement	H	ongoing
Societal						
Route 123 (state permitting is a snag)	Route 123	state	S/ V	look at signalization; crosswalks; accessibility - complete streets - more accessibility from MassDOT; multi-community effort	H	ongoing
Route 140	Route 140	State	S/ V	look at signalization; crosswalks; accessibility - complete streets - more accessibility from MassDOT; multi-community effort	H	ongoing
Wingate/Norton Glen/274	Townwide	Town/private	S/ V			

Senior Center/120 West Main/Red Mill			S/V	Bring resiliency education to these facilities; employ ACT team more widely	L-M	ongoing
Great Brook/Dagett-Crandall			S/V	promote public safety (make sure you adequate staff and budget)		
4 schools on Rte 123 (all on West Main): 1 on Rte 140 - Legacy Christian; L.G. Norse on Plain St.	Townwide	Town (except Legacy Christian which is private)	S/V	All have special needs populations; Yelle School in particular; we have to address our ability to meet the needs; de-escalate; work w/ state reps on this	H	S & ongoing
North Cottage (rehab & prisoners)	access from Town Hall	DPH	S/V	All have special needs populations; we have to address our ability to meet the needs; de-escalate; work w/ state reps on this; KNOW WHERE THESE POPULATIONS ARE	H	S & ongoing
Judge Rotenburg Center (2)	Shelly Road by 495 overpass	Private	S/V	All have special needs populations; we have to address our ability to meet the needs; de-escalate; work w/ state reps on this; KNOW WHERE THESE POPULATIONS ARE	H	S & ongoing
N. Worcester St.	Shelly Road by 495 overpass	Private	S/V	All have special needs populations; we have to address our ability to meet the needs; de-escalate; work w/ state reps on this; KNOW WHERE THESE POPULATIONS ARE	H	S & ongoing
CCBC	West Main	Private	S/V	All have special needs populations; we have to address our ability to meet the needs; de-escalate; work w/ state reps on this; KNOW WHERE THESE POPULATIONS ARE	H	S & ongoing
Industrial Park	Commerce Drive/Way	Private	S/V	Look at the layout; accessibility; traffic issues; first responder issues	M	S
Industrial Park	Leonard St.	Private	S/V	Look at the layout; accessibility; traffic issues; first responder issues	M	S
Constantly work together to review bylaws/regs/ policies		Town	S	Retain this approach	H	ongoing
First response calls to schools and Wheaton (big increases for past several years)	Townwide	various	S/V	Keep good lines of communication + training open	M	ongoing