Mansfield, MA

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

January 2019

Submitted by:

Resilient Taunton Watershed Network (RTWN)

SRPEDD

The Nature Conservancy

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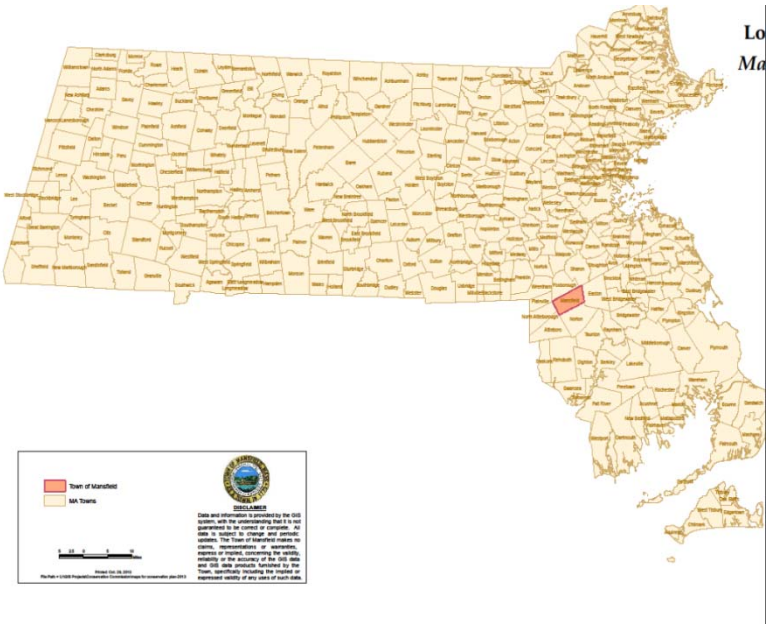
Overview

Mansfield is a town of over 23,000 residents in northwestern Bristol County, MA. Its neighboring towns include Easton to the east, Sharon to the northeast, Foxboro to the north, North Attleboro to the west, Attleboro to the southwest, and Norton to the south (see map from Mansfield's 2017 Open Space Plan). It is located about 28 miles south of Boston, 14 miles from Brockton, and 19 miles from Providence, Rhode Island. This inland community has collaborated with neighboring towns to steward shared natural resources, namely through the Canoe River Aquifer Advisory Committee (CRAAC).

Much of Mansfield is low-lying, and its proximity to critical water bodies like the Canoe River and Rumford River makes effective household and municipal water management systems important. The increasing severity of the regional **flood-drought cycle** is noted as a top concern to many residents. Regionally unique ecosystems like the Great Woods offer multiple benefits to the surrounding community and must be actively preserved against climate hazards. In addition to the flood-drought cycle, **heavy precipitation, high winds, and extreme temperatures** have severely impacted Mansfield's various assets. The town sees collaborative planning as the most effective way to ensure the future safety of town residents, and the protection of critical shared resources. This value of collaboration is seen in Mansfield's leadership as part of an emerging regional group of open space experts working to coordinate conservation efforts.

To help the town consider and prioritize actions to improve its climate resilience, the Town of Mansfield applied for and received a grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) to become a Designated Municipal Vulnerability Preparedness (MVP) Community. Core members of the Resilient Taunton Watershed Network (RTWN) were tasked with coordinating the workshop, specifically the Southeast Regional Planning and Economic Development Division (SRPEDD), who acted as Mansfield'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



Map taken from Mansfield's Open Space Plan

RTWN. These planning workshops took place on two consecutive Tuesdays, January 8 and 15, 2019 at Mansfield Town Hall.

Stakeholders from Mansfield were present as workshop participants, including members of the Planning Department, Information Technology Department, Building Department, Conservation Commission, Fire Department, Police Department, Mansfield-Foxboro-Norton Regional Wastewater District, Geographic Information Systems Department, the Massachusetts House of Representatives, Mansfield Electric, Conservation Department, and the Department of Public Works. Attendees were divided into two distinct groups that remained consistent in both workshops. Each group identified features in Mansfield visually with a map (Appendix A), and verbally on a matrix (Appendix B).

Each feature was related to hazards that the town is concerned about and participants determined whether a particular feature was considered a vulnerability or a strength in the face of these hazards. Each item listed on a group's matrix was numbered, and corresponded to a numbered dot they placed on their map. Three colors used on the map visually represented the different feature categories of infrastructural (red), environmental (green), and societal (blue).

Through facilitated discussion, workshop attendees:

- Defined top local natural and climate-related hazards of concern;
- Identified existing and future strengths and vulnerabilities;
- 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 **Continued Emergency Planning**, protecting the **Canoe River Aquifer**, assessing **bridges and dams**, and assessing **housing authority needs**. An important takeaway from the workshops was 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 of projects that were identified. Overall, relationship maintenance within Mansfield was identified as a basis for a stronger community and region.

Top Hazards and Vulnerable Areas

Participants discussed past hazards they have experienced and came to a consensus on the top four natural hazards to their community. Natural hazards were presented to the workshop participants as observable impacts of climate change Hazards of highest concern included:

- Flood/Drought Cycle
- Heavy Precipitation
- High Winds
- Extreme Temperatures

Flood/Drought Cycle describes concerns about the trend toward increased volume of precipitation during fall and winter months, impacting the Rumford River and local pond systems as well as built infrastructure. Even after a wet fall, winter, or spring, drought during summer months can limit available public water. Given that Mansfield depends on a local drinking water source, water quality and quantity are of high priority for the community. Increased precipitation causes infrastructure and water quality issues, while droughts threaten adequate availability. Both are intensified over time by climate change.

Heavy Precipitation addresses the infrastructure strain and public safety concerns related to large rain and snow events. Acute storms or rain events are bringing increasingly high volumes of precipitation over shorter periods of time, creating flood conditions. Aging dams and culverts struggle to manage large volumes of water and runoff from precipitation events. This contributes to nitrogen loading in Zone II of some public water supply wells and ongoing nonpoint source pollution.

Galen Laurence (The Nature Conservancy) discusses natural hazards with participants at the start of Mansfield's Planning Workshop.

High Winds are a concern because trees frequently fall and limit road access for residents and emergency personnel. High wind also threatens existing power infrastructure, and though Mansfield's municipal power provider responds consistently to outages, the town would like to prevent future disruptions caused by tree fall.

Extreme Temperatures refers to an increasing number of days over 90 degrees as well as cold snaps during winter and in early spring. This hazard relates somewhat to flood-drought cycle changes with distinct impacts to 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.

Categories of Concern and Current Challenges

Several locations and features in town were identified as important strengths, notable vulnerabilities, and some could be considered both a strength and a vulnerability. Infrastructure and resource disruptions are the outcomes attendees are most concerned about, especially considering the dependency on a local sole source aquifer for the majority of drinking water in the region.

Prioritization (high, medium, low) and time anticipated to address each concern is indicated in the digitized matrices (*Appendix C*). Groupings of concerns discussed at length by participants include:

Dams, Bridges, and Culverts throughout town

Mansfield possesses a mix of updated and aging infrastructure. To ensure safe and optimal function of the various dams, bridges, and culverts the town must identify which features need updating through a comprehensive assessment. Dams of most urgent interest to the town include Sweets Pond, Cabot's Pond, and Mill Pond. Culverts that attendees stressed as highly vulnerable to flooding and backup included the ones at East Street, Winthrop Street Parking Lot (box culvert), Franklin Street, East Street, Plain Street (three-sided), Otis Street, County Street, and School Street. The School Street bridge/culvert is flagged as a priority location also, due to its flooding impacts on the Plymouth Street Fire Station when it backs up.

Local Aquifer and the Rivers/Wetlands in its Network of Water Bodies

Participants noted that much of the public water consumed by Mansfield is transferred out of the recharge area of the Canoe River Aquifer. Wetlands along North Main Street, County Street, and Canoe River Drive absorb runoff from upstream in their respective parts of town, which impacts the entire aquifer system.

Housing Authority Buildings and Resident Safety from Hazards

Multiple municipal and state-owned buildings are important resources for residents of Mansfield. Housing Authority buildings specifically at Park Street, Eddy Street, Hawthorn Court, and Bicentennial Court are of interest to ensure that residents have access to air conditioning during increasingly hot summers (see *Appendix D)*, perhaps similarly modeled after the town's heating assistance program.

Resources for Environmental Justice Populations

The Council on Aging (COA) is a popularly utilized resource for its programming, ride share availability, and function as a cooling shelter. Cooling shelters are particularly critical to low income households who cannot acquire a cooling systems at home, and for aging residents whose health can be quickly impacted by extreme heat. The town library is connected to the COA and the site is experiencing erosion on the stream side of the building. The library is also a major venue for public engagement that residents have equal access to, barring transportation barriers.

Current Strengths and Assets

Mansfield is well acquainted with the many strengths it leverages to manage the risks that natural hazards pose. Bolstering and further supporting existing assets into the future will build local resilience and increase local capacity to address vulnerabilities. The following list of strengths/assets are essential for adapting to the impacts of a severe flood/drought cycle, high winds, strong storms, and extreme temperatures:

Infrastructural Strengths

- Mansfield Capital Improvement Funds are used annually to update infrastructure, namely roads. Updated infrastructure is another strength in itself, and will grow as more is updated over time. The town's Capital Improvement Committee itself is cited as a strength.
- New Emergency Operations Center, Mansfield's latest public safety building on Route 106 is anticipated to be completed by spring/summer of 2019. It will have new telecommunications and IT systems to support Mansfield's emergency response.
- Mansfield Electric, the town's public utility, is a huge asset in its responsiveness to power outages and overall trust-based relationship with the community.
- New wells added to the water supply system and updates to existing wells builds resilience in the drinking water infrastructure.

Environmental Strengths

- The Canoe River Aquifer was named both a strength and a priority vulnerability by the group. Decades of ongoing land protection work has been done to preserve water quality around the aquifer and other ecosystem services in the region.
- Public open space is an asset – despite management challenges - for the recreation opportunities and ecosystem services it offers (e.g. habitat, air quality improvements). Open space includes The Canoe River Conservation Area Greenbelt that runs along portions of the Rumford River, The Great Woods, Corporal Hardy
- Policies to maximize on-site strormwater management are another strength for the local environment. The Mansfield Conservation Commission requires downspouts and drywells for any residential projects that it reviews
- Community consciousness of environmental assets and the benefits of conservation was cited as a strength.

- The current land use bylaw created by Mansfield's Environmental & Conservation Planner to control erosion caused by runoff and non-point source pollution was also referenced.
- Various recreational facilities such as Plymouth St Soccer field, Otis Street, Memorial Park, provide community space to gather and a welcoming environment for families.
- The Pond at Mansfield Crossing retains water and serves as an important habitat area.

Societal Strengths

- Mansfield Housing Authority is both a priority vulnerability and a strength in Mansfield. Its prioritization reflects the critical resources it provides to residents.
- The Council on Aging is important as a community gathering space and way to disseminate information to residents, but is also vulnerable to flooding and erosion.
- Maintenance and consistent updates of town webpages allow residents to engage with changes in Mansfield, and social media presence increases accessibility of information by diversifying sharing platforms.
- School emergency planning is robust. Mansfield Schools will implement a new communication system through a recently awarded grant. Wheaton College in Norton has additional sheltering capacity and has a history of cooperation with surrounding towns.

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 several thematic priorities that workshop participants agreed were urgent for Mansfield's resilience. 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 led 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, to complement technological or built fixes. An action that limits damage from natural hazards through conserving existing lands, integrating benefits of nature where they are critically needed (e.g. flood storage, air quality improvements) into ongoing construction, or restores 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 requires community planning to integrate built infrastructure and the natural environment in mutually reinforcing ways.

The workshops' four emergent themes included bolstering emergency preparedness/response, stewardship of the Canoe River Aquifer, assessing Dams and Bridges, and assessing capacity of Mansfield Housing Authority/nearby community spaces. Ultimately the group named specific themes that need to be addressed through many incremental actions:

Emergency Preparedness

- Provide portable backup generators and other emergency response equipment to the Department of Public Works
- Improve evacuation planning and communication with the public
- Create a reverse 911 system similar to the existing public school communications system; allow residents to opt-in
- Improve telecom infrastructure in general; between the municipal government and public as well as interdepartmentally for resilience during emergencies/evacuations
- Create hazard signage on roads throughout town to increase public awareness of vulnerable areas

Canoe River Aquifer Protection

- Continue local workshops with Canoe River Aquifer Advisory Committee (CRAAC) to increase outreach, tax payer education through local cable and other outreach
- Integrate upcoming MS4 permitting process with goals of increasing stormwater infiltration across town

- Highlight importance of keeping local water local for better water quality and increased quantity
- Draw attention to the connection between the Three Mile River and the Taunton River through public education, special focus on middle school aged students
- Review existing bylaws in order to encourage conservation and water quality preservation, particularly through enhancing Zone II restrictions for fertilizer use in residential areas

Dams and Bridges

- Complete a baseline assessment of dams and bridges; fill in gaps of existing assessments done at different frequencies around town
- Create a more consistent methodology for monitoring and maintaining critical infrastructure
- Create evacuation plans for communities near dams considered vulnerable to hazards, informed by baseline assessment

Resources for Vulnerable Populations

- Assess baseline facilities of Housing Authority to serve the current population's needs and future capabilities (e.g. sufficient heating/cooling stations to meet demand during extreme temperatures, sufficient backup power for those facilities)
- Assess adequacy of space in Town Library and Council on Aging in shared building
- Supplement, where it is more economically efficient, AC/heating

Additional High Priority Actions

Mansfield's Forestry Management Plan can continue to develop in order to enhance the multiple benefits of tree cover while mitigating hazards. Mansfield's power grid and Electric Department are huge assets, and maintaining the resiliency of this system will require proactive vegetation management. Two high priority sites flagged for their strategic management needs are the Maple Street and Ware Street areas. Both have had red pines that were eliminated by blight. Both areas are nearby the Canoe River, with a section of Maple Street being a drinking water well field. Both areas pose fire risks with dead trees on site, which also slow the succession of other tree species while they're not managed.

Continue the Board of Health's monitoring and outreach work around fats, oils, and grease that cause sewer system back up. While new regulations effective January 1, 2019 are being enforced to manage contaminants that enter the sewer systems via local businesses, workshop participants recognize the importance of a long-term business and resident education campaign.

Supporting Mansfield Department of Public Works (DPW) with additional resources is critical for responding to natural hazards. Specifically, portable backup generators and portable pumps to respond to flooded buildings and buildings without power are needed. The DPW was repeatedly acknowledged during these Planning Workshops for its

contributions to Mansfield's overall resilience, and more support is needed to respond to increasingly frequent and severe hazards.

Outreach and education around vector-borne diseases carried by ticks and mosquitos are another high priority for Mansfield. The town uses Bristol County Mosquito Control Project's spraying services in the interest of public health. At the same time, impacts of insecticide spraying each season has adverse impacts on local water quality. Education to the public about staying safe from ticks and mosquitoes while minimizing spraying is critical for the community's long term health.

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*.

CRB Workshop Participants

Name	Affiliation
Laurie Anderson	Mansfield Electric
Shaun Burke	Mansfield Planning Dept
Chris Rostier	MFN Wastewater
Jennifer Davis	Mansfield Planning Dept
Sacha Zlatkova	Mansfield IT
Bob Blackman	Mansfield Building Dept
Xia Jin	MIS/GIS
Rick Alves	Town Engineer
Michael Healey	Conservation Commission
Neal Boldrighini	Fire Department
Katelyn Gonyer	Conservation Planner/Agent
Mark Cook	Department of Public Works - Highway
Brian Thibault	Mansfield Police Dept
Jay Barrows	MA House of Representatives

Citation

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Acknowledgements

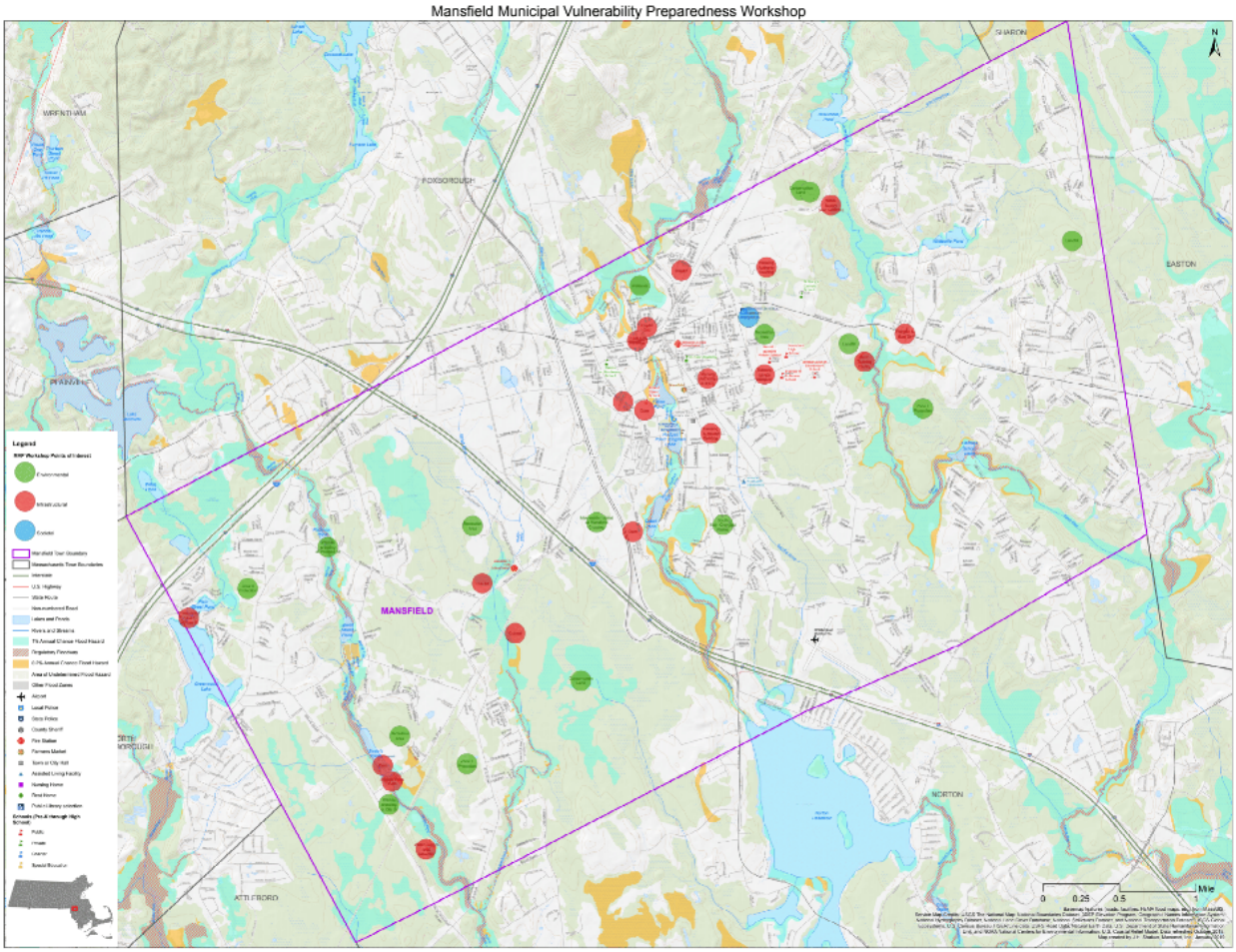
The Mansfield Core Team and Facilitation Team would like to thank the following for their contributions to the MVP Workshop process: Mansfield Town Hall staff for providing a wonderful meeting space, assistance with room set-up, and tech support; the Commonwealth of Massachusetts, EEA, Municipal Vulnerability 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 Mansfield and which hazard(s) they relate to. 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

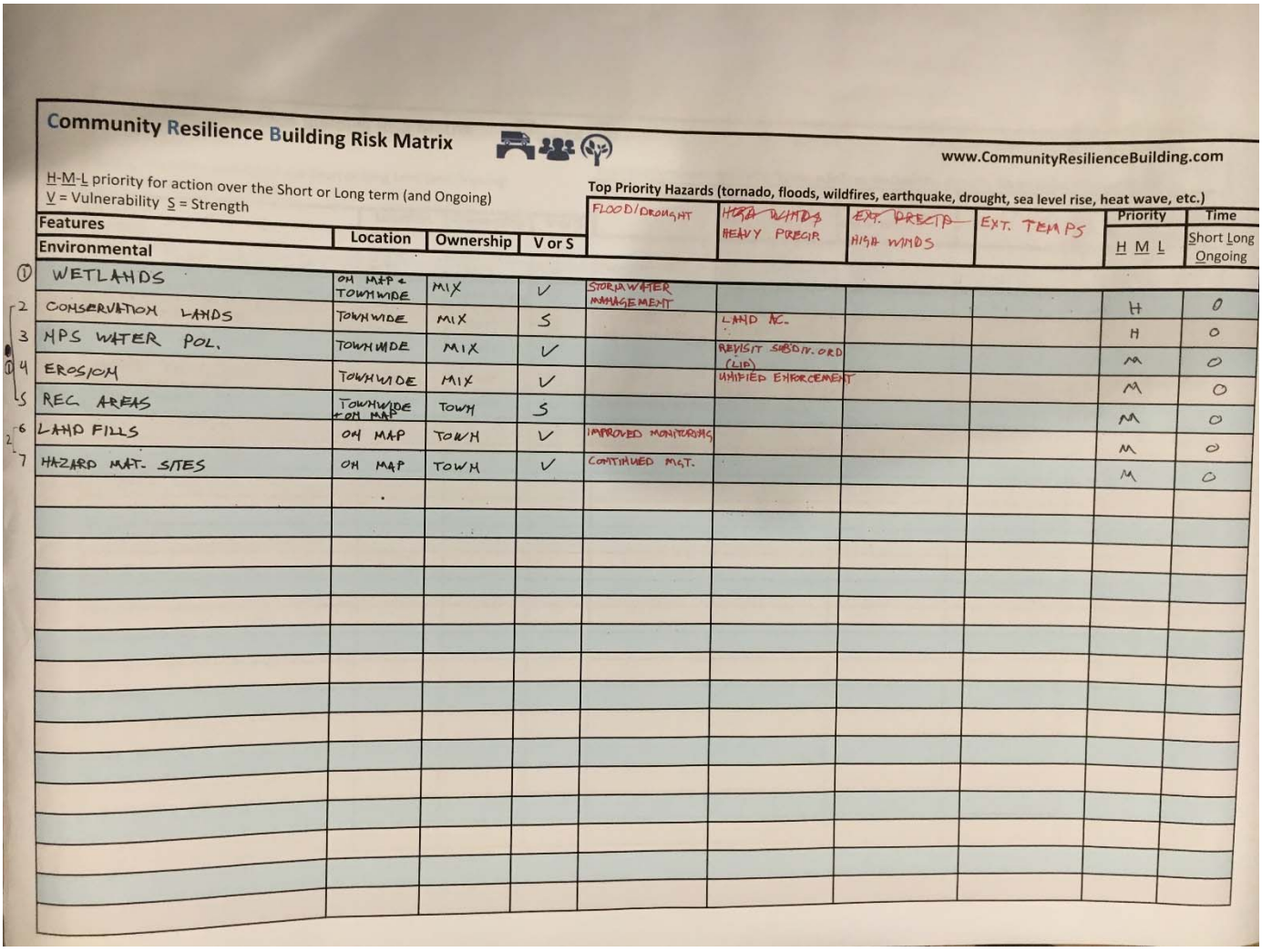
Map of Mansfield, with points of interest (POI) in different colors. During the workshop discussions, participants marked POI on a map to show the spatial distribution of features that are listed on each of their matrices (shown in *Appendix B* and *Appendix C).* Points marked with red dots indicate infrastructural features, green indicates environmental, and blue indicates societal, both working group points are combined on one map.



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 prioritization are written in red ink.

Group 1, Environmental



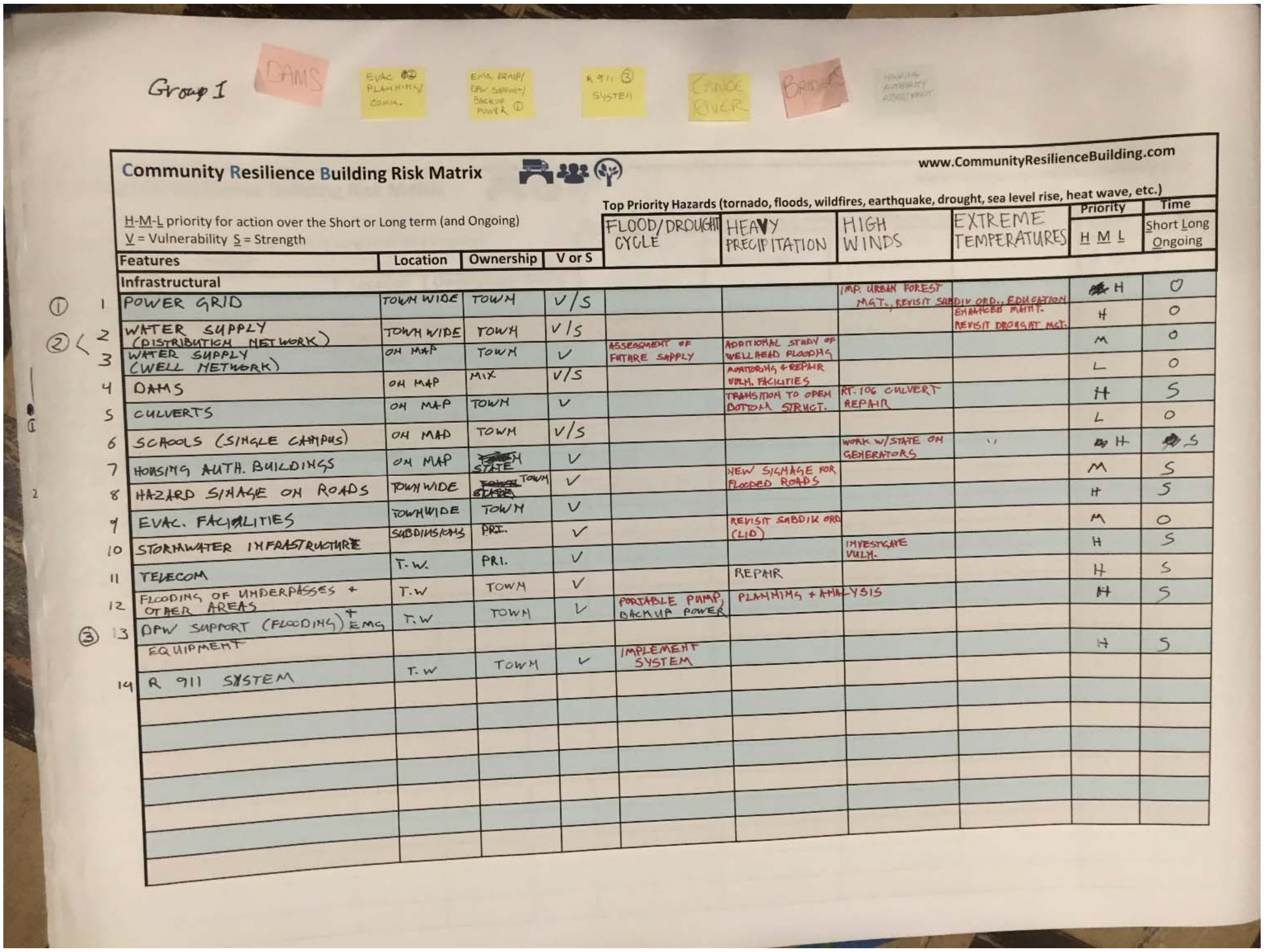
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

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	FLOOD/DROUGHT	~~HIGH WINDS~~ HEAVY PRECIP	~~EXT. PRECIP~~ HIGH WINDS	EXT. TEMPS	Priority H M L	Time Short Long Ongoing
Environmental									
1 WETLANDS	ON MAP & TOWNWIDE	MIX	V	STORMWATER MANAGEMENT				H	O
2 CONSERVATION LANDS	TOWNWIDE	MIX	S		LAND AC.			H	O
3 NPS WATER POL.	TOWNWIDE	MIX	V		REVISIT SUBDIV. ORD (LID)			M	O
4 EROSION	TOWNWIDE	MIX	V		UNIFIED ENFORCEMENT			M	O
5 REC. AREAS	TOWNWIDE +ON MAP	TOWN	S					M	O
6 LAND FILLS	ON MAP	TOWN	V	IMPROVED MONITORING				M	O
7 HAZARD MAT. SITES	ON MAP	TOWN	V	CONTINUED MGT.				M	O

Group 1, Infrastructural Features



Group 1

DAMS | EVAC ② PLANNING/COMM. | EMG. EQUIP/DPW SUPPORT/BACKUP POWER ① | R 911 ③ SYSTEM | CANOE RIVER | BRIDGES

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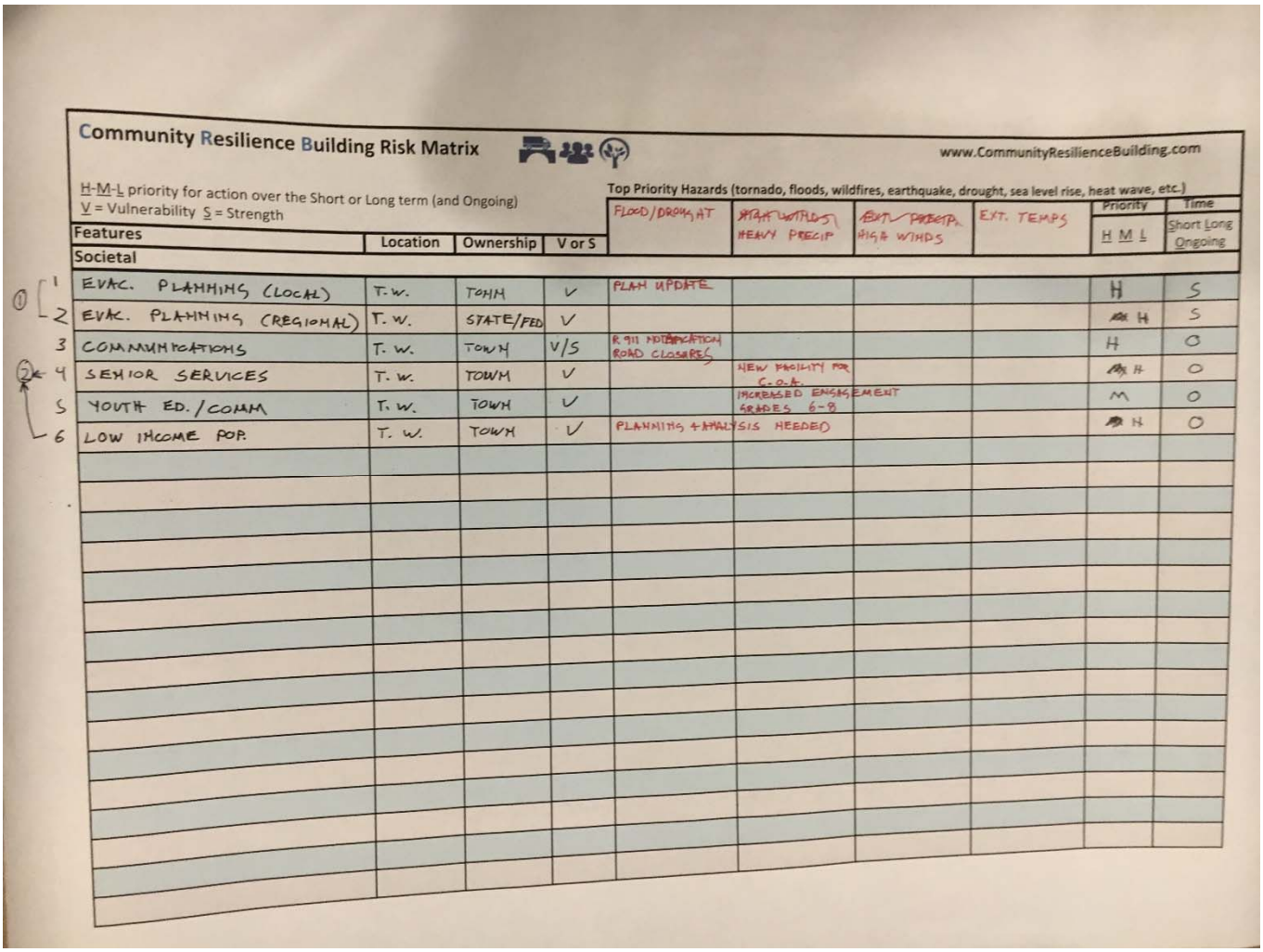
	Features	Location	Ownership	V or S	FLOOD/DROUGHT CYCLE	HEAVY PRECIPITATION	HIGH WINDS	EXTREME TEMPERATURES	Priority H M L	Time Short Long Ongoing
	Infrastructural									
1	POWER GRID	TOWN WIDE	TOWN	V/S			IMP. URBAN FOREST MGT., REVISIT SUBDIV ORD., EDUCATION	ENHANCED MAINT. REVISIT DROUGHT MGT.	H	O
2	WATER SUPPLY (DISTRIBUTION NETWORK)	TOWN WIDE	TOWN	V/S					H	O
3	WATER SUPPLY (WELL NETWORK)	ON MAP	TOWN	V	ASSESSMENT OF FUTURE SUPPLY	ADDITIONAL STUDY OF WELLHEAD FLOODING			M	O
4	DAMS	ON MAP	MIX	V/S		MONITORING & REPAIR VULN. FACILITIES			L	O
5	CULVERTS	ON MAP	TOWN	V		TRANSITION TO OPEN BOTTOM STRUCT.	RT. 106 CULVERT REPAIR		H	S
6	SCHOOLS (SINGLE CAMPUS)	ON MAP	TOWN	V/S			WORK W/STATE ON GENERATORS	''	L	O
7	HOUSING AUTH. BUILDINGS	ON MAP	STATE	V					H	S
8	HAZARD SIGNAGE ON ROADS	TOWN WIDE	TOWN	V		NEW SIGNAGE FOR FLOODED ROADS			M	S
9	EVAC. FACILITIES	TOWNWIDE	TOWN	V					H	S
10	STORMWATER INFRASTRUCTURE	SUBDIVISIONS	PRI.	V		REVISIT SUBDIV ORD (LID)	INVESTIGATE VULN.		M	O
11	TELECOM	T.W.	PRI.	V		REPAIR			H	S
12	FLOODING OF UNDERPASSES + OTHER AREAS	T.W	TOWN	V		PLANNING + ANALYSIS			H	S
13	DPW SUPPORT (FLOODING) + EMG EQUIPMENT	T.W	TOWN	V	PORTABLE PUMP, BACKUP POWER				H	S
14	R 911 SYSTEM	T.W	TOWN	V	IMPLEMENT SYSTEM				H	S

Group 1, Societal 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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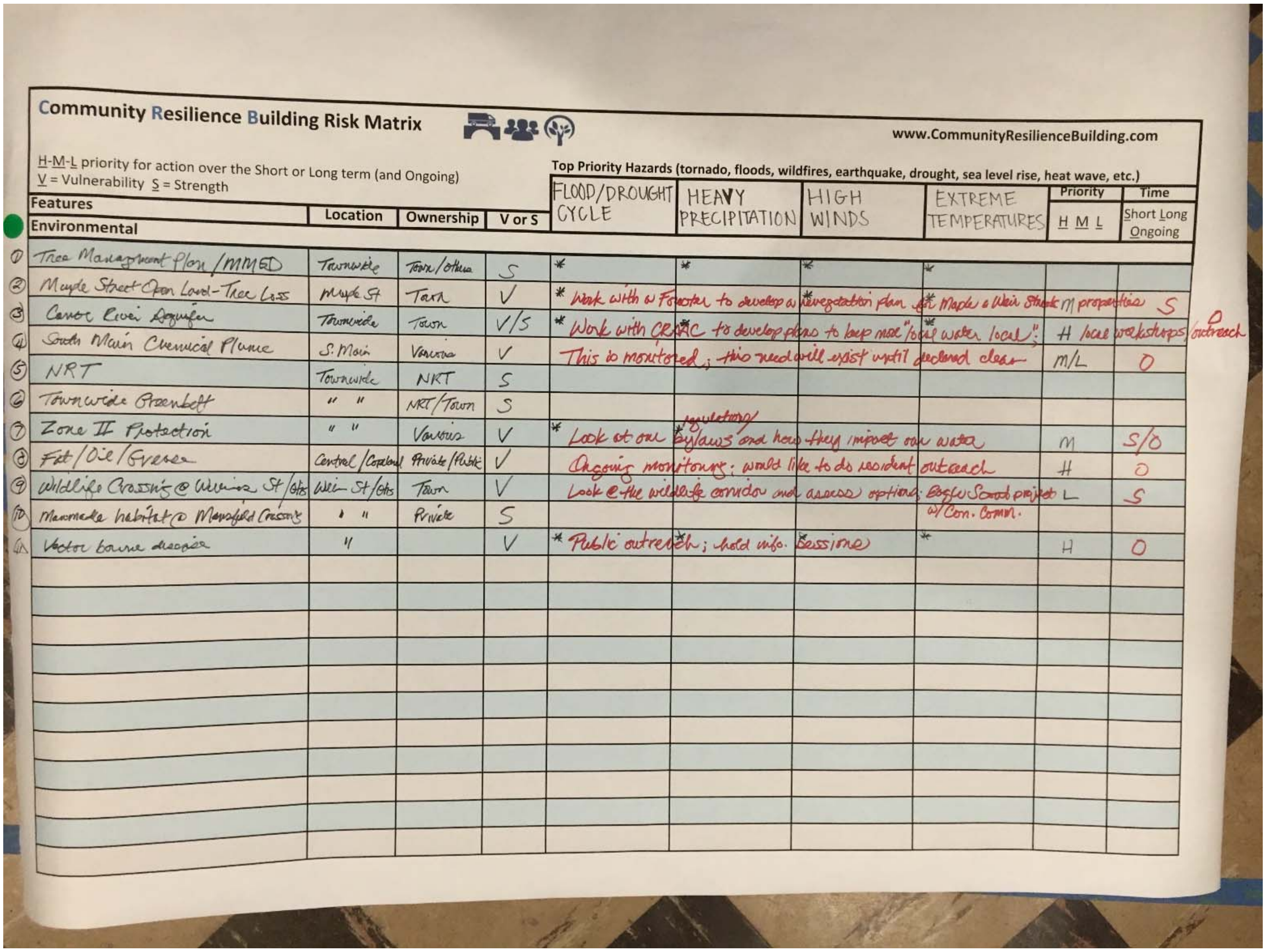
Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.)

	Features	Location	Ownership	V or S	FLOOD/DROUGHT	STORM WITH HEAVY PRECIP	EXT. PRECIP. HIGH WINDS	EXT. TEMPS	Priority H M L	Time Short Long Ongoing
	Societal									
① 1	EVAC. PLANNING (LOCAL)	T. W.	TOWN	V	PLAN UPDATE				H	S
① 2	EVAC. PLANNING (REGIONAL)	T. W.	STATE/FED	V					~~H~~ H	S
3	COMMUNICATIONS	T. W.	TOWN	V/S	R 911 NOTIFICATION ROAD CLOSURES				H	O
② 4	SENIOR SERVICES	T. W.	TOWN	V		NEW FACILITY FOR C.O.A.			~~H~~ H	O
5	YOUTH ED./COMM	T. W.	TOWN	V		INCREASED ENGAGEMENT GRADES 6-8			M	O
① 6	LOW INCOME POP.	T. W.	TOWN	V	PLANNING + ANALYSIS NEEDED				~~H~~ H	O

Group 2, Environmental Features



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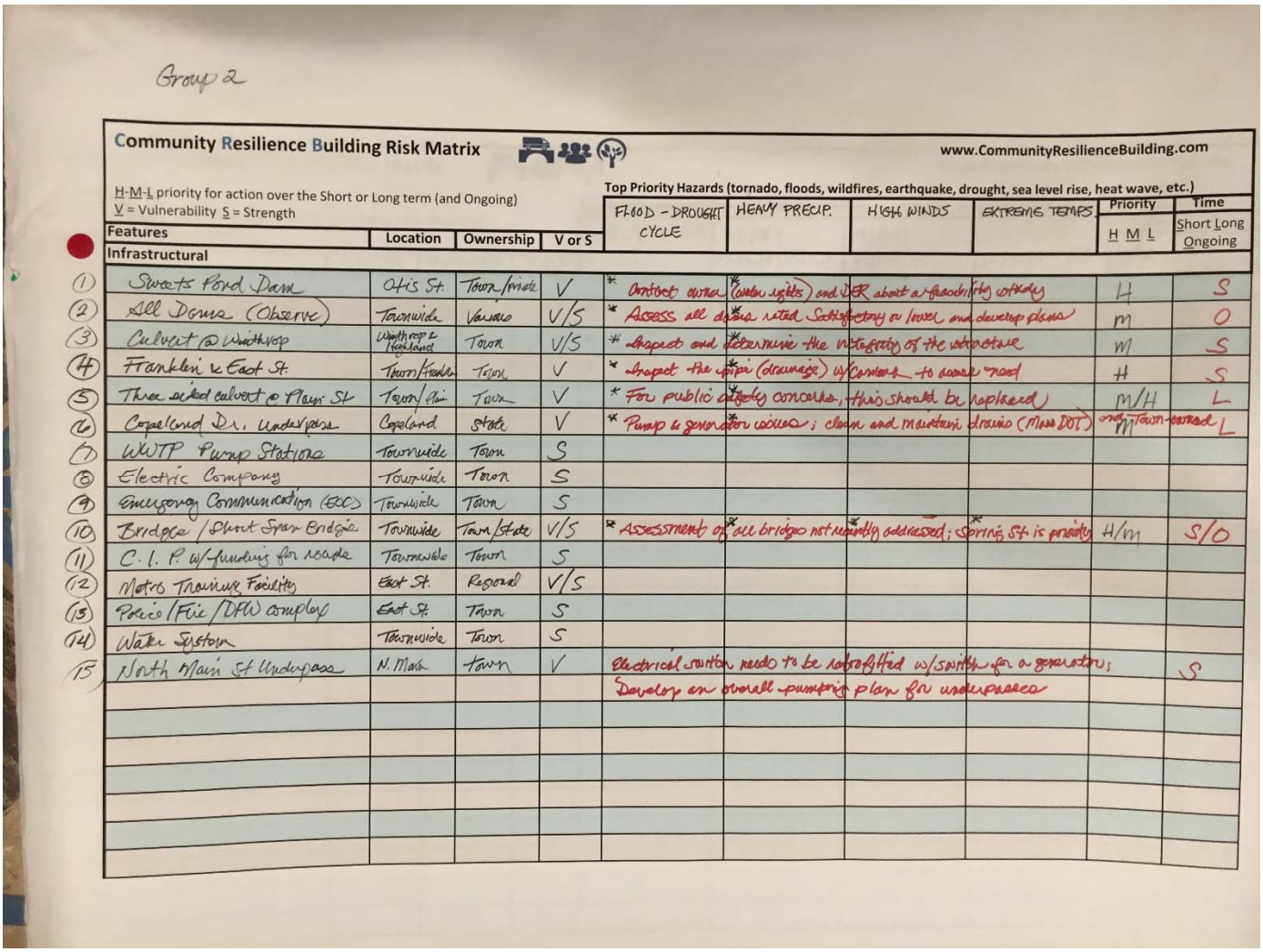
	Features: Environmental	Location	Ownership	V or S	FLOOD/DROUGHT CYCLE	HEAVY PRECIPITATION	HIGH WINDS	EXTREME TEMPERATURES	Priority H M L	Time Short Long Ongoing
1	Tree Management Plan / MMED	Townwide	Town/others	S	*	*	*	*		
2	Maple Street Open Land - Tree Loss	Maple St	Town	V	* Work with a Forester to develop a revegetation plan for Maple & Weir Streets properties	*		*	M	S
3	Canoe River Aquifer	Townwide	Town	V/S	* Work with CRWC to develop plans to keep more "local water local";	*		*	H local workshops/outreach	O
4	South Main Chemical Plume	S. Main	Various	V	This is monitored; this need will exist until declared clear				M/L	O
5	NRT	Townwide	NRT	S						
6	Townwide Greenbelt	" "	NRT/Town	S						
7	Zone II Protection	" "	Various	V	* Look at our regulatory/bylaws and how they impact our water	*			M	S/O
8	Fat/Oil/Grease	Central/[illegible]	Private/Public	V	Ongoing monitoring; would like to do resident outreach				H	O
9	Wildlife Crossing @ Weir St/Otis	Weir St/Otis	Town	V	Look @ the wildlife corridor and assess options; Eagle Scout project w/Con. Comm.				L	S
10	Mammals habitat @ Mansfield Crossing	" "	Private	S						
11	Vector borne disease	"		V	* Public outreach; hold info. sessions	*	*	*	H	O

Group 2, Infrastructural Features



Group 2

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

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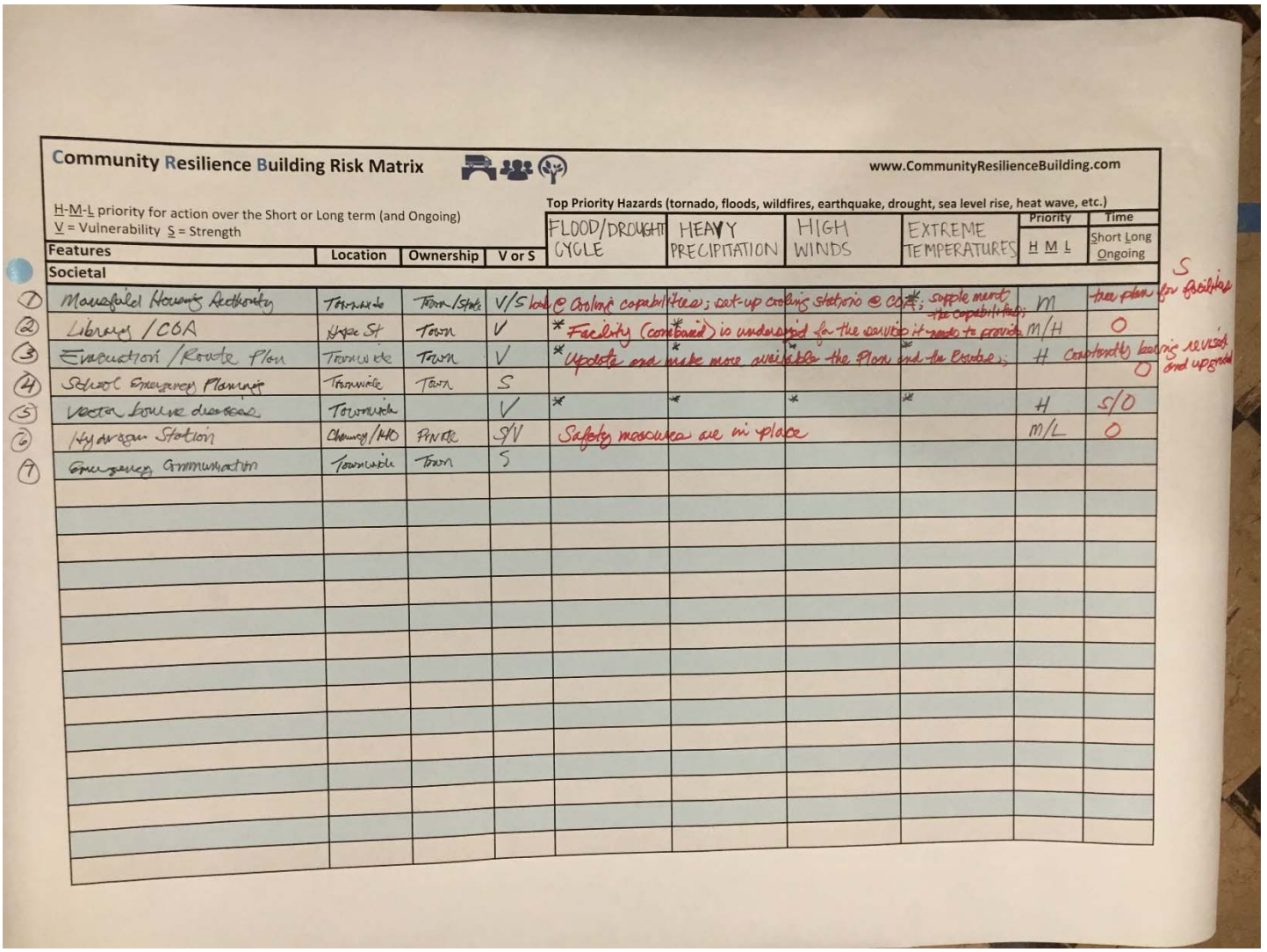
Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.)

	Features	Location	Ownership	V or S	FLOOD – DROUGHT CYCLE	HEAVY PRECIP.	HIGH WINDS	EXTREME TEMPS	Priority H M L	Time Short Long Ongoing
	Infrastructural									
(1)	Sweets Pond Dam	Otis St.	Town/Private	V	* Contact owner (water rights) and DER about safety of dam				H	S
(2)	All Dams (Observe)	Townwide	Various	V/S	* Assess all dams rated Satisfactory or lower and develop plans				M	O
(3)	Culvert @ Winthrop	Winthrop & Highland	Town	V/S	* Inspect and determine the integrity of the structure				M	S
(4)	Franklin & East St.	Town/Private	Town	V	* Inspect the repair (drainage) w/Conway to assess road				H	S
(5)	Three sided culvert @ Main St	Town/Pri	Town	V	* For public safety concerns, this should be replaced				M/H	L
(6)	Copeland Dr. Underpass	Copeland	State	V	* Pump & generator issues; clean and maintain drains (Mass DOT)				M	Town-owned L
(7)	WWTP Pump Stations	Townwide	Town	S						
(8)	Electric Company	Townwide	Town	S						
(9)	Emergency Communication (ECC)	Townwide	Town	S						
(10)	Bridges / Short Span Bridges	Townwide	Town/State	V/S	* Assessment of all bridges not regularly addressed; Spring St. is priority				H/M	S/O
(11)	C.I.P. w/funding for roads	Townwide	Town	S						
(12)	Metro Training Facility	East St.	Regional	V/S						
(13)	Police/Fire/DPW complex	East St.	Town	S						
(14)	Water System	Townwide	Town	S						
(15)	North Main St Underpass	N. Main	Town	V	Electrical switch needs to be retrofitted w/switch for a generator; Develop an overall pumping plan for underpasses					S

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.)

	Features	Location	Ownership	V or S	FLOOD/DROUGHT CYCLE	HEAVY PRECIPITATION	HIGH WINDS	EXTREME TEMPERATURES	Priority H M L	Time Short Long Ongoing
	Societal									
1	Mansfield Housing Authority	Townwide	Town/State	V/S	body @ Cooling capabilities; set-up cooling stations @ COA; supplement the capabilities;				M	then plan for facilities S
2	Library / COA	Hope St	Town	V	* Facility (combined) is underused for the services it needs to provide				M/H	O
3	Evacuation / Route Plan	Townwide	Town	V	* Update and make more available the Plan and the Routes;				H	Continually looking revised and upgraded O
4	School Emergency Planning	Townwide	Town	S						
5	Vector borne diseases	Townwide		V	*	*	*	*	H	S/O
6	Hydrogen Station	Chemung/NHO	Private	S/V	Safety measures are in place				M/L	O
7	Emergency Communication	Townwide	Town	S						

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**	**Flood/ Drought Cycle**	**Heavy Precip-itation**	**High Winds**	**Extreme Temp-eratures**	**Priority**	**Time**
Infrastructural								HML (high, med, low)	SLO (short, long, on-going)
Power Grid	Town-wide	Town	V/S	Improve urban forest management, revisit subdivision ordinances, Increase education to the public				H	O
Water Supply (Distribution Network)	Town-wide	Town	V/S	Enhanced management, revisit drought management				H	O
Water Supply (Well Network)	On Map	Town	V	Assessment of future supply	Additional study of wellhead flooding			M	O
Dams	On Map	Mixed	V/S	Monitoring + repair vulnerable facilities				L	O
Culverts	On Map	Town	V		Transition to open bottom structures	Route 106 Culvert repair		H	S
Schools (single campus)	On Map	Town	V/S					L	O
Housing authority buildings	On Map	State	V		Work with state on acquiring more generators			H	S
Hazard signage on roads	Town-wide	Town	V	New signage for flooded roads				M	S
Evacuation facilities	Town-wide	Town	V	Increase/maintain capacity and resiliency of existing facilities, designate additional sheltering facilities as necessary				H	S
Stormwater infrastructure	Subdiv-isions	Private	V	Revisit subdivision ordinance to incorporate low impact development				M	O

Telecommuni-cations	Town-wide	Private	V	Investigate vulnerabilities in telecommunications network				H	S
Flooding of underpass + other areas	Town-wide	Town	V	Repair infrastructure in flood prone areas				H	S
DPW Support (flooding) + EMT Equipment	Town-wide	Town	V	Provide portable pump and backup power sources	Complete additional planning + analysis			H	S
R 911 system	Town-wide	Town	V	Implement system				H	S
Environmental									
Wetlands	On Map + Town-wide	Mix	V	Stormwater Management				H	O
Conservation lands	Town-wide	Mix	S		Land Acquisition			H	O
Non-point Source Water Pollution	Town-wide	Mix	V		Revisit subdivision incorporate (Low Impact Development)			M	O
Erosion	Town-wide	Mix	V		Unified enforcement			M	O
Recreation areas	Town-wide + on map	Town	S					M	O
Landfills	On Map	Town	V	Improved monitoring				M	O
Hazardous Materials Sites	On Map	Town	V	Continued management				M	O
Societal									
Evacuation planning (local)	Town-wide	Town	V	Plan update				H	S
Evacuaction Planning (regional)	Town-wide	State/fed	V					H	S
Communi-cations	Town-wide	Town	V/S	R 911 notification road closures				H	O
Senior Services	Town-wide	Town	V		New facility for COA			H	O
Youth Education/Communication	Town-wide	Town	V		Increased engagement grades 6-8			M	O
Low income populations	Town-wide	Town	V	Planning + analysis needed				H	O

Digitized Feature Matrices, Group 2

Features	Location	Ownership	V or S	Flood - Drought Cycle	Heavy Precip	High Winds	Extreme Temps	Priority	Time
Infrastructural								HML (high, med, low)	SLO (short, long, ongoing)
Sweets Pond Dam	Otis St.	Town/Private	V	Contact owner (water rights) and DER about feasibility study				H	S
All dams (observe)	Town-wide	Various	V/S	Assess all dams rated satisfactory or lower and develop plans				M	O
Culvert @ Winthrop	Winthrop & Highland	Town	V/S	Inspect and determine the integrity of the structure				M	S
Culvert @ Franklin & East St.	East Street/Franklin Street	Town	V	For public safety concerns, this should be replaced				M/H	L
Three sided culvert @ Plain St.	Town/Plain Street	Town	V	Pump & generator issues; clean and maintain drains (MassDOT) and town-owned				M	L
Waste Water Treatment Plant Pump Stations	Town-wide	Town	S						
Electric Company	Town-wide	Town	S						
Emergency Communication (Emergency Operations Center)	Town-wide	Town	S						
Bridge/short span bridges	Town-wide	Town/state	V/S	Assessment of all bridges not recently addressed; Spring St is priority				H/M	S/O
Capital Investment Plan with funding for roads	Town-wide	Town	S						
Metro Training Facility	East St.	Regional	V/S						
Police/fire/DPW complex	East St.	Town	S						
Water system	Town-wide	Town	S						
North Main St. underpass	N. Main	Town	V	Electrical switch needs to be retrofitted w/ switch for a generator; Develop an overall pumping plan for underpass				M	S
Environmental									
Tree Management Plan/MMED	Town-wide	Town/other	S						
Maple Street Open Land - Tree Loss	Maple St	Town	V	Work with a forester to develop a vegetation plan for Maple & Weir Street properties				M	S
Canoe River Aquifer	Town-wide	Town	V/S	Work with CRAAC to develop plans to keep more "local water local;" local workshops/outreach				H	O

South Main Chemical Plume	South Main Street	Various	V	This is monitored; this need will exist until declared clear				M/L	O
Natural Resources Trust	Town-wide	NRT	S						
Townwide Greenbelt	Town-wide	NRT/Town	S						
Zone II Protection	Town-wide	Various	V	Look at our regulatory bylaws and how they impact our water				M	S/O
Fat/Oil/Grease	Central/Copeland	Private/Public	V	Ongoing monitoring; would like to do resident outreach				H	O
Wildlife crossing at Weir St/Otis	Ware St/Otis St	Town	V	Look at the wildlife corridor and assess options; build on Eagle Scout project with Conservation Commission				L	S
Manmade habitat at Mansfield Crossing	Mansfield Crossing	Private	S					L	O
Vector borne disease	Town-wide		V	Public outreach; hold info sessions				H	O
Societal									
Mansfield Housing Authority	Town-wide	Town/State	V/S	Examine cooling capabilities; set up cooling stations @ COA, supplement current capabilities; tree plan for facilities				M	S
Library/COA	Hope St.	Town	V	Facility (combined) is undersized for the services it needs to provide, expand to meet demand				M/H	O
Evacuation/Route Plan	Town-wide	Town	V	Update and make more available the Plan and the Route; constantly being revised and updated				H	O
School emergency planning	Town-wide	Town	S						
Vector borne diseases	Town-wide		V	*	*	*	*	H	S/O
Hydrogen station	Chauncy/Route 140	Private	S/V	Safety measures are in place, continue measures				M/L	O
Emergency communication	Townwide	Town	S						

Appendix D Climate Change Impacts – Observations and Projections in the Taunton Watershed