Marion, MA

Municipal Vulnerability Preparedness (MVP) Workshop
Summary of Findings

Submitted June 2018

Resilient Taunton Watershed Network (RTWN)

manomet
Charting Solutions. Grounded Science.

The Nature Conservancy

Mass Audubon
Shaping the Future of Your Community

SRPEDD

Overview

The Town of Marion is a coastal community that relies on its seaside nature for preservation of its community character as well as its economy. The town has been impacted by severe storms in the past several years and anticipates that sea level rise and future storms will require working together in both the short and long term to maintain the safety of its residents and infrastructure.

In October of 2017, the town completed a new Master Plan, which included for the first time a section on "Resilience to Climate Change." The three years of outreach that led to the plan highlighted the importance of nature-based solutions such as Low Impact Development (LID) and village-style, walkable, mixed use neighborhoods that preserve open space and benefit economic development and housing options for the community.

To help them consider and prioritize actions in town to be more climate resilient, the Town of Marion applied for and received a grant from the Massachusetts Executive Office of Energy and Environmental Affairs to become a Certified Municipal Vulnerability Preparedness (MVP) Community. As part of this process, the Town hired the Southeastern Regional Planning and Economic Development District (SRPEDD) as their provider to guide them through the Community Resilience Building (CRB) process. SRPEDD then engaged its partners in the Resilient Taunton Watershed Network (RTWN), including The Nature Conservancy (TNC), Manomet, the Massachusetts Audubon Society, and the Environmental the Environmental Protection

Protection Agency (EPA).. The CRB workshops took place on two consecutive Wednesdays, May 23 and 30, 2018 at the Marion Town Music Hall.

Stakeholders from Marion were present as workshop participants, including representatives from the Sippican Land Trust, Police Department, Fire

Department/EMTs, Planning Board, Building Department, Burr Brothers Boats, Coastal Zone Management, and other residents. Attendees were divided into two distinct groups that remained consistent in both workshops.

Each group identified social, environmental, and infrastructural features in Marion visually with a map (see Appendix A), and verbally on a matrix (see Appendix A). Each feature is related to hazards that the town is concerned about and whether it was considered vulnerable to those hazards or a strength that helps Marion mitigate them. Each item listed on a group's matrix is numbered (Appendix B), and corresponds to a numbered dot on the group's map. Three colors used on the map visually represent the different feature categories of infrastructural (red), environmental (green), and social (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.

Top Hazards

Participants discussed past hazards they've experienced, including:

- Coastal flooding
- Extreme winter storms
- Extreme heat and hurricanes in summer
- Stormwater management issues and flooding
- Septic leaching

Stakeholders agreed upon the current top four natural hazards to their community as:

- Sea Level Rise/Coastal Flooding
- Extreme Precipitation
- Wind
- Extreme Temperature

The harbor in Marion, just one area on the coast vulnerable to sea level rise

Sea level rise and coastal flooding can severely impact the town's built and natural infrastructure. Marion is in a low-lying, coastal watershed with much of its downtown located in a flood zone that is densely developed. Wastewater is handled, for about half of the town, through a municipal wastewater treatment plant, with pump stations located throughout the town, and almost all at low elevation. The remainder of the town's wastewater is managed by onsite septic systems. Saturated soil during coastal flooding

puts septic systems at risk of leaching, and contaminating the surrounding environment. Beaches and marshes act as barriers to the full impacts of storms, but many are shrinking in area. Erosion from storms is decreasing beach area, and sea level rise has a similar effect on salt marshes. Development along the shoreline prevents these ecosystems from migrating inland and adapting to these hazards, which in turn decreases their mitigation services to the town.

Extreme precipitation impacts public health and built infrastructure. Similar to concerns about coastal flooding, extreme precipitation also threatens the integrity of Marion's public wastewater system through inflow and infiltration, and potential inundation of the pump stations resulting in mechanical failure. Individual septic systems may also be functionally compromised by stormwater inundation. Extreme precipitation also impacts the ability of aging infrastructure (primarily culverts) to adequately convey stormwater; one resident cited 3.5 feet of water flooding the basement of town hall during Hurricane Bob. Flooding from stormwater, and coastal floods alike, have damaged private homes and municipal property. Many culverts in town do not have the capacity for the volume of water received currently and often get backed up (i.e. culvert at Hathaway Pond, culvert near Creek Road pump station). This will be especially difficult moving forward as more extreme and more frequent precipitation is expected.

Wind events have impacted Marion primarily by blowing trees down during storms (primarily pines). Old growth pine trees are a staple of the local landscape and surround many main roads. With shallow root systems that prefer wet soil, concentrated (heavier) foliage toward the top of the tree, and exposure to the full force of strong wind when at the edge of an open road, pines are especially vulnerable to damage. Evacuation routes for residents in the high coastal risk areas (Appendix A) and access paths for first responders to reach residents in need are limited during storms, and road obstruction by fallen trees contributes to the risk of isolation. One participant described being isolated on Dexter Street earlier this year, the result of a fallen tree, with limited communication during a storm. Another town official was trapped on Route 6 in northeast Marion during a storm, and cites Delano Road as another at-risk area. Participants were also concerned about the options for those on the east side of town, especially along Point Road which is the main path for evacuation in that area. Fallen trees also damage above-ground utility lines. Communications and internet access have been repeatedly compromised during storms, which increases risks to residents and first responders. Sections of town have experienced power outages spanning from one day to over one week in the aftermath of utility line damages.

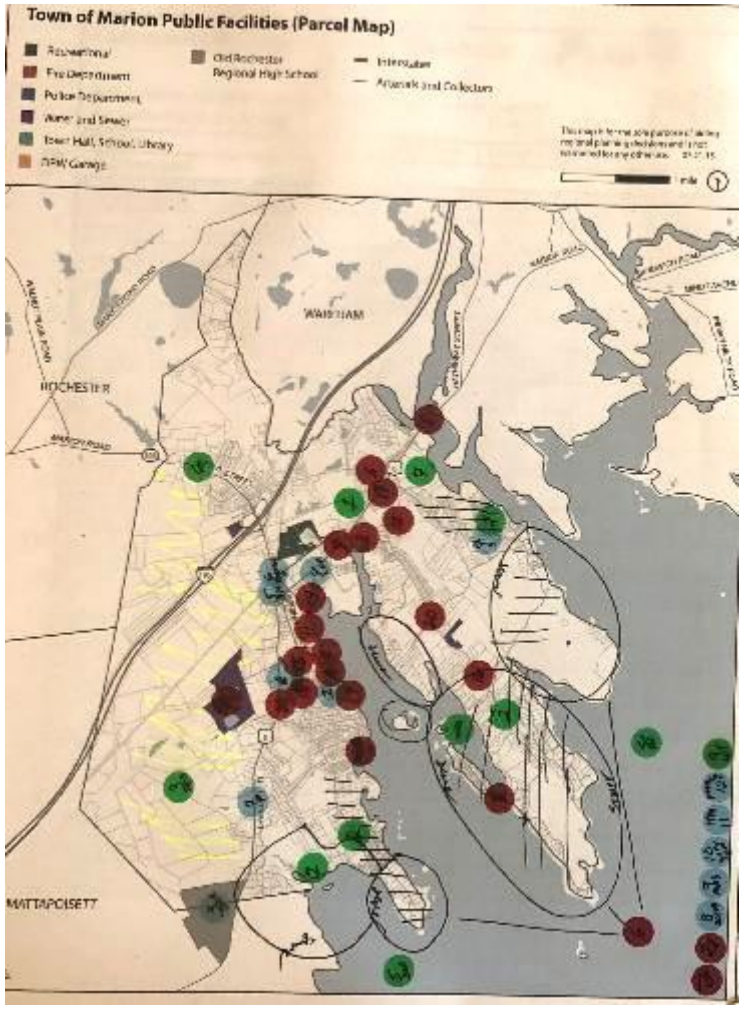
Extreme temperatures refer to higher temperatures on the hottest days of the year, and higher average temperatures overall. This increased heat has impacts on the health and safety of vulnerable populations (elderly, low income), and changes the life cycles of insect

Population is aging
36% of Marion is 65+

populations. Invasive insects like Gypsy Moths become more difficult to manage, because extreme weather can vary their time of hatching and reproducing. These insects can degrade forest health, making a greater number of trees weaker/more vulnerable to damage in storms. Tick populations have also been increasing, and hotter average temperatures with longer summer season means more opportunity for ticks to interact with people. Increasing temperature also creates a positive feedback for organisms that thrive in nitrified waterways, which contributes to water quality degradation.

Areas of Concern

Several locations in town were identified as vulnerable, many of which were unsurprisingly along the coast. Groups noted that at different times of the year, different locations were vulnerable to storms – nor'easters in the winter (NE Marion, especially West County Rd and Bullivant Farm Rd) and hurricanes or tropical storms in the summer (SW Marion, especially Route 6 and Aucoot Cove area). Flooding was identified as an issue throughout the town, with some specific estimates of frequency and susceptibility in Appendix A. Prioritization (high, medium, low) and time anticipated to take each action is indicated in the digitized matrices (Appendix C)



A marked up map from one group at the workshop noting several vulnerable locations along the coast. Red dots indicate infrastructural features, blue social, and green environmental.

Infrastructure

A number of infrastructural features – both green and grey – were highlighted in the workshops, including:

- Private septic systems are vulnerable due to the high water table
- Waterfront homes inundated by storms and coastal flooding
- Downtown buildings susceptible to sea level rise and strong storms
    - Municipal: Town House, Sippican School, Building Department, Music Hall
    - Taber Academy
- All pump stations are in flood zones and identified as vulnerable
    - Creek Road, Silver Shell Beach, Front Street, Bullivant Farm Road/River Road

- Public Schools, which act as shelters currently
- Marshes in the south west part of town are disappearing from sea level rise and storms
- Forested streets susceptible to blown down
    - Dexter Beach
    - Point Road
    - Converse Road

Planning for Communications, Sheltering, and Evacuating

Communications and evacuation plans were a top area of concern for the community. The generator at the Marion Department of Public Works (DPW) Repeater site was a specific site that was identified as being critical for communication. During storms January 2017-March 2018 and in previous years, the repeater became non-operational during emergencies where first responders needed to communicate. Radio communication is crucial for an efficient emergency response team,

As storms increase, evacuations may also become more common. Participants discussed the need to create an evacuation plan, which was not addressed in Master Plan. This can build from the existing emergency response plan. Specifically, the Town of Marion would like to:

- Plan for when trees obscure roads
- Increase capacity via staff and/or volunteers at shelters
- Ensure backup power at shelters
- Increase number of shelters available to residents

Similarly, those that shelter in place will also need accommodations. The Town would like to increase:

- Ability of shelters to accommodate residents for:
    - The amount of time shelter is needed – more than 24 hours
    - The volume of residents who need shelter – in Marion and regionally
- Accessibility of shelters to vulnerable populations, especially those in
    - Marconi Village
    - Little Neck Village
    - Delano

Finally, stakeholders noted that an updated Hazard Mitigation Plan is critical for both emergency responders and residents to accompany the Master Plan and their MVP program.

Current Strengths and Assets:

The community's willingness to educate themselves and have these types of planning dialogues is a sure strength in Marion. Their recently completed Master Plan and the current work to update their Open Space plan are also strengths. Willingness to initiate/engage in regional planning is also a strength.

The town's land use and number of local environmental resources provide another strength to the community. Currently, 49% of the town's acreage is protected (of which 16% is afforded temporary protection), most of it being located in western Marion. There are a number of marshes that provide mitigation from storm impacts, such as Aucoot Cove, which may be able to offer room for marsh migration as well. Recent projects such as Bud Island restoration and Washburn Park/Beaton Bog provide ecological services that may serve as models for future nature-based solutions that offer resilience for all four hazards identified. Additionally, Marion already has a Stewards of Community Open Space Committee (SoCOS), which is actively creating an education plan to engage residents on the multiple benefits of open space, future planning for resilience; interdepartmental partnership at the local level, oversees open space entities to coordinate conservation efforts.

Town of Marion: 9,105 acres
Protected Land: 4,477 acres
49% of the town

Other strengths range from new infrastructure to social capacity and volunteer engagement with opportunities for even more improvement:

- New fire station that increases emergency response capacity
- Medical Reserve Corps (MRC) volunteer in the evacuation shelter
- Stone Estates area, Kittansett Point offer marshland potential and the ecosystem services that could be maintained if the adverse impacts of hazards on this space is mitigated
- Waterfront infrastructure/businesses provide an opportunity to pool resources to study the impacts of sea level rise in that part of town
- Spring Street Town House, Schools, and Library are social and economic assets to the town (but are also in an area vulnerable to extreme storm or stormwater flooding)
- Sippican School is used as a short term shelter as recently as March 2018 and is currently run by volunteers from MRC

- Young people from Mattapoisett, Marion, and Rochester build relationships through attending Old Rochester Regional High School together; this provides an opportunity to use physical and social infrastructure as part of a long term shelter plan to benefit all three towns

Top Recommendations to Improve Resilience

Each of the two small groups identified their top 3-4 actions with their facilitator, then those were discussed as a whole group. Interestingly, both groups had nearly identical top three priorities, with one group adding the Forest Management Plan, which the other group had also discussed and wanted to include in their top recommended actions:

Enhance Communication systems

- Purchase generator to install at DPW Repeater site
- Hire an Information Technology support person either full or part time to manage more robust tech/communication systems
- Invest in an alert system for residents that can call and/or text residents of any town-wide happening, including road closures, detours, evacuation routes, etc.
- Purchase and install battery backup at Point Road Repeater Site

Elevate Pump Stations

- Assess existing pump stations for elevation and create a plan to elevate to make public water system more resilient to hazards like sea level rise and flooding

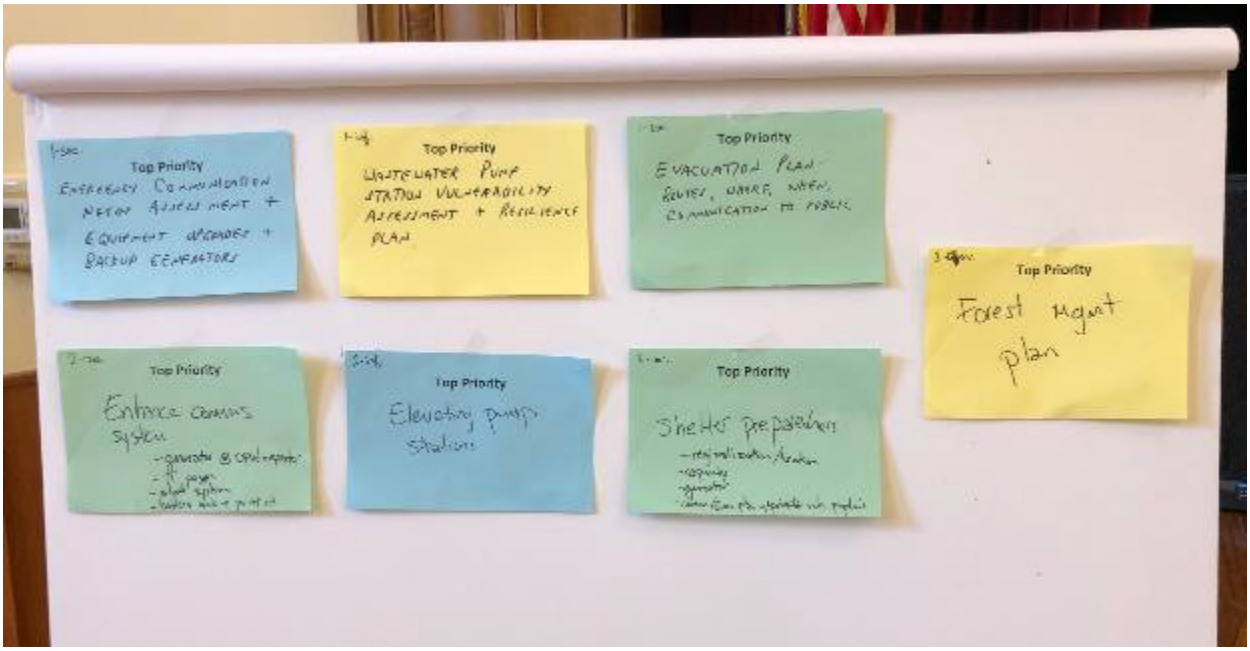
Ensure Shelter Preparedness and Evacuation Planning

- Plan that identifies where and when to evacuate and where and when to shelter
- Work with regional partners to create sheltering plan that addresses capacity and needs currently and into future
- Ensure shelters have generators for heating/cooling and charging necessary electronics
- Create communication and evacuation plan with private vulnerable group homes to understand evacuation and/or sheltering measures

Create Forest Management Plan

- Directly ties into evacuation and shelter access related to roads that experience tree blowdown

- Plan that prioritizes these roads to prevent damage from wind events while making land and soil more resilient



Top row of priorities are from group 1; the bottom row and to the right are from group 2. The priorities are surprisingly aligned.

In making these recommendations, this cohort was unique in its ability to cover almost all of the same points while in two separate groups for discussion. There was a remarkable amount of unity in perspective, and knowledge of environmental systems/vulnerabilities shared by participants, that seemed to go beyond their individual jobs and experiences. By the end of the workshops, both groups agreed on four priority next steps (above).

CRB Workshop Participants

Norman Hills, Marion Planning Board

Brian Jackvony, Marion Fire/EMS

Scott Shippey, Building Dept

Eileen Marum, Marion Planning Board

James Arruda, Resident

Jim Bride, Sippican Land Trust

Jean Mahor, Resident

Paul Dawson, Resident/Town Administrator

Tucker Buur, Burr Brothers Boats

Jennifer Francis, EMC

Gregg Nourjian, Resident

Gil Hilario, Marion Planning Board/Town Planner

Dave Janik, MA Coastal Zone Management/Resident

Isaac Perry, Marion Harbormaster

David Bramley, Resident

Shaun Coronier, Marion Town Music Hall

John Henry, DPW Superintendent

Citation

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

CRB Workshop Project Team

Town of Marion, Norm Hills, Board of Selectmen/Core Team Member. Project Coordinator

Town of Marion, Isaac Perry, Harbor Master/Core Team Member

Town of Marion, John B. Garcia, Chief of Police/Core Team Member

Town of Marion, Brian Jackvony, Fire Chief/Core Team Member

Town of Marion, John Henry, DPW Superintendent/Core Team Member

Town of Marion, Scott Shippey, Building Commissioner/Core Team Member

SRPEDD, Bill Napolitano, Facilitator

Mass Audubon, Stefanie Covino, Facilitator

The Nature Conservancy, Sara Burns, Scribe

EPA, Trish Garrigan, Scribe

Mass Audubon, Daniel Brown, Scribe

Mass Audubon, Ariel Maiorano, Scribe

Acknowledgements

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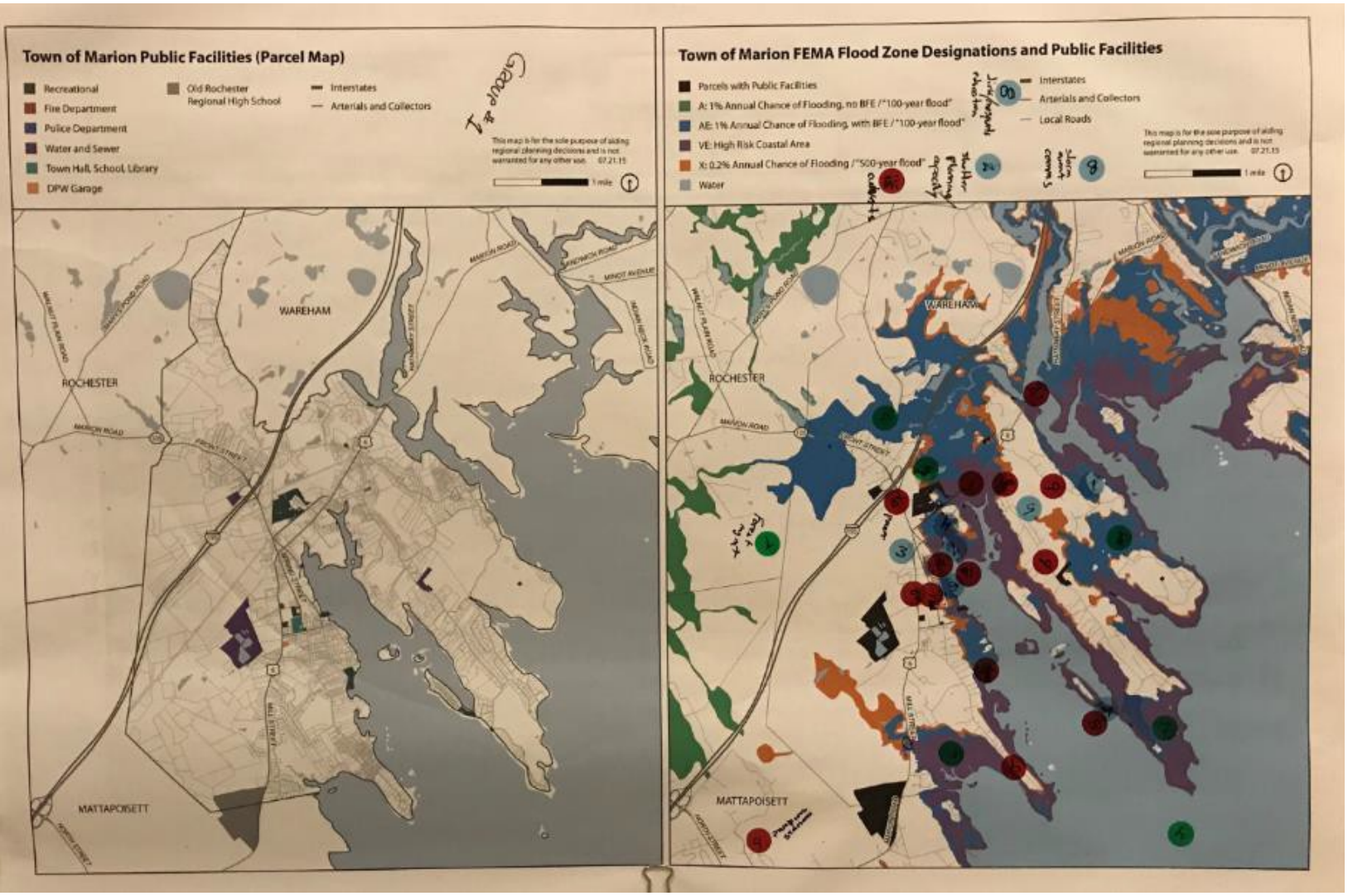
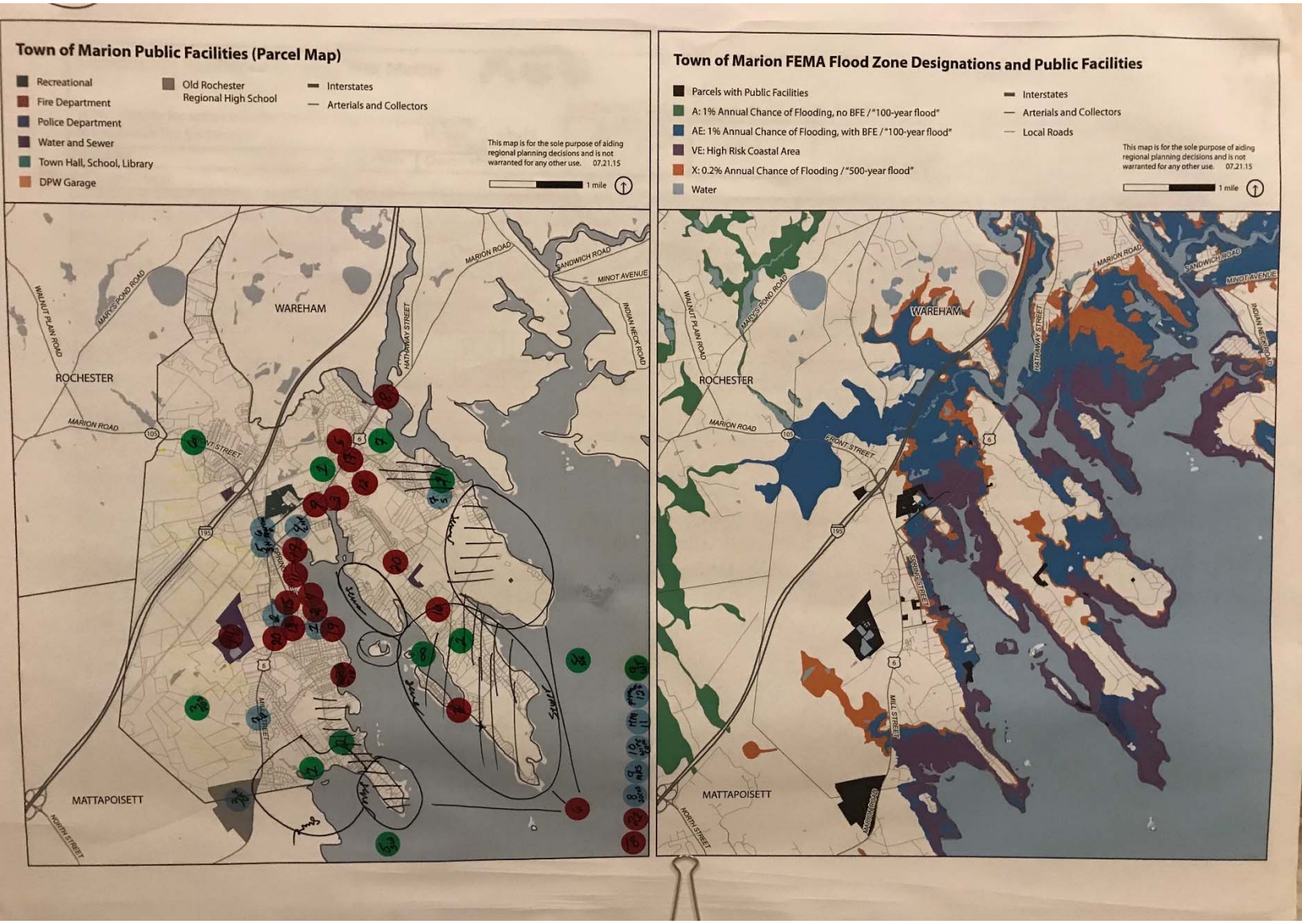
Appendix A: Group 1 Map, pulled from the current Master Space Plan, marked with corresponding features numbered on matrices

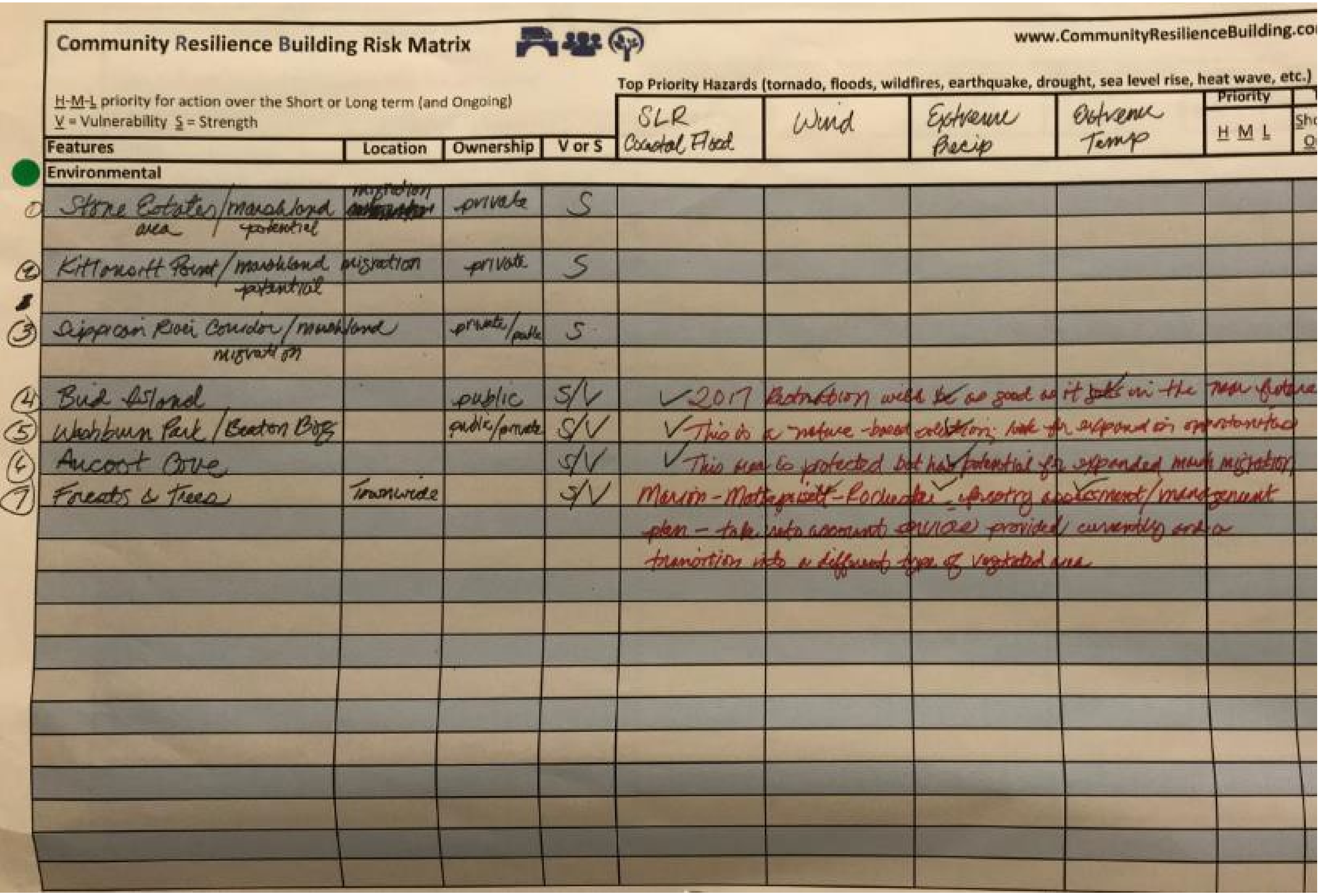


Group 2 Map, pulled from the current Master Plan, marked with corresponding features numbered on matrices



Appendix B: Group CRB Matrices

Group 1 Environmental Feature Matrix



Community Resilience Building Risk Matrix

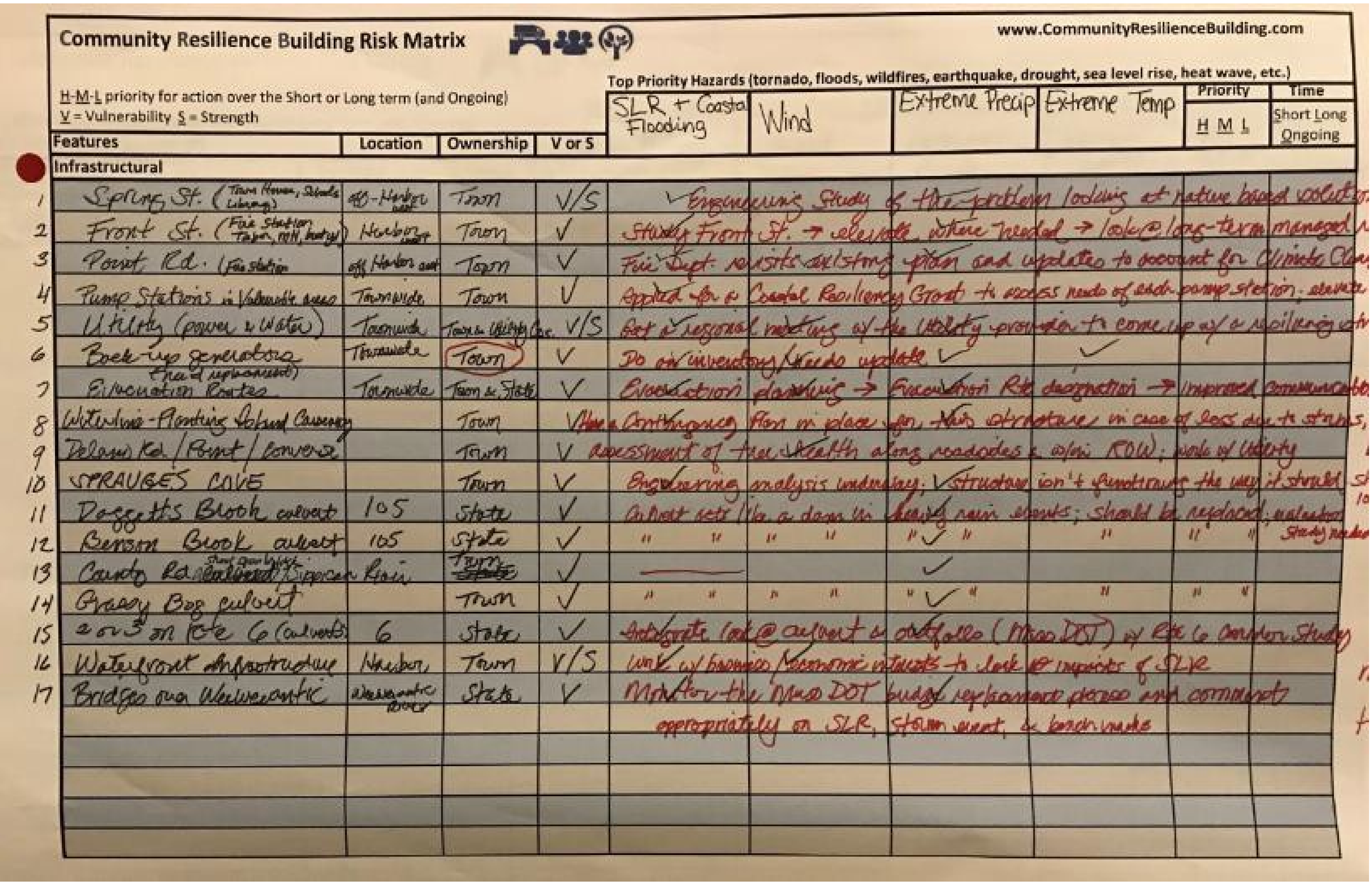
www.CommunityResilienceBuilding.co

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	SLR Coastal Flood	Wind	Extreme Precip	Extreme Temp	Priority H M L
	Environmental								
①	Stone Estates/marshland area / potential	migration	private	S					
②	Kittansett Point/marshland potential	migration	private	S					
③	Sippican River Corridor/marshland migration		private/public	S					
④	Bird Island		public	S/V	✓2017 Restoration will be as good as it gets in the near future				
⑤	Washburn Park/Benson Bog		public/private	S/V	✓This is a nature-based solution; look for expansion opportunities				
⑥	Aucoot Cove			S/V	✓This area is protected but has potential for expanded marsh migration				
⑦	Forests & Trees	Townwide		S/V	Marion-Mattapoisett-Rochester – forestry assessment/management plan – take into account services provided, currently and as a transition into a different type of vegetated area				

Group 1 Infrastructure Feature Matrix



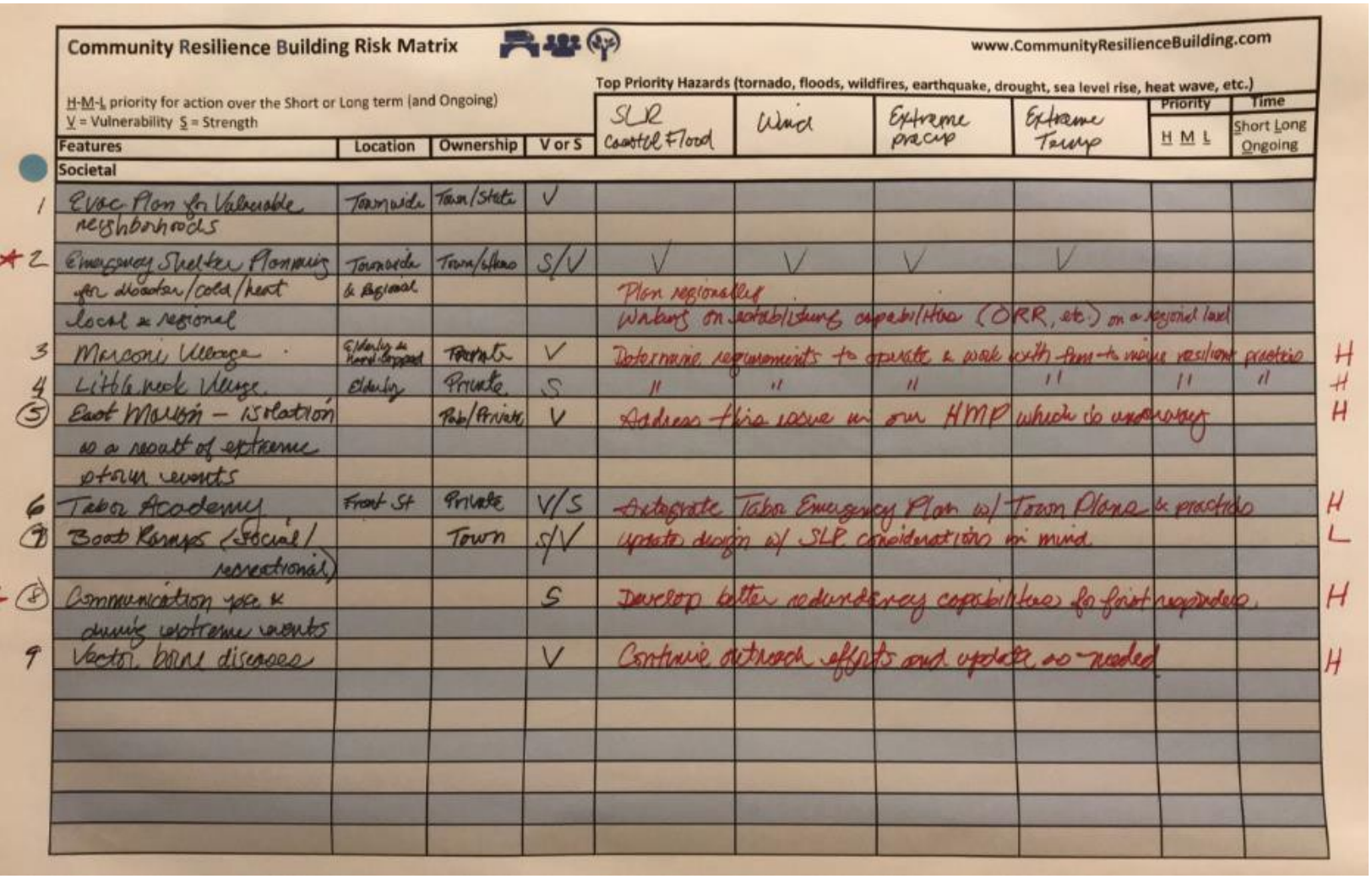
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

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	SLR + Coastal Flooding	Wind	Extreme Precip	Extreme Temp	Priority H M L	Time Short Long Ongoing
Infrastructural									
1 Spring St. (Town House, Schools, Library)	off-Harbor	Town	V/S	✓ Engineering Study of the problem looking at nature based solutions					
2 Front St. (Fire Station, Tabor, [illegible])	Harbor	Town	V	Study Front St. → elevate where needed → look @ long-term managed [illegible]					
3 Point Rd. (Fire station	off Harbor	Town	V	Fire Dept. revisit existing plan and update to account for Climate Change					
4 Pump Stations in Vulnerable areas	Townwide	Town	V	Applied for a Coastal Resiliency Grant to assess needs of each pump station; elevate					
5 Utility (power & Water)	Townwide	Town & Utility Co.	V/S	Set a regional meeting w/ the Utility providers to come up w/ a resiliency [illegible]					
6 Back-up generators (fixed & [illegible])	Townwide	Town	V	Do an inventory/needs update ✓			✓		
7 Evacuation Routes	Townwide	Town & State	V	Evacuation planning → Evacuation Rte designation → improved communication					
8 Wickets-Planting Island Causeway		Town	V	Have a Contingency Plan in place for this structure in case of loss due to storms,					
9 Delano Rd. / Point / Converse		Town	V	Assessment of tree health along roadsides & w/in ROW; role of Utility					
10 SPRAGUES COVE		Town	V	Engineering analysis underway; structure isn't functioning the way it should					
11 Doggetts Brook culvert	105	State	V	Culvert acts like a dam in heavy rain events; should be replaced; evaluation					
12 Benson Brook culvert	105	State	V	" "	" "	" ✓ "		"	" " Study needed
13 County Rd. [illegible] Sippican River		Town ~~State~~	V	———		✓			
14 Grassy Bog culvert		Town	V	" "	" "	" ✓ "		"	" "
15 2 or 3 on Rte 6 (culverts)	6	State	V	Integrate look @ culvert & outfalls (Mass DOT) w/ Rte 6 Corridor Study					
16 Waterfront Infrastructure	Harbor	Town	V/S	Work w/ business/economic interests to look @ impacts of SLR					
17 Bridges over Weweantic	Weweantic River	State	V	Monitor the Mass DOT bridge replacement process and comment appropriately on SLR, storm event, & bench marks					

Group 1 Social Feature Matrix



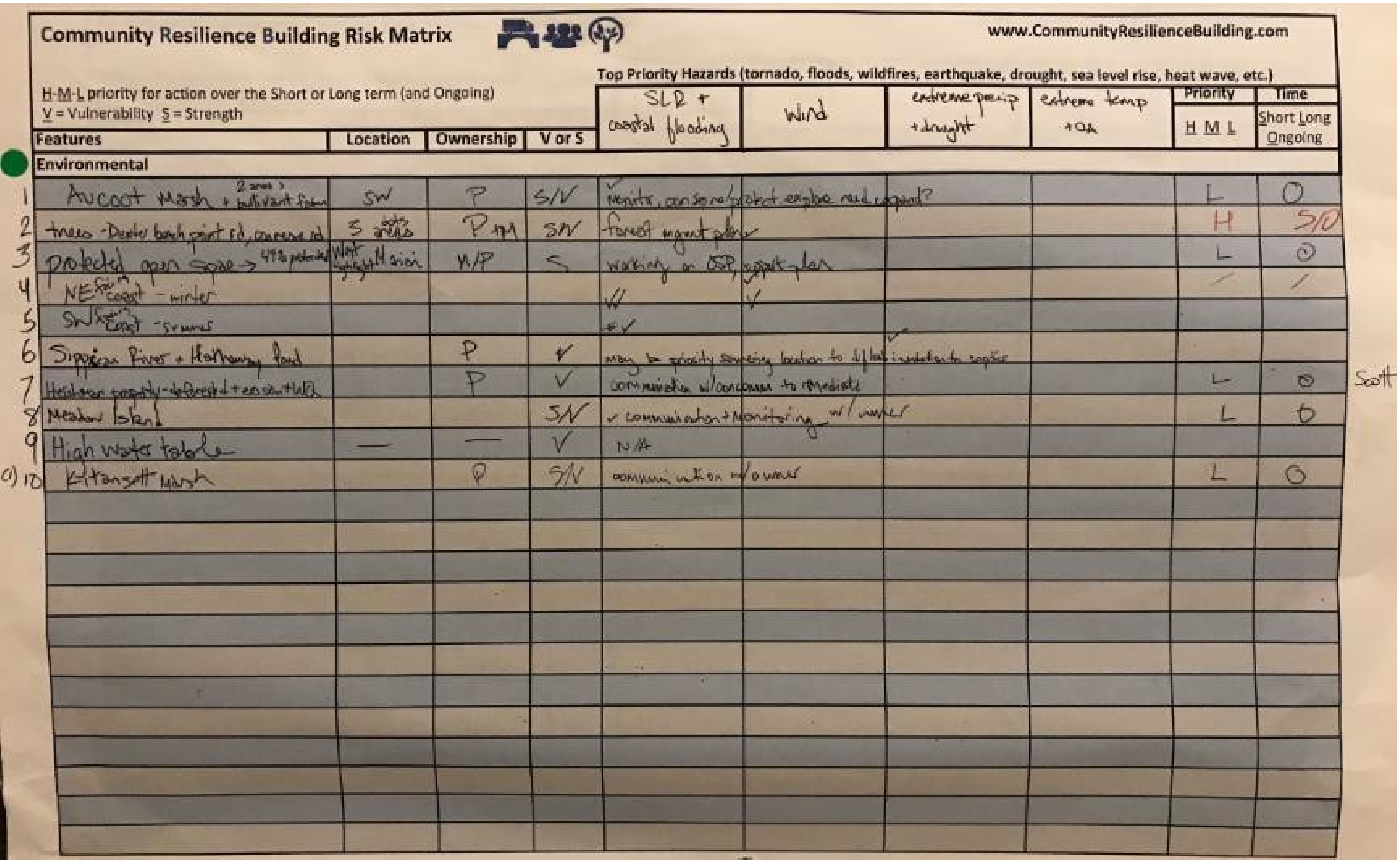
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

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	SLR coastal Flood	Wind	Extreme precip	Extreme Temp	Priority H M L	Time Short Long Ongoing
	Societal									
1	Evac Plan for Vulnerable neighborhoods	Townwide	Town/State	V						
*2	Emergency Shelter Planning for disaster/cold/heat local & regional	Townwide & Regional	Town/others	S/V	V	V	V	V		
					Plan regionally					
					Working on establishing capabilities (ORR, etc) on a regional level					
3	Marconi Village	Elderly & Flood Exposed	Private	V	Determine requirements to operate & work with Town to improve resilient practice					H
4	Little neck Village	Elderly	Private	S	"	"	"	"	"	H
(5)	East Marion – isolation as a result of extreme storm events		Pub/Private	V	Address this issue in our HMP which is underway					H
6	Tabor Academy	Front St	Private	V/S	Integrate Tabor Emergency Plan w/ Town Plans & practice					H
(7)	Boat Ramps (Social/ recreational)		Town	S/V	Update design w/ SLR considerations in mind					L
(8)	Communication pre & during extreme events			S	Develop better redundancy capabilities for first responders.					H
9	Vector borne diseases			V	Continue outreach efforts and update as needed					H

Group 2 Environmental Feature Matrix



Community Resilience Building Risk Matrix

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H-M-L priority for action over the Short or Long term (and Ongoing)
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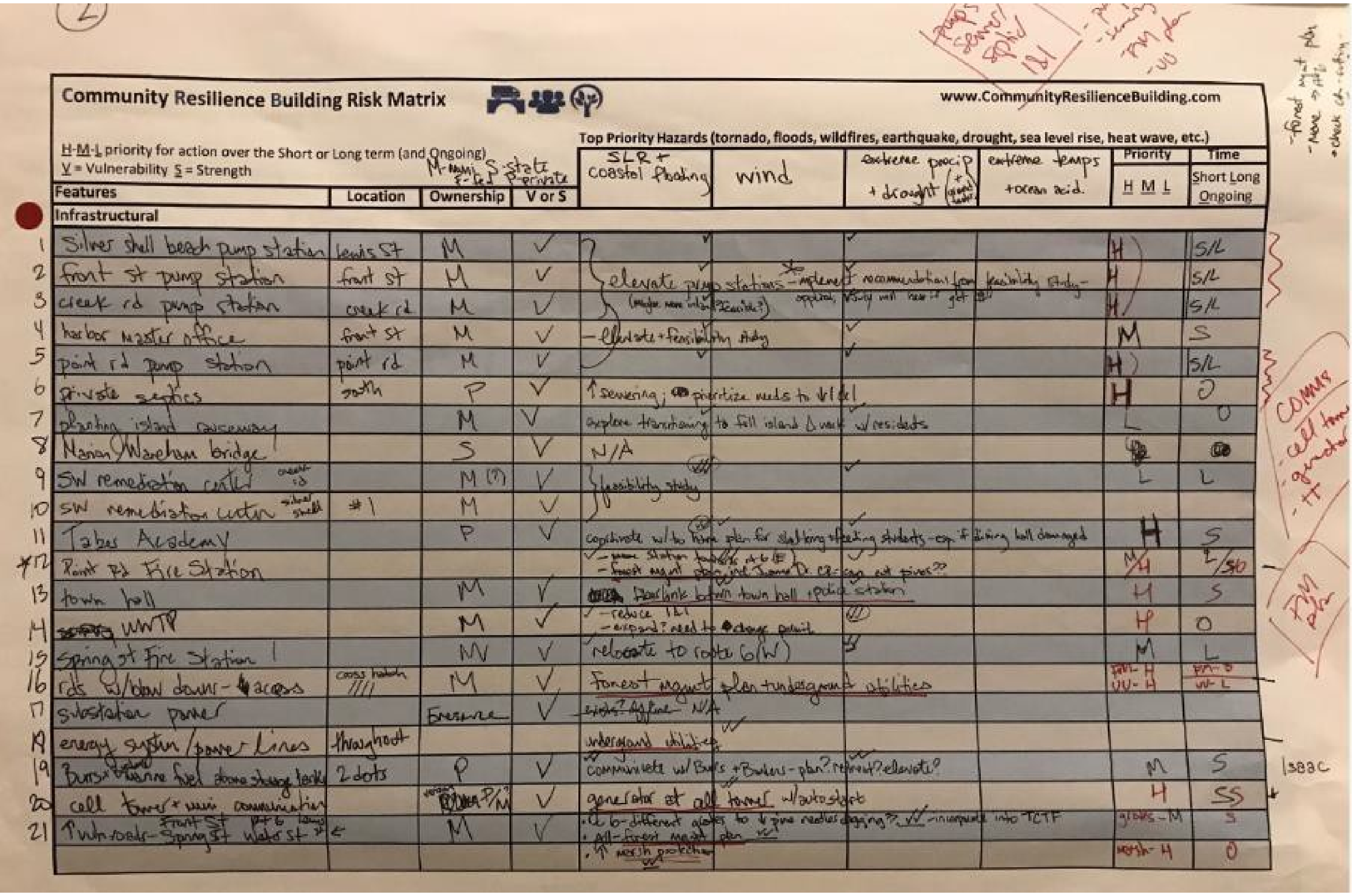
	Features	Location	Ownership	V or S	Top Priority Hazards (tornado, floods, wildfires, earthquake, drought, sea level rise, heat wave, etc.): SLR + coastal flooding	Wind	extreme precip + drought	extreme temp + OA	Priority H M L	Time Short Long Ongoing
	Environmental									
1	Aucoot Marsh + (2 areas) [illegible]	SW	P	S/V	✓ monitor, conserve/protect [illegible]				L	O
2	trees - Dexter beach point rd, [illegible]	S [illegible] areas	P [illegible]	S/V	forest mgmt plan ✓				H	S/O
3	protected open space → 49% protected	[illegible]	W/P	S	working on OSP, support plan				L	O
4	NE Storm coast - winter				✓✓	✓			/	/
5	SW Storm Coast - summer				*✓					
6	Sippican River + Hathaway Pond		P	V	may be priority [illegible] location to [illegible]		✓ [illegible]			
7	[illegible] property - deforested + erosion + [illegible]		P	V	communication w/ concerns to remediate				L	O
8	Meadow Island			S/V	✓ communication + Monitoring w/ owner				L	O
9	High water table	—	—	V	N/A					
(?) 10	Kittansett Marsh		P	S/V	communication w/ owner				L	O

Scott

Group 2 Infrastructure Feature Matrix



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V = Vulnerability S = Strength
M-muni S-state F-fed P-private

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

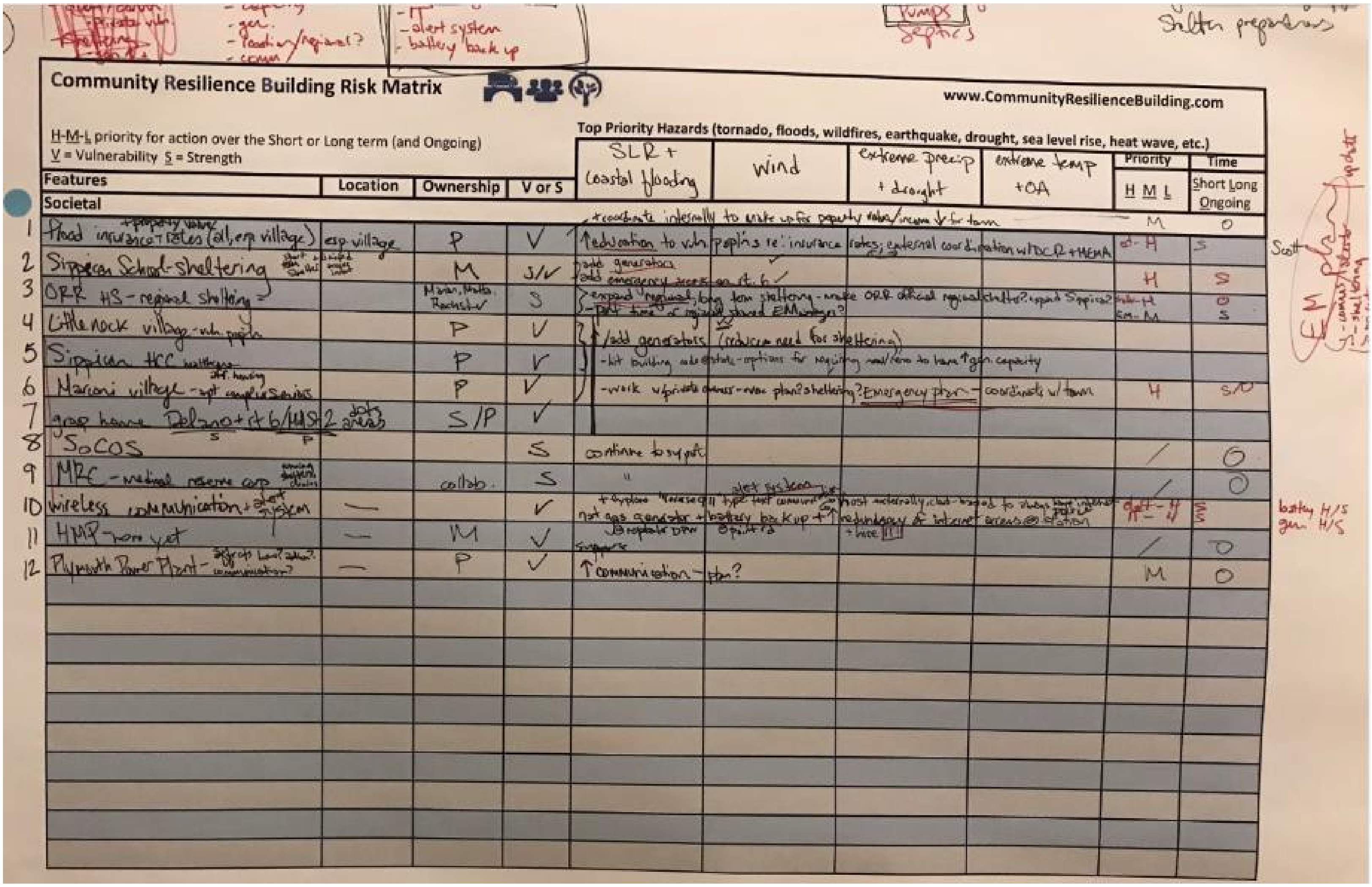
#	Features	Location	Ownership	V or S	SLR + coastal flooding	wind	extreme precip + drought	extreme temps + ocean acid.	Priority H M L	Time Short Long Ongoing
	Infrastructural									
1	Silver shell beach pump station	lewis St	M	V	✓		✓		H	S/L
2	front st pump station	front st	M	V	elevate pump stations – implement recommendation from feasibility study –				H	S/L
3	creek rd pump station	creek rd	M	V	(maybe more inland?)		applied,		H	S/L
4	harbor master office	front st	M	V	– elevate + feasibility study		✓		M	S
5	point rd pump station	point rd	M	V			✓		H	S/L
6	private septics	south	P	V	↑ sewering; prioritize needs to …				H	O
7	planting island causeway		M	V	explore transitioning to fill island & work w/ residents				L	O
8	Marion/Wareham bridge		S	V	N/A					
9	SW remediation center (creek rd)		M (?)	V	feasibility study		✓		L	L
10	SW remediation center (silver shell)	#1	M	V						
11	Tabor Academy		P	V	coordinate w/ to form plan for sheltering + feeding students – esp. if dining hall damaged		✓		H	S
*12	Point Rd Fire Station				– station … – forest mgmt …				M/H	L/SO
13	town hall		M	V	… town hall + police station				H	S
14	WWTP		M	V	– reduce I&I – expand? need to change permit				H	O
15	Spring st Fire Station		M	V	relocate to route 6 (W)				M	L
16	rds w/ blow down – access	cross hatch ////	M	V	Forest mgmt plan + underground utilities				FM – H UU – H	FM – S UU – L
17	substation power	Eversource		V	N/A					
18	energy system / power lines	throughout			underground utilities					
19	Burs + marine fuel storage tanks	2 dots	P	V	communicate w/ Burrs + Barden's – plan? retrofit? elevate?				M	S
20	cell tower + wireless communication	P/M		V	generator at all towers w/ autostart				H	SS
21	Tree-lined rds – Spring St, Front St, Rt 6, Water St	←	M	V	• 6 different gloves … pine needles … – incorporate into TCTF • All-forest mgmt plan • ↑ marsh protection				gloves – M marsh – H	S O

COMMS – cell tower generator – IT

FM plan

Isaac

Group 2 Social Feature Matrix



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	Societal				+coordinate internally to make up for property value/income ↓ for town				M	O
1	Flood insurance rates (all, esp village) + property value	esp village	P	V	↑education to vuln. pop'ns re: insurance rates; external coordination w/ DCR + MEMA				H	S
2	Sippican School - sheltering		M	S/V	add generators; add emergency access on rt. 6				H	S
3	ORR HS - regional sheltering		Marion, Matt., Rochester	S	expand "regional", long term sheltering - make ORR official regional shelter? expand Sippican?; part time of regional shared EM manager?				H; M	O; S
4	Little neck village - vuln. pop'n		P	V	↑/add generators (reduce need for sheltering)					
5	Sippican HCC		P	V	-[illegible] building [illegible] - options for requiring [illegible] to have ↑ gen. capacity					
6	Marconi village - apt complex seniors, aff. housing		P	V	-work w/ private owners - evac plan? sheltering? Emergency plan - coordinate w/ town				H	S/O
7	group home Delano + rt 6/MHS 2 areas		S/P	V						
8	SoCOS			S	continue to support				/	O
9	MRC - medical reserve corp		collab.	S	"				/	O
10	wireless communication + alert system	—		V	+ explore "reverse 911" type text communication alert system; host externally, cloud-based; not gas generator + battery back up + ↑ redundancy of internet access @ station				H	S
11	HMP - none yet	—	M	V					/	O
12	Plymouth Power Plant -	—	P	V	↑ communication - plan?				M	O

Appendix C Digitized Feature Matrix, Group 1

Features	Location	Ownership	V or S	Sea Level Rise/ Coastal Flood-ing	Wind	Extreme Precipi-tation	Extreme Temp-eratures	Priority H M L (high, med, low)	Time Short Long On-going
Infrastructural									
Spring St. (Town House, Schools, Library)	off-Harbor west	Town	V/ S	Engineering study of the problem looking at nature based solutions X		X		M	
Front St. (Fire Station, Tabor, MH, Boat Yard)	Harbor west	Town	V	Study Front St. --> elevate where needed -->look at long-term managed retreat X		X		H	
Point Rd. (Fire Station)	off-Harbor east	Town	V	Fire Dept. revisits existing plan and updates to account for climate change impacts X	X	X		M	
Pump Stations in vulnerable areas	Townwide	Town	V	Applied for a Coastal Resiliency Grant to assess needs of each pump station; elevate switch X					
Utility (power & water)	Townwide	Town & Utility Companies	V/ S	Get a regional meeting with the utility provider to come up with a resiliency strategy X	X	X		M	
Back-up generators (need replacement)	Townwide	Town	V	Do an inventory/needs update X	X	X	X	H	
Evacuation Routes	Townwide	Town & State	V	Evacuation planning -->evacuation route designation -->improved communication X	X	X		H	
Waterline-Planting Island Causeway		Town	V	Have a contingency plan in place for this structure in case of loss due to storms, etc. X		X		L	
Delam Rd./Point/converse		Town	V	Assessment of tree health along roadsides and within ROW; work with utility	X			L-M	

Sprauges Cove		Town	V	Engineering analysis underway; structure isn't functioning the way it should					S & L
				X		X			
Doggetts Brook culvert	105	State	V			Culvert gets like a dam in heavy rain events; should be replaced; evaluation study needed		M	
Benson Brook culvert	105	State							
County Rd short span bridge/Sippican River		Town							
Grassy Bog culvert		Town							
2 or 3 culverts on Rte 6	6	State	V	Integrate look at culvert and outfalls (MassDOT) with Rte 6 corridor study				M	
				X		X			
Waterfront Infrastructure	Harbor	Town	V/S	Work with business/economic interests to look at impacts of sea level rise				M-H	
				X	X				
Bridges over Weweantiv	Weweantic River	State	V	Monitor the MassDOT bridge replacement process and comment appropriately on sea level rise, storm event, and bench marks				H	
				X		X			
Environmental									
Stone Estates area (marshland migration potential)		Private	S						
Kittansitt Point (marshland migration potential)		Private	S						
Sippican River corridor (marshland migration)		Private/Public	S						
Bird Island		Public	S/V	2017 restoration will be as good as it gets in the near future					L
				X	X	X	X		

Washburn Park/Beaton Bog		Public/Private	S/V	This is a nature-based solution; look for expansion opportunities				M	
				X		X			
Aucoot Cove			S/V	This area is protected but has potential for expanded marsh migration				M	
				X		X			
Forests and trees	Townwide		S/V	Marion-Mattapoisett-Rochester forestry assessment/management plan --> take into account service provided currently and a transition into a different type of vegetated area				M-H	
					X	X	X		
Societal									
Evacuation Plan for vulnerable neighborhoods	Townwide	Town/State	V						
Emergency shelter planning for disaster/cold/heat	Townwide & Regional	Town/Others	S/V	V	V	V	V		
				Plan regionally; Working on establishing capabilities (ORR, etc.) on a regional level)					
Marconi Village	Elderly & Handicapped		V	Determine requirements to operate and work with them to more resilient practices				H	
Littleneck Village	Elderly	Private	S	Determine requirements to operate and work with them to more resilient practices				H	
East Marion (isolation as a result of extreme storm events)		Public/Private	V	Address this issue in our HMP which is underway				H	
Tabor Academy	Front St.	Private	V/S	Integrate Tabor Emergency Plan with town plans and practices				H	
Boat ramps (social/recreational)		Town	S/V	Update design with sea level rise considerations in mind				L	
Communication pre & during extreme events			S	Develop better redundancy capabilities for first responders				H	
Vector borne diseases			V	Continue outreach efforts and update as needed				H	

Digitized Feature Matrix, Group 2

Features	Location	Ownership	V or S	Sea Level Rise & Coastal Flood-ing	Wind	Extreme Precipi-tation	Extreme Temp-eratures	Priority	Time
								H M L (high, med, low)	Short Long On-going
Infrastructural									
Silver Shell Beach pump station	Lewis St	Municipal	V	• Elevate pump stations (maybe more inland? Feasible?) • Implement recommendations from feasibility study (applied; July will hear if get $)				H	S/L
Front St. pump station	Front St	Municipal	V					H	S/L
Creek Rd pump station	Creek Rd	Municipal	V					H	S/L
Harbor Master office	Front St	Municipal	V					M	S
Point Rd pump station	Point Rd	Municipal	V	X		X		H	S/L
Private septics	South	Private	V	Increase sewering; prioritize needs to decrease I & I				H	O
Planting Island causeway		Municipal	V	Explore transitioning to full island and work with residents				L	O
Mario/Wareham bridge		State	V	N/A					
SW remediation center (Creek Rd)		Municipal (?)	V	Feasibility study XXX		X		L	L
SW remediation center (Silver Shell)	#1	M	V	Feasibility study					
Tabor Academy		Private	V	Coordinate with to have plan for sheltering and feeding students, esp. if dining hall damaged XXX	X	X		H	S
Point Rd Fire Station				• Move station toward Rte 6 (east) • Forest management plan, including Joanne Dr. CR - can cut pines?? X	XXX	X		M/H	L/S/O
Town Hall		Municipal	V	Fiberlink between town hall and police station 	XX	X		H	S
WWTP		Municipal	V	• Reduce I & I • Expand? Need to change permit				H	O

				X		XX			
Sprint St Fire Station		Municipal	V	Relocate to Rte 6 (west)					
				X		XX		M	L
Roads with blow downs (access)	Cross hatched area on map	Municipal	V	Forest management plan and underground utilities				H	O (Forest Mgmt) L (Utilities)
Substation power		Eversource	V	N/A					
Energy system/power lines	Through out			Underground utilites					
					XX				
Burr's and Barden's fuel above storage tanks	2 dots on map	Private	V	Communicate with Burr's and Barden's - Plan? Retreat? Elevate?				M	S
				XX		XX			
Cell tower and [?] communication		Verizon (Private/Municipal?)	V	Generator at cell town with autostart				H	S
					XX				
Increasingly vulnerable roads	Front St; Spring St; Rte 6; Water St, Lewis St	Municipal	V	• Rt 6 - different grates to decrease pine needles clogging?? - incorporate into TCTF • All - forest management plan • Increase marsh protection				H (marsh)	O
				XX	XX	XX			
Environmental									
Aucoot Marsh & 2 areas, Bullivant Farm	SW	Private	S/V	Monitor, conserve/protect, explore need to expand?				L	O
				X					
Trees	Dexter Beach, Point Rd, Converse Rd	Private/Municipal	S/V	Forest management plans				H	S/O
Protected open space	West Marion	Municipal/Private	S	Working on OSP, support plan				L	O

(49% protected highlight)									
Northeast facing coast (winter)					X				
Southwest facing coast (summer)				XXX	X				
Sippican River & Hathaway Pond		Private	V	May be priority sewering location to decrease flood inundation to septics		X			
Hershman property (deforested, erosion, water quality issues)		Private	V	Communication with Conservation Commission to remediate				L	O
Meadow Island			S/V	Communication and monitoring with owner				L	O
				X					
High water table			V	N/A					
Kitansett Marsh		Private	S/V	Communication with owner					
Societal									
Flood insurance rates & property value	All (esp. village)	Private	V	Increase education to vulnerable populations re: insurance rates; external coordination with DCR & MEMA				H	S
				Coordinate internally to make up for property value/income decrease for town				M	O
Sippican School - sheltering (short-term shelter and limited access in/out)		Municipal	S/V	• Add generators • Add emergency access on Rt 6				H	S
					X				
ORR HS - regional sheltering		Marion, Mattapan, Rochester	S	Expand regional, long-term sheltering - make ORR official regional shelter? Expand Sippican?				H	O
				Part time or regional shared emergency managers?				M	S
Littleneck village - vulnerable population		Private	V	• Add generators (reduce need for sheltering) • Hit building code at state - options for requiring new/renovation to have increased generator capacity				H	S/O

				• Work with private owners - Evacuation plan? Sheltering? Emergency plan - coordinate with town					
Sippican HCC healthcare		Private	V						
Marconi village (affordable housing, apartment complex for seniors)		Private	V						
Group home	Delano Rd & Rt 6; Mill St	State; Private	V						
SoCos			S	Continue to support					O
MRC (medical reserve corp.) - running shelters, clinics		Collaboration	S	Continue to support					O
Wireless communication & alert system			V	• Natural gas generator @ repeater DPW & battery backup @ Point Rd • Increase redundancy of internet access @ police station & hire IT (host externally, cloud-based to always have internet • Explore "reserve 911"-type text communication				H	S
HMP - none yet		Municipal	V	Support					O
Plymouth Power Plant (affects how? action? Communication ?)		Private	V	Increase communication - plan?				M	O