TOWN OF DOUGLAS

MUNICIPAL VULNERABILITY PREPAREDNESS

SUMMARY OF FINDINGS

DECEMBER 2019

WITH ASSISTANCE FROM

CMRPC
Central Massachusetts Regional Planning Commission

CMRPC Mission and History

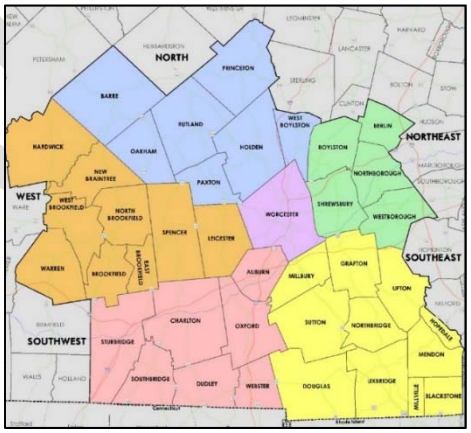
CMRPC Mission

The Central Massachusetts Regional Planning Commission is a regional partnership serving the planning and development interests of 40 member communities in southern Worcester County in Massachusetts. Our primary mission is to improve the quality of life for those who live and work in our region.

We do this by (1) addressing growth and development issues that extend beyond community boundaries; (2) maintaining the region's certification for federal transportation improvement funds; (3) providing technical knowledge an resources to assist local government in addressing specific land use, economic or environmental problems resulting from growth or decline, and (4) building strong working relationships with member communities, state and federal officials, as well as the range of area stakeholders.

Our History and Progress

Founded by the Massachusetts Legislature in 1963, the Central Massachusetts Regional Planning Commission (CMRPC) provides a variety of services to its constituencies and brings a regional perspective to planning and development. One of 13 regional planning agencies in Massachusetts, CMRPC serves the city of Worcester and 39 surrounding communities in the southern two-thirds of Worcester County. CMPRC's programs include Transportation, Regional Services, Geographic Information Systems (GIS), and Community Development and Planning.



Federal Title VI/Nondiscrimination Protections

The Central Massachusetts Metropolitan Planning Organization (CMMPO) hereby states its policy to operate its programs, services and activities in full compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related federal and state statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin, including limited English proficiency, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving Federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, the Federal Transit Administration, or both prohibit discrimination on the basis of age, sex, and disability. These protected categories are contemplated within the CMMPO's Title VI Programs consistent with federal and state interpretation and administration. Additionally, the CMMPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

State Nondiscrimination Protections

The CMMPO also complies with the Massachusetts Public Accommodation Law, M.G.L. c272§§ 92a, 98, 98a, prohibiting making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on race, color, religious creed, national origin, sex, sexual orientation, disability or ancestry. Likewise, CMMPO complies with the Governor's Executive Order 526, section 4, requiring all programs, activities and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status (including Vietnam-era veterans), or background.

ACKNOWLEDGEMENTS

This Community Resiliency Workshop has been prepared for the community of Douglas by the Central Massachusetts Regional Planning Commission with funding from the Massachusetts Municipal Vulnerability Program. The MVP encourages cities and towns to begin the process of planning for climate change and for implementing priority projects to safeguard against identifiable hazards. Communities that complete the MVP program and develop action-oriented resiliency plans become certified and are eligible for additional MVP Action grant funding and other opportunities.

The Core Team

The CMRPC would like to acknowledge the Town of Douglas and its residents for their time and hard work in participating in this project. These include, but are not limited to:

Bill Cundiff, Town Engineer

John Furno, Town Highways Superintendent

Kent Vinson, Fire Chief

Matt Wojcik, Town Administrator

Nick Miglionico, Police Chief

Robert Sullivan, Town Water & Sewer Systems Manager

The following individuals were directly and personally involved in planning and conducting the Douglas Community Resilience Building Workshop:

Andrew Loew, CMRPC

Gabrielle S.D. Weiss, CMRPC

Ian McElwee, CMRPC

Peter Peloquin, CMRPC

Sarah Adams, CMRPC

Hillary King, EEA

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EXECUTIVE ORDER 569 AND THE MASSACHUSETTS MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

In September 2016, Massachusetts Governor Baker signed Executive Order 569, directing multiple state agencies to develop and implement a statewide comprehensive climate adaptation plan with the best climate-change data available. Recognizing that many adaptation solutions are local in nature, a key commitment of Executive Order 569 is to assist local governments in completing their own assessments and resiliency plans. The MVP Grant and Designation Program represents the first step in fulfilling this commitment.

The MVP program provides planning grants to municipalities to complete vulnerability assessments and develop action-oriented resiliency plans. Funding is used by cities and towns to hire a MVP-certified consultant who is trained to provide technical assistance and complete a community's vulnerability assessment and resiliency plan using the Community Resilience Building Framework. Towns and cities are free to choose the consultant of their choice from a list of certified MVP provider. The Town of XXXXX invited the Central Massachusetts Regional Planning Commission to lead them in this planning effort.

Communities that complete the MVP planning process become certified "MVP Communities" and are eligible for Action Grant funding and other opportunities through the Commonwealth.

DOUGLAS: A PROFILE

Located in the southern portion of Worcester County, MA, and bordering the states of Rhode Island and Connecticut, Douglas was first settled in 1715 and officially incorporated in 1746. According to the United States Census Bureau, the town has a total area of 37.7 square miles of which 36.4 square miles is land and 3.57 square miles is water.

The Town of Douglas is dominated by forested land, with the Department of Conservation and Recreation owned Douglas State Forest occupying one quarter of the area of the town. A tributary of the Blackstone River, the Mumford River flows through the town, linking the Whitin Reservoir, Mumford River Reservoir, and Gilboa Pond, all within the town then flowing eastward into the neighboring town of Uxbridge.

As of the 2010 census, there were 8,471 people residing in the town. The population density was 240 people per square mile. Approximately 97 percent of its residents were White. The median age of residents was 42 with 27 percent of residents under the age of 18. According to the 2017 American Community Survey, the median income for the town was $94,675 with 4 percent of the population living below the poverty line.

The northeastern portion of the town known as East Douglas is the most densely settled area of the town and has the oldest infrastructure in the town, including the North St. Bridge over the Mumford River. The eastern portion of the town is served by municipal wells and town sewer, while the remainder relies on septic systems and private wells. Emergency services in Douglas are a hybrid of professional and volunteer; professional police force and two professional fire staff on duty at all times with volunteers able to be called in for major events. Douglas has several town facilities, including a Town Hall, Fire and Police stations, a wastewater treatment plant, drinking water wells, one high school, one middle school, and two elementary schools.

The Douglas Municipal Center
Photo: Peter Peloquin

WORKSHOP SUMMARY

8:00am – 4:30pm November 20, 2019, Douglas Municipal Center:
CMRPC Presenters: Peter Peloquin, Ian McElwee, Andrew Leow
EEA: Hillary King

The Town of Douglas' Municipal Vulnerability Preparedness (MVP) workshop was held on November 20, 2019 at the Douglas Municipal Center. Douglas contracted with the Central Massachusetts Regional Planning Commission (CMRPC) to serve as the MVP provider, inclusing the Community Resilience Building (CRB) Workshop. A small group of Town officials and board members convened to form the 'Core Team' which, together with CMRPC staff, organized and planned the day.

Core Team

Name	Affiliation	Role
Bill Cundiff	Town of Douglas	Engineer, Project Lead
Robert Sullivan	Town of Douglas	Water & Sewer Systems Manager
John Furno	Town of Douglas	Highways Superintendent
Kent Vinson	Town of Douglas	Fire Chief
Matt Wojcik	Town of Douglas	Administrator
Nick Miglionico	Town of Douglas	Police Chief
Peter Peloquin	CMRPC	Associate Planner, Staff Lead
Ian McElwee	CMRPC	Associate Planner

The Workshop's goal was to identify top hazards and develop strategies to enhance the town's resiliency related to climate change. Following the CRB work plan process, CMRPC facilitators and planners gave three presentations:

- Information about the CRB process and the MVP program.
- A summary of climate change projections and a detailed profile of natural hazards in the Town of Douglas, including the top four hazards perceived by the core team.
- Description of climate mitigation strategies.

CMRPC facilitators then guided stakeholders in small groups to examine the resources of the Town and:

- Identify the Town's most serious concerns regarding natural and climate-related hazards that threaten their community.
- Categorize existing and potential strengths and vulnerabilities.

Next, Hillary King of the Executive Office of Energy and Environmental Affairs presented examples of projects from other municipalities in the state that were funded by MVP Action Grants, providing inspiration for participants to:

- Develop and prioritize actions to prevent or allay threats.
- Identify opportunities for collaboration aimed at increasing the Town's resilience.

Douglas Residents and Invitees

Twenty people attended the MVP Workshop, including representatives from the town government, emergency services, the MVP Core team and the Department of Conservation and Recreation which has significant land holdings in town. One person from the Senior Center along with local high school students acted as scribes, and contributed their perspective as well.

Participants were divided among four tables where they discussed issues raised during the presentations, completed the Community Resilience Building matrices, and annotated maps with the locations of opportunities or vulnerable areas in Douglas. CMRPC staff helped to facilitate discussions at each table. A public listening session to discuss MVP results and recommendations for future actions was held on Date. Between the two meetings, a total of XX people were in attendance.

Workshop Invitees and Participants

Name	Table	Affiliation	Attended
Carol Gogolinski	1	Local Developer / Various Boards	Y
Kent Vinson	1	Fire Chief	Y
Matthew Wojcik	1	Town Administrator	Y
Michael Fitzpatrick	1	Local Developer / Various Boards	N
Patrice Rousseau	1	Adult Center	Y
Nick Daley	2	Emergency Mgmt Asst. Dir	Y
Adam Furno	2	Facilities Maintenance	Y
Cary Vandenakker	2	DCR	Y
Chuck Stone	2	DCR	Y
Robert Minarik	2	Economic Development Committee	Y
Willam Cundiff	2	Town Engineer	Y
Colin Haire	3	Local Developer / Various Boards	Y
Daniel Heney	3	Local Developer / Various Boards	N
John Furno	3	Highway Supt. / Deputy Fire Chief	N
Kevin Morse	3	Board of Selectmen	N
Matthew Keith	3	Fire Department Intern	Y
Robert Larson	3	DCR - Fire District #7	N
Timothy Bonin	4	Board of Selectmen	N

Andy Leonard	4	Pyne Sand and Stone	N
Ernest Marks	4	Planning Board Chair	N
Linda Brown	4	Conservation / Various Boards	Y
John C Coyn	4	Fire Department	Y
Nick Miglionico	4	Police Chief	Y
Robert Sullivan	4	Water/Sewer Supt.	Y
Shirly Mosczynski	4	Fmr. Selectman, Various Boards	N
Christin Waller	3	Douglas High School	Y
Lauren D'Amico	2	Douglas High School	Y
Angelina Carneiro	4	Douglas High School	Y
Janis Duchan	1	Adult Center	Y

Workshop participants listen to CMRPC presentations and discuss hazards and actions.
Photos: Peter Peloquin

FINDINGS

EXECUTIVE SUMMARY

Overall, the workshop was received positively. Though some attendees questioned the accuracy of the presented climate projections, they agreed with the goal of being better prepared and more resilient as a town. Following the presentations, participants were asked if they agreed with the core team's identification of, in no particular order, flooding, drought and wildfire, winter storms, and high wind as the primary hazards facing Douglas. All of the participants felt these hazards were the most relevant for Douglas.

The town's emergency shelters and backup generators were described as strengths, along with mutual aid agreements with neighboring towns. Budget and tax burden was a weakness and a barrier to action identified by several attendees, along with a complex relationship between the town and the Whitin Reservoir Water District. Other weaknesses mentioned were issues of tree health and maintenance, water provision for firefighting, and local bridges and dams.

Recommendations centered on emergency response, water and power resources, and road infrastructure. Each table identified specific vulnerable locations that are already in need of attention and will likely face worsening impacts due to climate change. These include the North Street Bridge, properties adjacent to water bodies, the Whitins Reservoir Causeway, and forests throughout the town.

TOP HAZARDS

The hazards identified by the Core Team and workshop participants are **flood**, **drought**, **winter storms**, and **wind events**. In 2016, Douglas experienced extreme drought along with the majority of the state of Massachusetts. In the late 1990s a 200 acre wildfire burned an area east of Whitin Resrvoir. In 2001, a larger wildfire burned 600 acres in the northwest portion of Town. Severe storms, including high wind and intense rainfall, have been increasing in frequency. All of these have caused disruption to the town, including localized flooding, power outages, and calling upon mutual aid agreements. With climate change, all of these types of events are expected to increase in severity and frequency.

DROUGHTS & WILDFIRES

Projecting an increase of consecutive dry days, with the driest periods in the summer and fall. This leads to increased wildfire risk and stress on drinking water systems.

FLOODING

Expected increase in precipitation across all seasons. Heavy rainfall will become more frequent, increasing the risk for flash floods. Also increases non-point source pollution.

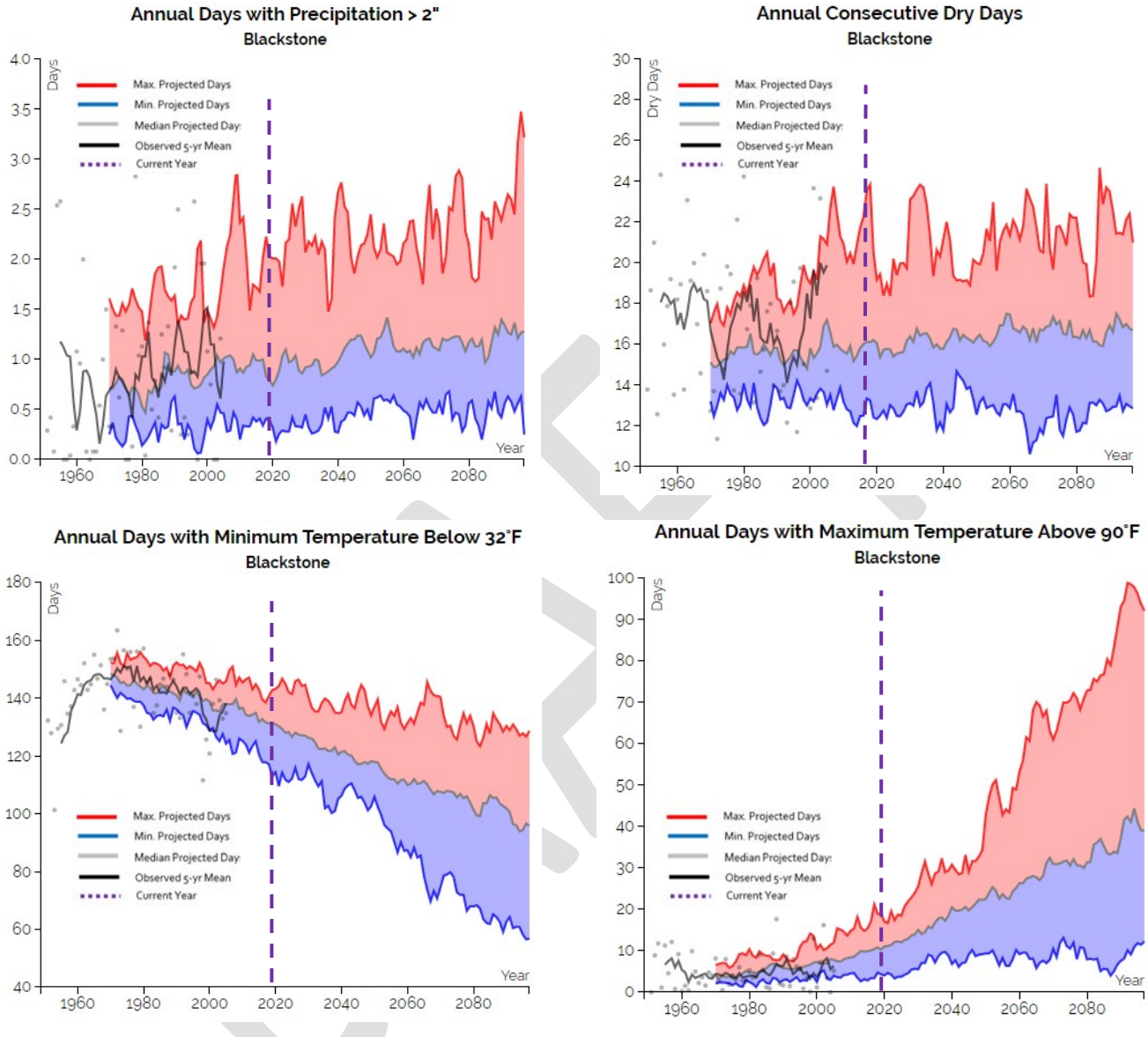
WINTER STORMS

Annual days below freezing will decrease, winter precipitation falling as rain or freezing rain. This increases risk for ice storms and flash flooding when rain falls on frozen ground.

HIGH WIND

Intensity of storm events is expected to increase due to the warmer atmosphere. This will lead to increased severe thunderstorm and hurricane activity with higher wind speeds.

The climate projections that these conclusions were based on include data provided by the Massachusetts Climate Clearinghouse as well as watershed-specific data from the Northeast Climate Adaptation Science Center (NE CASC) at the University of Massachusetts at Amherst. For the Blackstone River Basin, projections show an expected increase in precipitation overall, with the greatest increase in the winter. The number of days with over 2" of rainfall, potentially leading to inland flooding, is also expected to increase, with the average expected to be close to 15 by 2100 compared with approximately 10 currently. Consecutive dry days and days above 90 degrees Fahrenheit are expected to increase, leading to drought, and days above freezing are also expected to increase, leading to a greater likelihood of freezing rain in the winter and higher wind as storm severity increases with warmer temperatures.



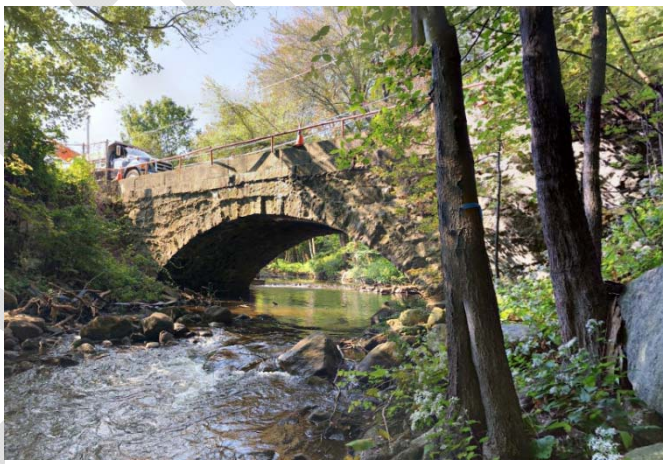
Climate projections for the Blackstone River Basin
Source: Northeast Climate Adaptation Science Center

VULNERABLE AREAS

The locations in Douglas identified by workshop participants during discussion as vulnerable to the hazards discussed include areas adjacent to water bodies, forested areas, roadways that frequently flood, and neighborhoods that are dense and difficult to access in case of emergency.

Forested areas throughout town are vulnerable to increasing pressures from heat, drought, and invasive insect species. Crossings over streams and the Mumford River are vulnerable as increased precipitation and intensity of storms raise water levels. In particular, the **North Street Bridge** has been identified as a bottleneck for evacuation and vulnerable to high water and debris flow in case of flooding.

Forested areas are vulnerable to wildfire.
Photo: John Phelan



The North Street Bridge on the Mumford River.
Photo: William Cundiff

Douglas Fire Department on Route 16.
Photo: Google Streetview

Senior housing along Centerville Brook.
Photo: Google Earth

Roadway flooding is an issue on **Route 16** immediately in front of the Douglas Fire Department, a particular concern because it could impede emergency response. Neighborhoods that are low-lying and near water are at risk for flooding, especially those near **Wallum Lake**, **Whitin Reservoir**, the **Mumford River**, and senior housing along **Centerville Brook**.

CURRENT CONCERNS AND CHALLENGES PRESENTED BY HAZARDS AND CLIMATE CHANGE

Identification of current concerns and challenges was part of the first step in completing the Community Resilience Building (CRB) Matrix at each table. These topics are compiled from the matrices from all four tables at the Doulas MVP Workshop. The completed Matrix for each table can be found in Appendix 3 of this document.

INFRASTRUCTURE

North Street Bridge
Culverts
Water service

SOCIETY

Older residents
Flood-prone neighborhoods

ENVIRONMENT

Insect-borne disease

Tree maintenance

Infrastructure Topics

Several infrastructure elements were identified as of concern by attendees, with the following three most-often. The **North Street bridge** over the Mumford River was identified by several participants as a concern because of its low arch over the water and narrow roadway. The low arch is a risk during flooding when debris may become trapped under the bridge, and the narrow roadway creates a bottleneck along an important evacuation route for the town. There are **culverted streams** throughout the town, several of which have been identified by workshop participants as currently undersized. As precipitation volume and intense rain events increase with climate change, these culverts will not be able to handle the capacity of water needing to flow through them. Finally, **the lack of water service** outside of the northeast corner of town was discussed. As occurrence of drought increases and invasive species impact forests in town, the fuel load in forests and fire risk increases. Those areas outside of the town water district require water used in firefighting to be brought in via tanker or pumped from nearby surface water bodies.

Societal topics

Attendees felt that **older residents** and those **living in flood-prone areas** are most at risk from climate impacts. Their risks include greater vulnerability to hot days, septic systems being impacted by rising water tables, and potential property damage or difficulty evacuating in case of flood. **Better access to recreation areas** and a need for better understanding of how those areas will change due to climate impacts was another topic of discussion.

Environmental Topics

Major environmental concerns centered on impacts to human health and wellbeing. **Risk of insect-borne diseases,** especially Eastern Equine Encephalitis (EEE) and Lyme Disease, as the climate warms and periods of flood and drought increase was mentioned frequently by participants. Forested areas in Douglas, including the Department of Conservation and Recreation managed Douglas State Forest are at risk from invasive insects and drought. Both of these hazards lead to increased fire load and risk of **wildfires**, and many of these areas have limited access to water for firefighting. **Tree maintenance**, especially around power lines was also raised as many street trees reach the end of their lifecycle or are impacted by invasive insects, making them more vulnerable to damage during intense storm events and ice brought by climate change.

CURRENT STRENGTHS AND ASSETS

Identification of current strengths in Douglas was part of the first step in completing the CRB Matrix at each table. These topics are compiled from the matrices from all four tables at the Doulas MVP Workshop. The completed Matrix for each table can be found in Appendix 3 of this document.

INFRASTRUCTURE

Backup generators

Emergency shelters

SOCIETY

Mutual aid agreements

East Douglas neighborhood

ENVIRONMENT

Forests

Surface water

Infrastructure Strengths

Douglas' emergency preparedness is the source of infrastructure strengths identified by workshop attendees. They felt that the town has adequate **emergency shelter** options and that **backup generators** at town facilities will enable services to be provided in the event of a power outage.

Societal Strengths

Good working relationships between emergency services in Douglas and neighboring towns is a major strength in the town. **Mutual aid agreements** provide assistance in case of major events and help Douglas provide services despite limited budget. The dense **East Douglas** neighborhood provides a town center, links to the history of the town, and helps create a sense of community in Douglas.

Environmental Strengths

The tree canopy and large areas of **forest** were identified by participants as beneficial for the overall feel of the town and a buffer to increasing heat. Opportunities for recreation in nature, including cooling off in local **surface water** bodies on hot days, and the tourism that those resources bring were also discussed.

RECOMMENDATIONS TO IMPROVE RESILIENCE

After watching the presentation by Hillary King on projects already funded by MVP Action Grants and examples of best practice, Workshop participants at each table took the next step in completing the CRB Matrix by suggesting actions that would address vulnerabilities, or further bolster strengths they identified. The following actions are compiled from the matrices from all four tables at the Doulas MVP Workshop. The completed Matrix for each table can be found in Appendix 3 of this document.

INFRASTRUCTURE

Replace North St Bridge

Improve water provision for firefighting

Evaluate dams and culverts

SOCIETY

Train first responders

Reach out to and educate residents

Improve recreation access

ENVIRONMENT

Study potential sources of polluting runoff

Street tree maintenance

Forest management

Infrastructure Actions

Identifying **bridges** that are at risk from flooding, and evaluating **dams and culverts** in town are actions that will improve current infrastructure and help Doulgas prepare for expected increases in flood events. Addressing road flooding, especially along Route 16, the Causeway across Whitin Reservoir, Linden Street, Perry Street, and Southeast Main Street was recommended and is important to provide regular access to homes and evacuation routes in case of emergency.

Water quality-related actions include: Adding drinking water wells or relocating existing ones since the current well field is downstream from the uncapped town landfill. This could contaminate the wells if ground water tables rise or if a prolonged flood event occurs. Studying the feasibility of a constructed wetland at Gilboa Pond to address wastewater treatment challenges in times of low flow in the Mumford River.

Installing dry hydrants or cisterns to provide water in case of wildfire was discussed at multiple tables, others suggested expanding town water supplies to reach further into forested areas. Collaboration with DCR on these efforts is essential. Maintaining the Southern New England Trunkline Trail and the Buckeye-owned former pipeline corridor for firefighting access was also recommended.

Societal Actions

Resident outreach on emergency preparedness, and promoting resident engagement in general was discussed as important. Regarding emergency preparedness, the historic neighborhood of East Douglas including Jenkes Store, Riddle Brook Senior Housing, Hayward Landing, Wallum Lake Terrace, and local campgrounds were identified as needing evacuation planning assistance. To address insect-borne disease hazards, **education** on prevention techniques was the primary suggestion, and developing a town policy for how to address the increasing incidence of tick and mosquito diseases. **Educating** residents about forest management and reducing fuel load on privately owned land is another topic for outreach. Improved engagement throughout the town was seen as important to building support for future projects, including those generated from the MVP process

Participants, especially those representing the Police and Fire Departments, felt that Douglas would benefit from **first responder training**, and strengthening their relationships with neighboring towns by organizing a regional MEMA workshop or training. They also discussed developing improved methods of contact for their volunteer firefighers.

Improving access to recreation facilities, especially places to cool off during hot weather (including lakes and ponds) was suggested. To make this possible, multiple tables suggested developing a better relationship with and making agreements between the town and DCR who manage Wallum Lake and the Whitin Watershed District who manage Whitin Reservoir.

Environmental Actions

Forest management and reducing the fuel load in forests was discussed at every table, with several mentioning past wildfires. There is a need for management of forested lands throughout the town, whether DCR, Town, or privately-owned. Improved pruning and maintenance and if necessary, removal or replanting, of **street trees** -- particularly those near power lines -- was highlighted by several tables and it was suggested that a survey be done of existing street trees to develop a priority list for action, and an increase in budget for such work.

Setting up a more accurate local weather station and recording temperature and seasonal data was suggested to track and understand the changing climate and provide better information for residents. Tracking wildlife populations and insect numbers was suggested by another table. Beavers and their dams are a concern, and participants would like changes in state laws regarding them, and to continue working with DCR on managing dams.

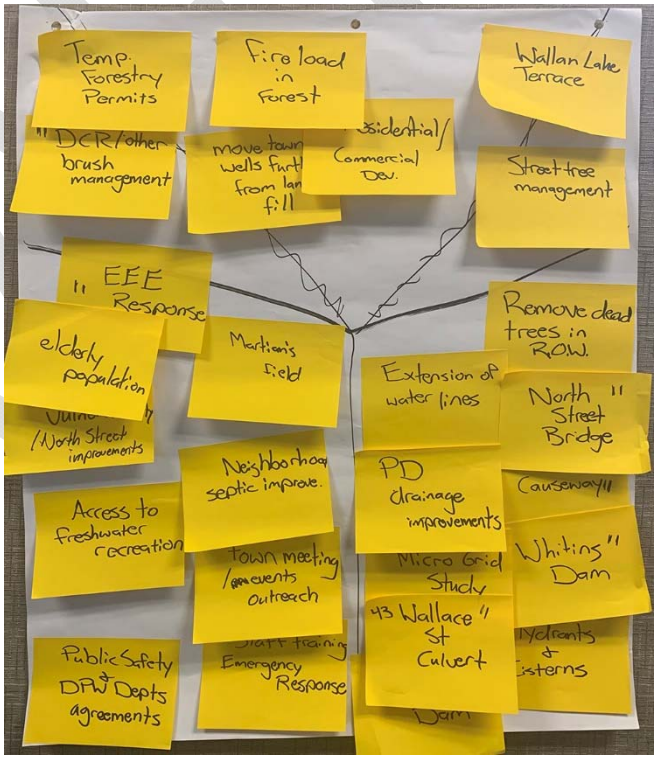
Pollution and eutrophication of local water bodies from **runoff** is a concern. Private solar farms, dense neighborhoods near Wallum Lake and Whitin Reservoir, Main Street as it travels alongside Centerville Brook, and Gilboa Street along the Mumford River were identified as specific locations needing to be **studied** to determine if runoff from them is negatively impacting water quality, and then an appropriate plan developed to address any issues. Bylaws limiting fertilizer use near water and reduced salting were another action suggested for this concern.

Reviewing bylaws regarding new commercial and residential development to make sure they are reflective of environmental best practices was recommended. Participants felt the earthen berm at Riddle Brook Senior Housing and current development sites should be reviewed as well to make sure they are considering future climate changes.

TOP RECOMMENDATIONS

At the end of the workshop, each table was asked to report out summaries of their concerns and recommended actions. Several tables mentioned similar concerns and suggested similar ways to address them, but each table had a unique perspective on the challenges Douglas faces. These recommendations were organized on a large sheet to enable participants to see the overlap between tables and to learn about suggestions not discussed at their table.

Three out of four tables agreed that replacing the North Street Bridge, addressing EEE risk, replacing the culvert on Wallace St, evaluating Whiting Dam, and managing brush for forest fire safety, should be top priorities. Other actions mentioned during the report-out include; tree maintenance, first responder training, improving recreation opportunities, reaching out to vulnerable populations/ neighborhoods, and assessing road and dam conditions.



Recommendations reported out by tables. See Appendix 1 for a table of these items

Finally, the completed CRB Matrices from each table were posted on the wall and all participants were invited to vote on the actions they felt should be priorities. Each person was given five stickers to vote for the actions they felt strongest about, whether from their own table or another. Peter Peloquin then thanked attendees for giving their time and attention, and announced several of the actions with the most votes. Those actions were largely similar to what each table reported out, with the top five being; fuel load reduction in forests,

The following top recommendations were compiled based on those actions reported out by each table and those actions that participants voted for. Actions are organized by priority and project type, with corresponding icons. A full listing of suggested actions can be found in the completed Matrix for each table in Appendix 3 of this document. Icons used throughout the table are:

CATEGORY OF ACTION:

Infrastructure

Society

Environment

CATEGORY OF HAZARD:

Wildfire/ Drought

Winter Storm

Wind

Flood

Project type	Category	Location	Issue	Recommended Action	Hazard
High Priority					
Culverts		Town-wide	Increased intensity of rain storms.	Study capacity of culverts throughout town, create priority list of those that need 'rightsizing' or switching to box culverts.	
		Causeway St		Upgrade capacity.	
		Wallace St		Replace with box culvert, increase capacity .	
		North St		Replace culvert that was removed as part of spillway removal.	
Road work		Route 16	Roadway currently flooding, frequent water main breaks.	Raise roadway at fire station. Culvert and water main need upgrades. Study how to accomplish these things concurrently.	
Bridge upgrade/ replace		North St	Bottleneck on an evacuation route and the arch is low.	Study how to upgrade or replace North St Bridge.	
Emergency Planning		Town-wide	Concern that people in town may not know evacuation procedures, are not well-informed about their risks.	Develop outreach materials for community about resources in emergencies, evacuation plans. Distribute by mailings, at senior center, schools, town hall, etc. Improve access to emergency shelter at high school.	
Emergency Services		Town-wide	First responders, especially volunteers, would benefit from training.	Create 72-hour emergency contact list for Fire Dept.	
				Public safety/ response training. Hold regional workshop with MEMA consultant.	
Water provision		West side of town	Fire risk in areas with no municipal water service.	Install dry hydrants near water bodies, review cistern bylaw for new developments. Study potential to extend municipal water for fire protection.	
Public health		Town-wide	Increasing insect populations: invasive species, mosquitoes, ticks.	Develop public education program about the risks of insect-borne diseases, especially EEE and Lyme. Create plan for ?	
Dams		Whitin Reservoir	Emergency spillway at northwest corner of reservoir no longer functions. Water levels not well-managed.	Upgrade/ replace emergency spillway. Improve relationship with water district re: water level management.	
		Wallis Pond	Dam is not sufficient	Upgrade/ replace dam.	
Catch basins		Town-wide	Flood, Winter Storm	Increase catch basin maintenance/ cleaning.	
Runoff pollution		Wallum Lake Terrace	Dense neighborhoods next to water may be increasing nutrient loads in lakes	Study if there is pollution from runoff. Develop by-laws to restrict fertilizer usage adjacent to surface water.	
		Cottage Colony			
Brownfield		Landfill/ transfer station	Flood: Potential for contamination	Re-cap landfill site. Study moving town well field away from landfill.	
Street trees		Town-wide, especially Manchaug, Gilboa St, and Route 16	Winter Storm & Wind: Dead/ unhealthy trees	Increase town tree trimming budget. Document street tree condition throughout town and create a prioritized list for removal or pruning based on hazard level. Develop plan for storage and use of removed trees.	

Medium Priority					
Electrical Grid		Throughout town	Trees near powerlines need management, could lead to outage if limbs or an entire tree fall on power lines during wind or winter storm events.	Work with National Grid to improve tree maintenace near power lines. Study installing battery banks at town facilities. Study creating a regional Power& Light with neighboring towns. Study installing batteries instead of generators at town facilities.	
			Transmission lines are at max capacity, won't handle increased a/c loads as hot days increase.	Study creating microgrids within in the town using renewable generation and batteries to supplement available power.	
Wastewater treatment		Gilboa Pond	Low flow of water in outlet stream during summer will worsen with more dry days.	Design and install a constructed wetland to further treat effluent leaving the wastewater treatment plant so that water meets quality standards even during drought.	
Zoning		Throughout town	Development should consider climate projections, open space needs	Review and reassess development regulations	
Vulnerable neighborhoods		Riddle Brook Senior Housing	All: Population that will need help evacuating	Build relationship with owners and administration. Develop emergency communication and evacuation plans.	
		Campground			
Forest management		DCR Land	Fire risk increasing with more dry days, declining tree species because of invasive species and ecosystem change	Develop and enact forest management plans including brush and dead-wood clearing programs, including public outreach to encourage action on private lands, to reduce fuel load in forest areas. Study potential for controlled burns.	
		Privately-owned forested land			
Septic systems		Wallum Lake Terrace	Older septic systems could leach into nearby groundwater.	Communicate with residents about risks of leaking septic systems, encourage upgrades. Review codes relating to septic systems. Study potential to create shared systems, other options to manage sewage.	
		Cottage Colony			
		Birch Hill Road			
Vulnerable neighborhoods		Hayward Landing	Most at risk from flooding because of their proximity to lakes.	Build relationships with neighborhoods, help them plan for flood risk.	
		Cottage Colony			
		Wallum Lake Terrace			
		East Douglas (especially upper North St.)	Difficult for evacuation or emergency access. Water main breaks frequently.	Improve pedestrian and emergency access. Study water infrastructure upgrades in the neighborhood.	
Drinking water		Town-wide	More dry days, well pump outage, other issues could all lead to emergency water need.	Develop connection to neighboring town (Sutton or Uxbridge) for backup water supply.	
Bridge Upgrade/ Replace		Mechanic St	Bridge is low, and the approach is awkward.	Replace bridge, realign approach.	
Road work		Linden St	Groundwater is heaving road from below. This is likely to worsen as precipitation increases.	Study need for culverts, improving base course, or raising roads.	
		Perry St			
		Southeast Main St			

Low Priority					
Hydro-electric generation		Whitin Reservoir or Gilboa Pond	Interest in providing renewable power to the town, especially in case of outages.	Feasibility study for generating electricty at one or both of these locations.	
Ice		Town-wide	Ice is expected to increase, need better methods to deal with it.	Develop best management practices for treating roads, dealing with ice storms.	
Climate change		Town-wide	Changes are happening already but not scientifically documented.	Install local weather station to monitor temp and precip changes. Document shifts in insect, deer, plant populations.	
Open space		Town-wide	Need to document and protect assets that will help Douglas deal with climate change impacts.	Create an Open Space and Recreation Plan to help prioritize areas to be protected/ managed that will help buffer the town from climate impacts.	
Recreation		Soldier's Field	All	Maintain or repair condition after events. Improve driveway and parking access, and runoff mangement.	
		Martin Rd. Park			
		VFW Fields			
		Wallum Lake	Heat	Work with DCR to provide better access for visitors, especially to cool off on hot days.	

APPENDICES

1. Recommended Actions reported out ii

2. Photographs of Community Resilience Building Matrices and maps from Tables 1 – 4 iii

3. Community Resilience Building Matrices from Tables 1 – 4 xiii

RECOMMENDED ACTIONS REPORTED OUT

Recommended Actions	
Category	**Action**
Infrastructure	
	Hydrants & Cisterns Extension of water lines Remove dead trees in right of way Wallis St Culvert North St Bridge Wallis St Causeway Wallace Dam Whiting Dam Microgrid study
Society	
	Public safety & DPW Dept agreements EEE Response Access to fresh water recreation Staff training Emergency Response Neighborhood septic improvements East Douglas/ North Street Town meeting/ events outreach
Environment	
	Fire load in forest Street tree management Move town wells further from landfill Temporary forestry permits Residential/ commercial development Wallum Lake Terrace

PHOTOGRAPHS OF COMMUNITY RESILIENCE BUILDING MATRICES AND MAPS FROM TABLES 1 – 4

TABLE 1

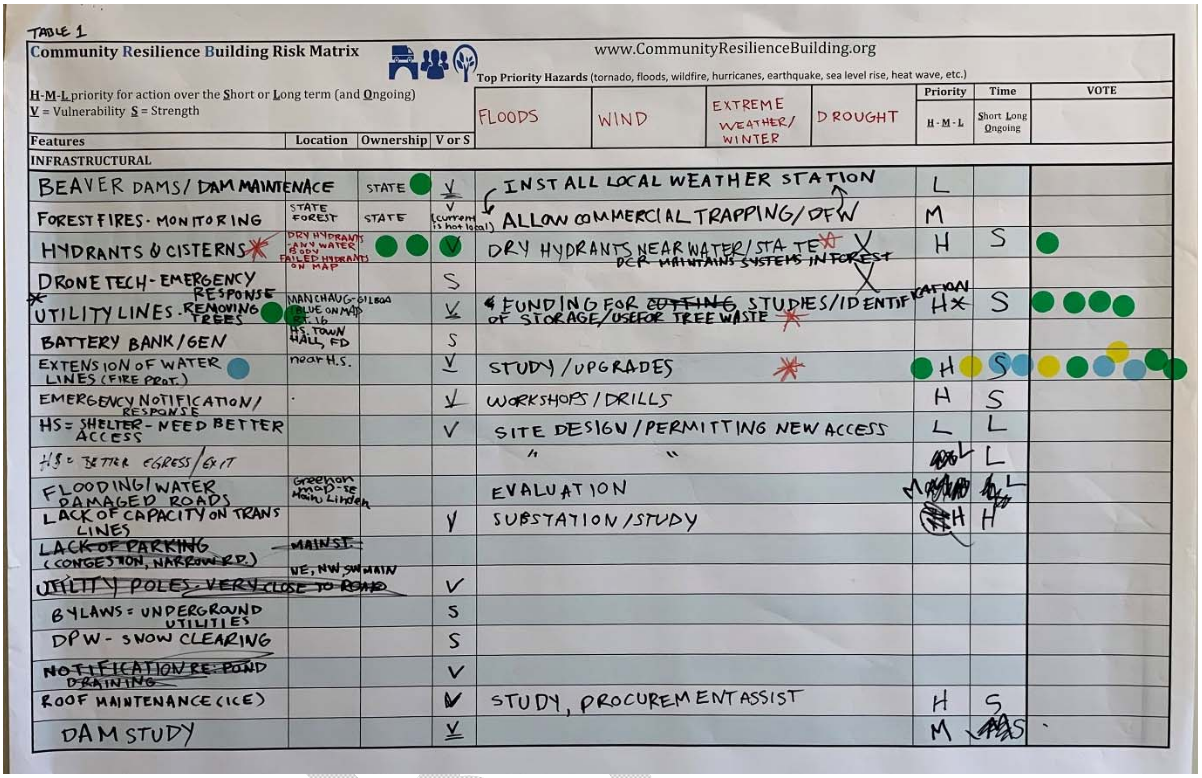


TABLE 1

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

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

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

Features	Location	Ownership	V or S	FLOODS	WIND	EXTREME WEATHER/ WINTER	DROUGHT	Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL										
BEAVER DAMS/ DAM MAINTENACE		STATE	V	INSTALL LOCAL WEATHER STATION				L		
FOREST FIRES - MONITORING	STATE FOREST	STATE	V (current is not local)	ALLOW COMMERCIAL TRAPPING/ DFW				M		
HYDRANTS & CISTERNS	DRY HYDRANTS - ANY WATER BODY FAILED HYDRANTS ON MAP		V	DRY HYDRANTS NEAR WATER/ STATE DCR MAINTAINS SYSTEMS IN FOREST				H	S	
DRONE TECH - EMERGENCY RESPONSE			S							
UTILITY LINES - REMOVING TREES	MANCHAUG - GILBOA (BLUE ON MAP) RT. 16		V	FUNDING FOR CUTTING STUDIES/IDENTIFICATION OF STORAGE/USE FOR TREE WASTE				H	S	
BATTERY BANK/GEN	HS. TOWN HALL, FD		S							
EXTENSION OF WATER LINES (FIRE PROT.)	near H.S.		V	STUDY/UPGRADES				H	S	
EMERGENCY NOTIFICATION/ RESPONSE			V	WORKSHOPS/DRILLS				H	S	
HS = SHELTER - NEED BETTER ACCESS			V	SITE DESIGN/PERMITTING NEW ACCESS				L	L	
HS = BETTER EGRESS/EXIT				" "				L	L	
FLOODING/WATER DAMAGED ROADS	Greenon map - SE Main, Linden			EVALUATION				[illegible]	L	
LACK OF CAPACITY ON TRANS LINES			V	SUBSTATION/STUDY				H	H	
LACK OF PARKING (CONGESTION, NARROW RD.)	MAIN ST.									
UTILITY POLES - VERY CLOSE TO ROAD	NE, NW, SW MAIN		V							
BYLAWS = UNDERGROUND UTILITIES			S							
DPW - SNOW CLEARING			S							
NOTIFICATION RE: POND DRAINING			V							
ROOF MAINTENANCE (ICE)			V	STUDY, PROCUREMENT ASSIST				H	S	
DAM STUDY			V					M	S	

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Features	Location	Ownership	V or S	FLOODS	WIND	WINTER STORMS	DROUGHT	Priority H-M-L	Time Short Long Ongoing	VOTE
SOCIETAL										
WORK FORCE HOUSING										
EMERGENCY NOTIFICATION/	RESPONSE & TRAINING		V	MUNI/PUBLIC SAFETY TRAINING/ DEV. PUBLIC OUTREACH MATERIALS				H	S	
PUBLIC EDUCATION - CUT BRUSH BACK, FIRE AWARENESS	private residences	private	V	CABLE PSA, SOCIAL, NEWSPAPER "				M	S	
→ REGIONAL TRAINING				DISTRICT 7 (?) WORKSHOP, MEMA CONSULTANT						
SHARED MUNI SERVICES (ED, DPW), WATER			S							
SENIOR CENTER EMERGENCY PREPAREDNESS SHEETS			S	MAILINGS (CENSUS), PSA				M	S	
VULNERABLE POP. RE EEE/ INSECT BORNE			V	PUBLIC OUTREACH, SOCIAL, TRAIL SIGNAGE, EXTEND HUNTING SEASON				H	S	
~~HS, ELEM SCHOOLS~~ = NOT GREAT ACCESS			~~S~~ V							
WALLUM LAKE - VISITORS - POLICE, TRAFFIC, PARKING (BOATS)			V, S	WORK W/ DCR TO PROVIDE BETTER ACCESS FOR RES.				H	O	
CAMPERS - INVASIVE CONCERN (FIREWOODS) ELEC. DRAIN			V	OUT REACH W/ OWNERS				L	L	
YOUTH SPORTS - PROGRAMMING, FACILITIES			V					L	L	
RECREATION / POTENTIAL ACQUISITIONS				STUDY						
OPEN SPACE & REC PLAN?										

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Features	Location	Ownership	V or S	FLOODS	WIND	WINTER STORMS	DROUGHT	Priority H-M-L	Time Short Long Ongoing	VOTE
ENVIRONMENTAL										
TEMP. FORESTRY PERMITS				DCR CONSULT, FORESTRY MANAGEMENT PLAN				H	S	
EEE / INSECT BORNE										
ECO SYSTEM CHANGES										
FLOODING/PAVEMENT DEGRADATION	Linden St Main (on map)	PUBLIC								
INVASIVES (ASH BORER) GYPSY MOTHS			V							
BEAVERS			V							
WALLUM LAKE - WATER QUALITY										
DEER			V							
ICE MELT FOR INCREASED (WATER QUALITY)	ICE		V	CONTINUED CATCHBASIN MAINT.				L	O	

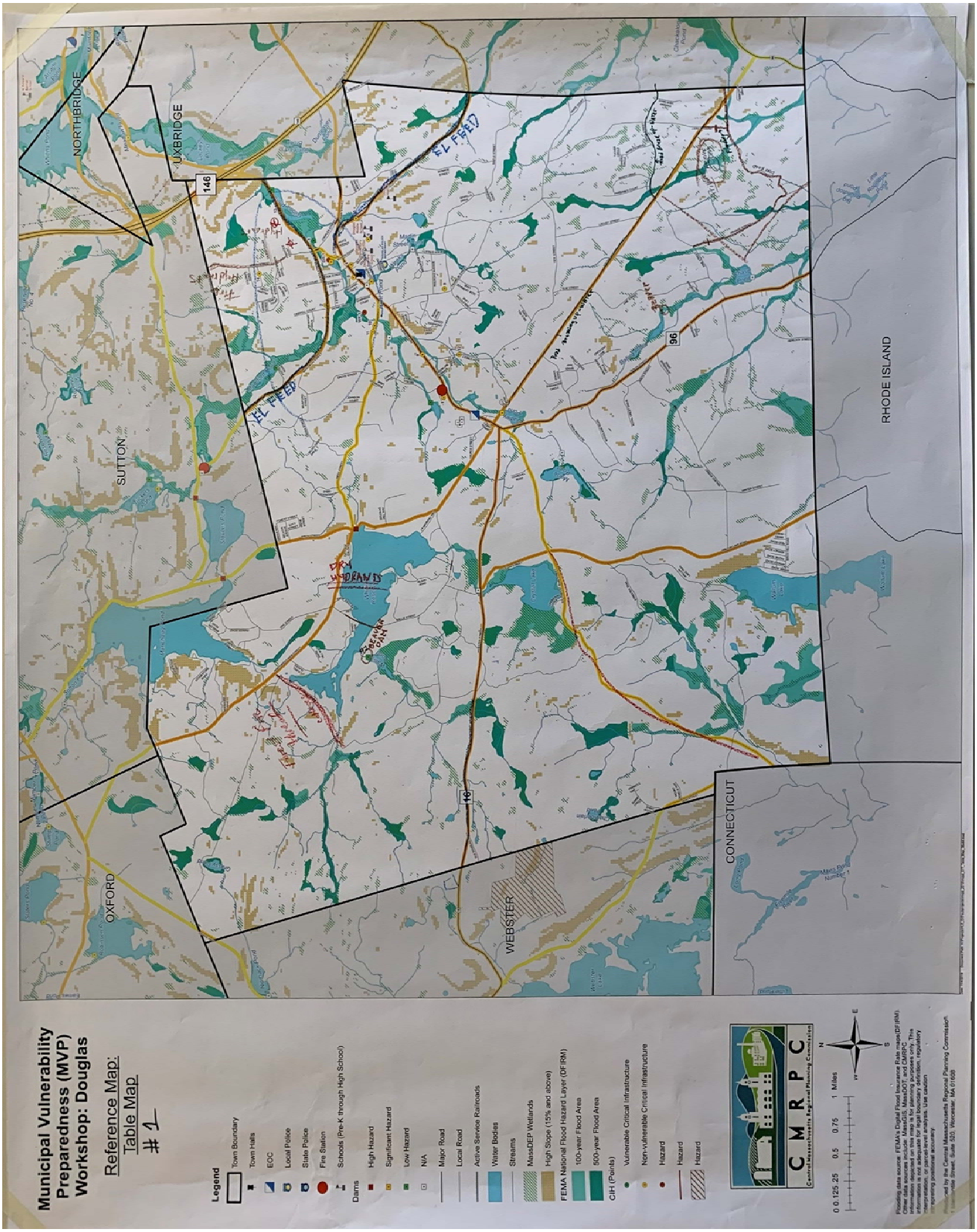

Municipal Vulnerability Preparedness (MVP) Workshop: Douglas
Reference Map: Table Map #1
Legend
Town Boundary
Town Halls
EOC
Local Police
State Police
Fire Station
Schools (Pre-K through High School)
Dams
High Hazard
Significant Hazard
Low Hazard
N/A
Major Road
Local Road
Active Service Railroads
Water Bodies
Streams
MassDEP Wetlands
High Slope (15% and above)
FEMA National Flood Hazard Layer (DFIRM)
100-year Flood Area
500-year Flood Area
CIH (Points)
Vulnerable Critical Infrastructure
Non-vulnerable Critical Infrastructure
Hazard
Hazard
Hazard
CMRPC
Central Massachusetts Regional Planning Commission
0 0.125 25 0.5 0.75 1 Miles
NORTHBRIDGE
UXBRIDGE
SUTTON
OXFORD
WEBSTER
CONNECTICUT
RHODE ISLAND
146
16
96

TABLE 2

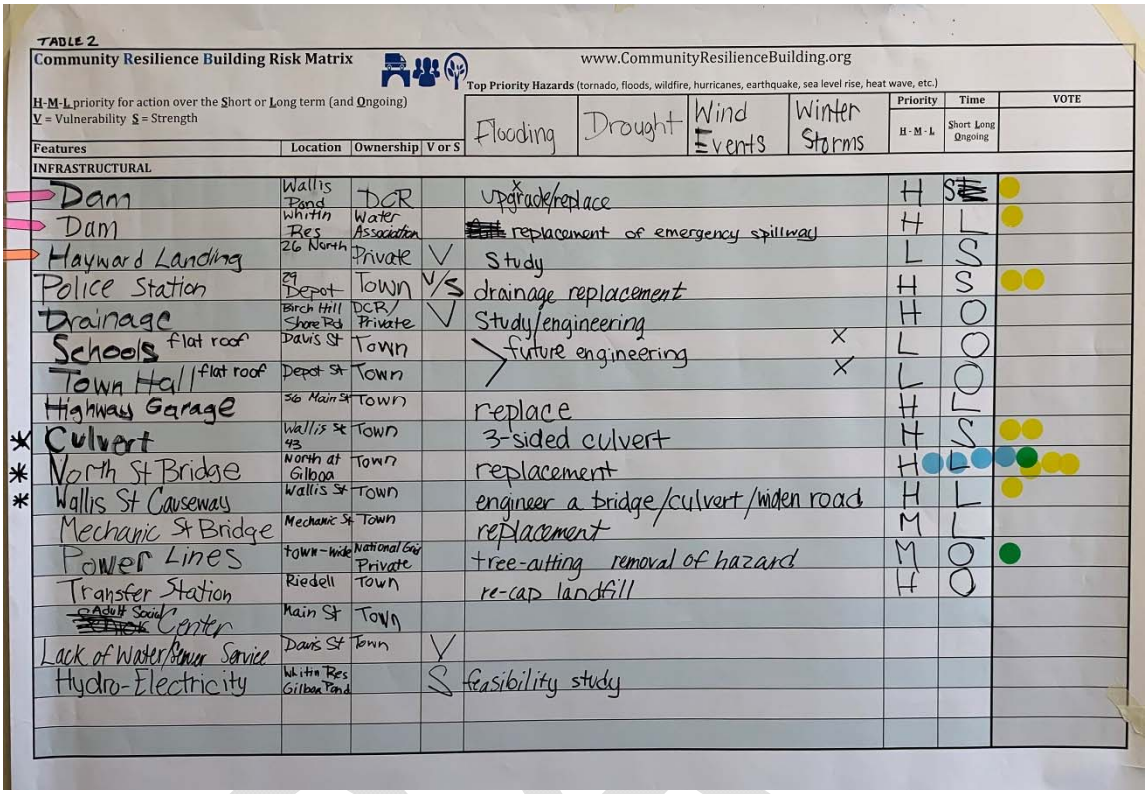


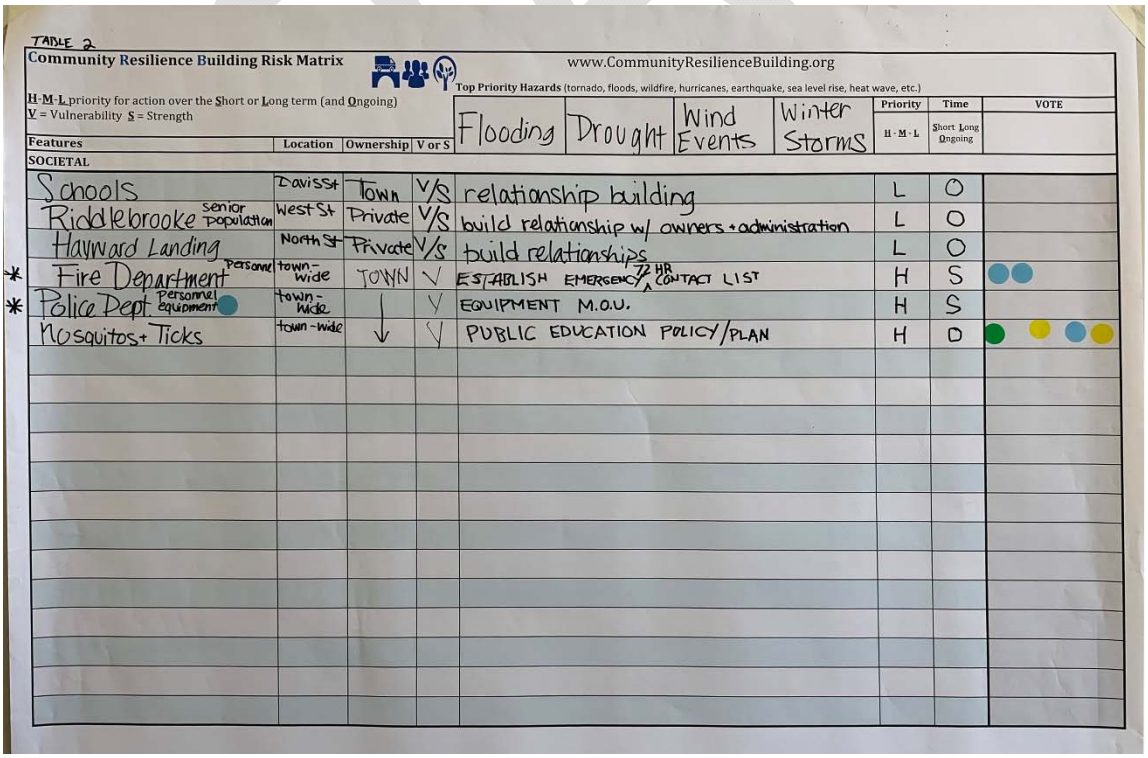
TABLE 2

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

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

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

Features	Location	Ownership	V or S	Flooding	Drought	Wind Events	Winter Storms	Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL										
Dam	Wallis Pond	DCR		upgrade/replace				H	S	
Dam	Whitin Res	Water Association		replacement of emergency spillway				H	L	
Hayward Landing	26 North	Private	V	Study				L	S	
Police Station	29 Depot	Town	V/S	drainage replacement				H	S	
Drainage	Birch Hill Shore Rd	DCR/ Private	V	Study/engineering				H	O	
Schools flat roof	Davis St	Town		future engineering		X	X	L	O	
Town Hall flat roof	Depot St	Town						L	O	
Highway Garage	36 Main St	Town		replace				H	L	
* Culvert	Wallis St 43	Town		3-sided culvert				H	S	
* North St Bridge	North at Gilboa	Town		replacement				H	L	
* Wallis St Causeway	Wallis St	Town		engineer a bridge/culvert/widen road				H	L	
Mechanic St Bridge	Mechanic St	Town		replacement				M	L	
Power Lines	town-wide	National Grid Private		tree-cutting removal of hazard				M	O	
Transfer Station	Riedell	Town		re-cap landfill				H	O	
~~Adult Social Center~~	Main St	Town								
Lack of Water/Sewer Service	Davis St	Town	V							
Hydro-Electricity	White Res Gilboa Pond		S	feasibility study						



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

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

Features	Location	Ownership	V or S	Flooding	Drought	Wind Events	Winter Storms	Priority H-M-L	Time Short Long Ongoing	VOTE
SOCIETAL										
Schools	Davis St	Town	V/S	relationship building				L	O	
Riddlebrooke senior population	West St	Private	V/S	build relationship w/ owners + administration				L	O	
Hayward Landing	North St	Private	V/S	build relationships				L	O	
* Fire Department personnel	town-wide	TOWN	V	ESTABLISH EMERGENCY 72 HR CONTACT LIST				H	S	
* Police Dept personnel equipment	town-wide	↓	V	EQUIPMENT M.O.U.				H	S	
Mosquitos + Ticks	town-wide	↓	V	PUBLIC EDUCATION POLICY/PLAN				H	D	

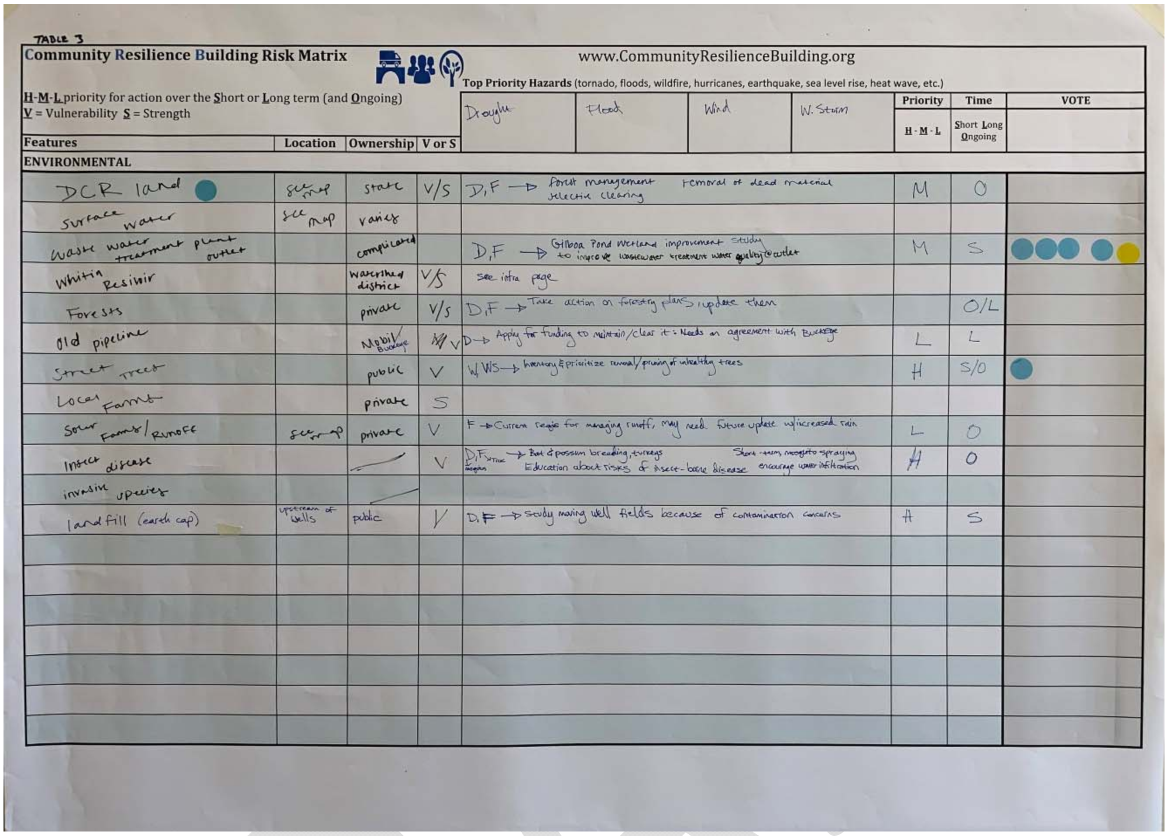
TABLE 3

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

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

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

Features	Location	Ownership	V or S	Drought / Flood / Wind / W. Storm	Priority H-M-L	Time Short Long Ongoing	VOTE
ENVIRONMENTAL							
DCR land	see map	state	V/S	D,F → forest management, removal of dead material, selective clearing	M	O	
surface water	see map	varies					
waste water treatment plant outlet		complicated		D,F → Gilboa Pond Wetland improvement study to improve wastewater treatment water quality @ outlet	M	S	
Whitin Reservoir		watershed district	V/S	see infra page			
Forests		private	V/S	D,F → Take action on forestry plans, update them		O/L	
old pipeline		Mobil/Buckeye	V	D → Apply for funding to maintain/clear it: Needs an agreement with Buckeye	L	L	
street trees		public	V	W, WS → Inventory & prioritize removal/pruning of unhealthy trees	H	S/O	
Local Farms		private	S				
Solar Farms/Runoff	see map	private	V	F → Current regs for managing runoff, may need future update w/increased rain	L	O	
insect disease			V	D,F, W.Storm → Bat & possum breeding, turkeys. Education about risks of insect-borne disease. Short-term, mosquito spraying; encourage water infiltration	H	O	
invasive species							
landfill (earth cap)	upstream of wells	public	V	D,F → Study moving well fields because of contamination concerns	H	S	

Municipal Vulnerability Preparedness (MVP) Workshop: Douglas
Reference Map: Table Map #2
Legend
Town Boundary
Town Halls
EOC
Local Police
State Police
Fire Station
Schools (Pre-K through High School)
Dams
High Hazard
Significant Hazard
Low Hazard
N/A
Major Road
Local Road
Active Service Railroads
Water Bodies
Streams
MassDEP Wetlands
High Slope (15% and above)
FEMA National Flood Hazard Layer (DFIRM)
100-year Flood Area
500-year Flood Area
CIH (Points)
Vulnerable Critical Infrastructure
Non-vulnerable Critical Infrastructure
Hazard
Hazard
Hazard
CMRPC
Central Massachusetts Regional Planning Commission
0 0.125 25 0.5 0.75 1 Miles
N
W
E
S
Flooding data source: FEMA's Digital Flood Insurance Rate maps(DFIRM). Other data displayed on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation or parcel level analysis. Use caution interpreting positional accuracy.
Produced by the Central Massachusetts Regional Planning Commission
Worcester, MA 01608
OXFORD
SUTTON
NORTHBRIDGE
UXBRIDGE
WEBSTER
CONNECTICUT
RHODE ISLAND
146
16
96

TABLE 3

TABLE 3

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

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

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.): Flooding | Drought/Heat | Winter Storms | Wind

Features	Location	Ownership	V or S	Top Priority Hazards (Flooding / Drought/Heat / Winter Storms / Wind)	Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL							
Dams	see map	private	V	F, D → legal action ~~Bridge~~ Trail Overflow Reconnect	H	L/O	
↳ Whitin Dam Sutton High Hazard Dams				↗			
Sewage treatment (water volume)	plant/ see map						
↳ coordination with Whitin Water district							
~~Access Road~~ Route 16 (Hwy Dept, Fire Station)			V	F → Study road levels Centerville Brook Sect, water main → temp difference	H	O	
Culverts	see map	public	V	F See below			
North St. Bridge / Spill way (1)	see map	public		F → Study bridge upgrade	H	S	
Cosway (2)	see map	private	V	F → upgrade culverts	M		
Wells / water supply	see map	public	S	D → ① study new well locations, update water source protection areas/ purchase land ② Water interconnection w/ Sutton	① H ② M	① S ② L	
Limited Geographic Coverage of Water System (firefighting)			V	D → update policies for new development to require systems? dry hydrants @ surface water	M	S,L,O	
Gilboa St. Water Main	see map		V	general ~~all~~ → ~~Studies~~ Replace	M	S/M	
Septic systems in outlying areas	see map		V	F → package water treatment plant study	M		
Trunk line Trail	see map		S	Study improved fire/emergency access	L		
Shelters (High School, Elementary School)	see map		S				
National Grid, tree maintenance		private	V	WS, W → Microgrid study • Lately not doing a good job of maintenance can Town can set priority areas? • Work w/ other towns to apply pressure or even set up regional grid/power co *long term*	H	S/O	
Back-up Generators			S	Done, consider updating to solar + batteries	L	L	
Wallace St (3)	see map	public	V	F → re-sizing		S	

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Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.): Flooding | Drought/Heat | Winter Storms | Wind

Features	Location	Ownership	V or S	Top Priority Hazards (Flooding / Drought/Heat / Winter Storms / Wind)	Priority H-M-L	Time Short Long Ongoing	VOTE
SOCIETAL							
Community Participation	/	/	V	community outreach improvement	H	O	
Resistance to Spending	/	/	V				
Riddle Brook Senior Housing	see map	private	V	education, outreach to vulnerable populations (Riddle Brook Senior Housing through Cottage Colony)	M (Riddle Brook Senior Housing through Cottage Colony)	S, O (Riddle Brook Senior Housing through Cottage Colony)	
East Douglas Neighborhood	see map	both	V/S				
Wallum Lake Terrace	see map	private	V				
Cottage Colony	see map	private	V				
Whitin Watershed District *see infrastructure page	see map	both	V		H		
Coordination with Sutton	/	/	S	study on w/ Sutton, Uxbr, Northbr hydrology		S-med	
High School & Elementary as Shelter	see map	public	S			O	
Mutual Aid	/	/	S			O	
Code Red	/	/	S			O	
Fire Station / Volunteers &	see map	public	S	increase staffing as needed	M	O	
Campgrounds	see map	both	V	F, D, ? Wind? check on communication in case of emergency	H	S	
Subdivision Regs regarding Fire protection	West side of town		V	F Cistern regs being discussed		O	

TABLE 4

TABLE 4

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

Flood	Drought	Wind Events	Winter Storms

Features	Location	Ownership	V or S		Priority H-M-L	Time Short Long Ongoing	VOTE
INFRASTRUCTURAL							
Route 16 in front of Fire Station culvert	Route 16	Town	V	investigate flooding issues & develop a solution	H	S	
Wallis Street Cosway	Whitin Reservoir	Town / Water District		elevate cosway	M	L	
Earthen Dam	North west Main Street	water District?		elevate cosway	M	L	
Whitin Reservoir Dam	west and Northwest St.	water District		make more efficient, determine ownership, emergency management plan	H	L	1
SW Drain	Police Department	Town	V	develop storm water management plan	H	S	
Webster Road / Route 16	Route 16	Town	V/S	maintain proper treatment for storms →	M	O	
Commercial Development	Davis St., Uxbridge Line	Private	V/S	perform a water & sewer feasibility study	H	S	1
Power Lines				increase tree trimming budget	H	O	5
Private Wells	Town wide	Private	V	complete town wide water conservation study	H	L	
Public Water	Main Street, Town water Area	Public	V/S	complete town wide water conservation study	H	L	1
Senior Center/Adult Social Center	Gleason Court	Town	V/S	assign alternate locations/ADA compliance	M	S	
Douglas Public Schools	Gleason Court Davis Street	Town	V	maintain code red system	M	O	
Municipal Buildings/Equipment	Main St (Fire station) Depot St (Police station)	Town	V	maintain equipment / keep up to date	H	O	

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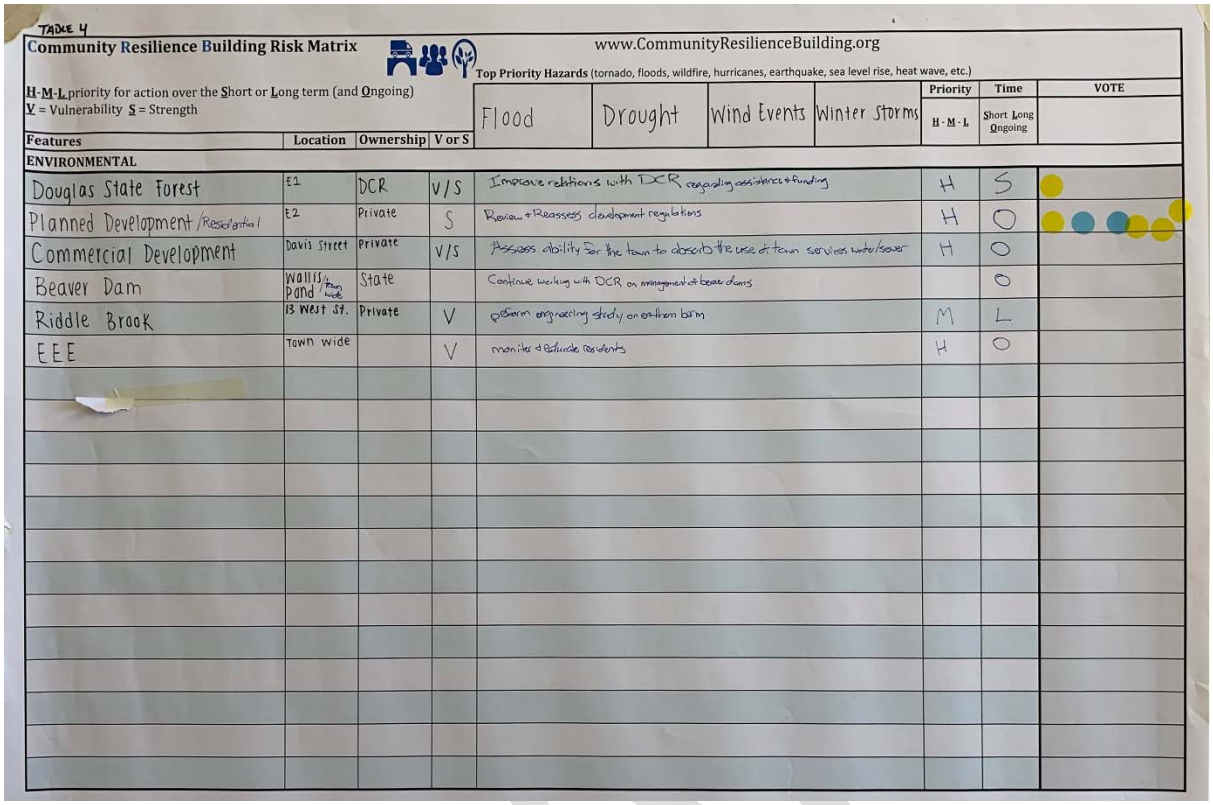
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, sea level rise, heat wave, etc.)

Flood	Drought	Wind Events	Winter Storms

Features	Location	Ownership	V or S		Priority H-M-L	Time Short Long Ongoing	VOTE
SOCIETAL							
Lake Manchaug Campground	Oak Street	Private Staruk		ensure proper notification is maintained	M	O	
Commercial Development	Davis Street	Private	S				
Riddle Brook	15 West St.	Private	V/S	develop an evacuation plan	M	S	
EEE	Town wide		V	educate public on prevention techniques	H	O	3
Elderly Population	Town wide		V/S	Maintain current lists and tracking of needs	M	O	
Soldier's Field	Mechanic St.	Town	V/S	Maintain post storms & maintain/improve driveway & parking access & water runoff	M	O	
Martin Road Park	Martin Road	Town	S	" " " "	M	O	
VFW fields	Main Street	Town	V/S	" " " "	M	O	
Douglas Public Schools	Gleason Court Davis Street	Town	S				
Jenks Store (Historic)	Main St.	Douglas Historical Soc.	S	historical preservation architectural study for improvements / ADA	H	O	



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

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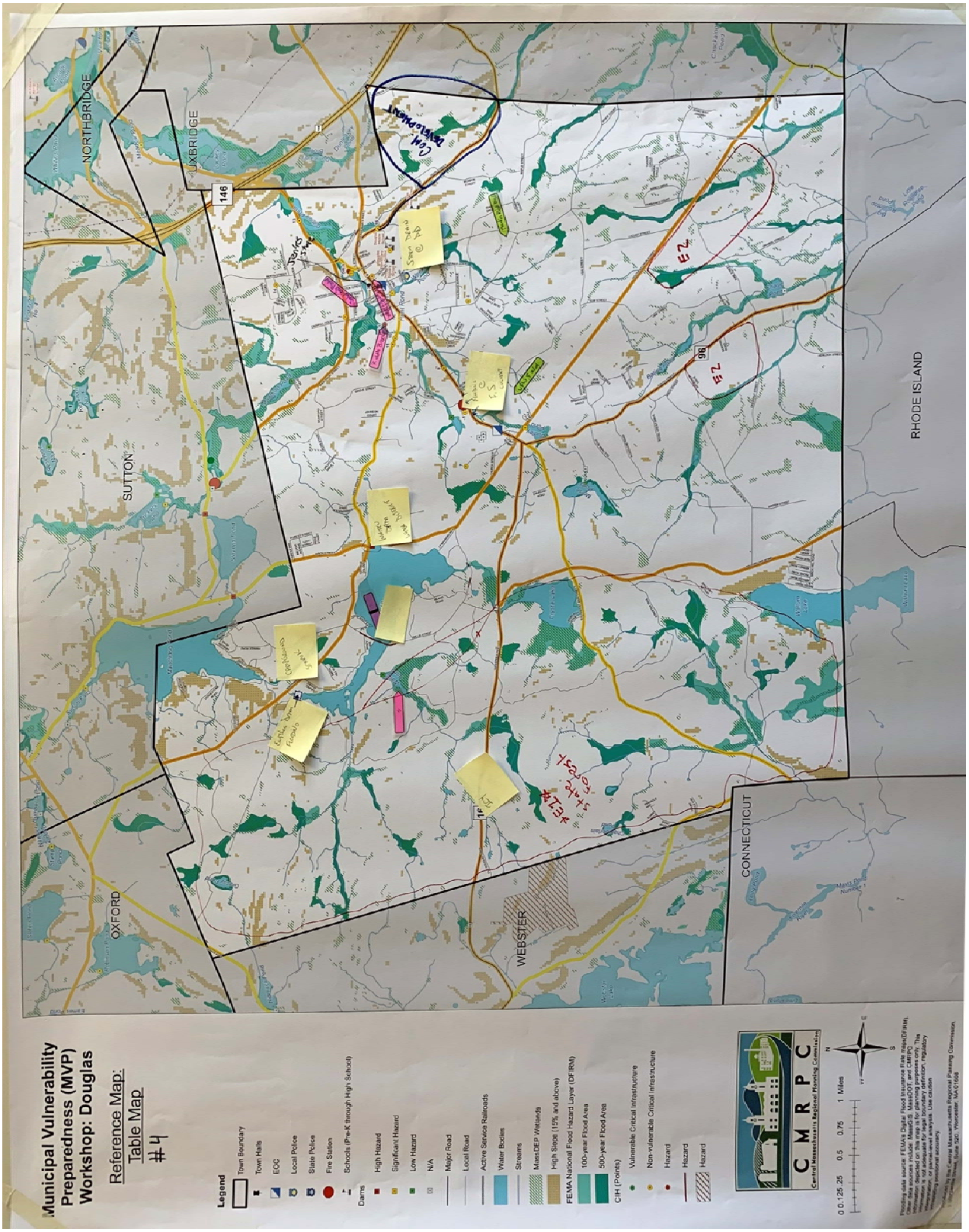
				Flood	Drought	Wind Events	Winter Storms	Priority	Time	VOTE
Features	**Location**	**Ownership**	**V or S**					**H-M-L**	**S**hort **L**ong **O**ngoing	
ENVIRONMENTAL										
Douglas State Forest	E1	DCR	V/S	Improve relations with DCR regarding assistance & funding				H	S	
Planned Development (Residential)	E2	Private	S	Review + Reassess development regulations				H	O	
Commercial Development	Davis Street	Private	V/S	Assess ability for the town to absorb the use of town services water/sewer				H	O	
Beaver Dam	Wallis Pond (Town wide)	State		Continue working with DCR on management of beaver dams					O	
Riddle Brook	13 West St.	Private	V	perform engineering study on earthen berm				M	L	
EEE	Town wide		V	monitor & Pesticide residents				H	O	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Local Police
State Police
Fire Station
Schools (Pre-K through High School)
Dams
High Hazard
Significant Hazard
Low Hazard
N/A
Major Road
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CIH (Points)
Vulnerable Critical infrastructure
Non-vulnerable Critical infrastructure
Hazard
Hazard
Hazard
NORTHBRIDGE
UXBRIDGE
SUTTON
OXFORD
WEBSTER
CONNECTICUT
RHODE ISLAND
146
16
96
E7
E7
CMRP
Central Massachusetts Regional Planning Commission
0 0.125 .25 0.5 0.75 1 Miles
N
W
E
S

COMMUNITY RESILIENCE BUILDING MATRICES

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

Douglas Table 1

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

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

V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S	Flood	Drought	Winter Storm	Wind Event	Priority H - M - L	Time S Short L Long O Ongoing
Infrastructural									
Hydrants and cisterns: Dry hydrants near water/ State DCR maintaints systems in forest	Any water body	State, Town, Private	V		X			H	S
Utility Lines, removing trees: Runding for studies/ indentification of storage/ use for tree waste	Manchaug-Gilboa, Rt 16	State, Town, Private	V		X	X	X	H	S
Extension of water lines (fire protection): Study/ upgrades	Near High School	Town	V		X			H	S
Emergency notification/ response: Workshops/ drills			V	X	X	X	X	H	S
Lack of capacity on transmission lines: Substation study		Town/ Private	V		X	X	X	H	H
Roof maintenance (ice): study, procurement assistance	Town-wide	Town-owned buildings	V			X		H	S
Flooding/ water damaged roads: evaluation	SE Main St & Linden St.	Town	V	X				M	L
Dam study	Town-wide	State, Town, Private	V	X		X		M	S
Forest fires - monitoring: Install local weather station: current location is not local	Town-wide	State, Town	V	X	X	X	X	M	
High School shelter - Need better access. Site design/ permitting new access.	High School	Town	V	X	X	X	X	L	L
High School shelter - egress/ exit: Site design/ permitting	High School	Town	V	X	X	X	X	L	L
Beaver dams/ dam maintenance	State forest	State	V	X		X		L	
Drone technology - emergency response	Town-wide	Town	S	X	X	X	X		
Battery bank/ generators	HS, Town Hall, Fire Dept	Town	S	X	X	X	X		
Bylaws: underground utility lines	Town-wide		S		X	X	X		
DPW - snow clearing	Town-wide	Town	S			X			
Societal									
Emergency notification/ response training: Municpal public safety training/ Develop outreach materials	Town-wide	Town	V	X	X	X	X	H	S
Vulnerable population re EEE/ insect-borne disease	Town-wide		V	X	X			H	S
Wallum Lake - visitors, police, traffic, parking, boats: Work with DCR to provide better access for residents	Wallum Lake	State	V & S		X			H	O
Public education - cut brush back, fire awareness: Cable PSA, social media, newspaper outreach materials	Private residences	Private	V		X			M	S
Regional training: District 7 (?) workshop, MEMA consultant				X	X	X	X		
Shared municipal services (FD, DPW), water	Town-wide	Town	S	X	X	X	X		
Senior center emergency preparedness sheets: mailings (cesnsus), PSA	Senior center	Town	S	X	X	X	X	M	S
Campers. Invasive concerns (firewood), electricity drain: Outreach w/ owners.	Campground	Private	V	X	X		X	L	L
Youth sports - programming, facilities	Sports fields	Town	V					L	L
Workforce Housing									
Recreation/ potential acquisitions: study	Town-wide	Town							
Open Space & Recreation Plan?	Town-wide	Town							
Environmental									
Temporary forestry permits: DCR consult, forestry management plan	Town-wide	State, Town, Private			X	X	X	H	S
EEE/ Insect borne diseases	Town-wide			X	X				
Ecosystem changes	Town-wide								
Flooding/ pavement degradation	Linden St, SE Main St.	Town							
Invasive species (Ash borer, gypsy moths)	Town-wide	State, Town, Private	V	X	X	X	X		
Beavers	Town-wide	State, Town, Private	V	X	X				
Wallum Lake - water quality	Wallum Lake	State							
Deer	Town-wide	State, Town, Private	V						
Ince melt for increased ice (water quality): continued catch basin maintenace	Town-wide	Town	V			X		L	O

Community Resilience Building Risk Matrix

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

Douglas Table 2

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

V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S	Flood	Drought	Winter Storm	Wind Event	Priority H - M - L	Time S L O
Infrastructural									
Dam: Upgrade/ replace	Wallis Pond	DCR		X				H	S
Dam: Replacement of emergency spillway	Whitin Reservoir	Water Association		X				H	L
Haywayrd Landing: Sutdy	26 North St	Private	V	X				L	S
Police station: Drainage replacement	29 Depot St	Town	V & S	X				H	S
Drainage: Sutydy/ engineering	Birch Hill/ Shore Rd.	DCR/ Private	V	X				H	O
Highway garage: replace	56 Main St	Town	V					H	L
Culvert: 3-sided culvert	43 Wallis St	Town	V	X				H	S
North St Bridge: replacement	North at Gilboa	Town	V	X				H	L
Wallis St Causeway: engineer a bridge/ culvert/ widen road	Wallis St	Town	V	X				H	L
Adult social center	Main St	Town							
Transfer station: re-cap landfill	Riedell	Town	V	X				H	O
Mechanic St Bridge: replacement	Mechanic St	Town	V	X				M	L
Power Lines: tree cutting, removal of hazard	Town-wide	National Grid/ Private	V		X	X	X	M	O
Schools: flat roof future engineering	Davis St	Town				X		L	O
Town Hall: flat roof future engineering	Depot St	Town				X		L	O
Lack of water/ sewer service	Davis St	Town	V						
Hydro-electricity: Feasibility study	Whitin Reservoir & Gilboa Pond	Town	S						
Town Hall: flat roof future engineering	Depot St	Town				X		L	O
Societal									
Fire Department personnel: Establish emergency 72 hour contact list	Town-wide	Town	V	X	X	X	X	H	S
Police Department: Personnel equipment. Equipment M.O.U.	Town-wide	Town	V	X	X	X	X	H	S
Mosquitos & ticks: Public education policy/ plan	Town-wide	State, Town, Private	V	X	X	X	X	H	O
Riddlebrook Senior population: Build relationship with owners and administration	West St	Private	V & S	X	X	X	X	L	O
Hayward Landing: Build relationships	North St	Private	V & S	X	X	X	X	L	O
Schools: Relationship building	Davis St	Town	V & S	X	X	X	X	L	O
Environmental									
Beavers: Mass (Fish & Wildlife) state laws need to be revised	Town-wide	State, Town, Private	V	X				H	O
Wetlands: Protect and maintain.	Town-wide	State, Town, Private	V	X	X			H	O
Eutrophication: By-laws, control fertilizer/ septic runoff	Lakes, waterways	State, Town, Private	V	X	X			H	O
Old landfill: Recap landfill area, study	Riedell	Town	V	X	X			H	O
Wallum Lake Terrace: Environmental study for runoff pollution	Birch Hill	Private	V	X	X			H	O
Forests: Fire Hazard/ control burns/ public education.	Town-wide	State, Town, Private	V & S	X	X	X	X	M	O
Invasive insect species: Public education	Town-wide	State, Town, Private	V	X	X	X	X	M	O

Community Resilience Building Risk Matrix

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

Douglas Table 3

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

V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S	Flood	Drought	Winter Storm	Wind Event	Priority H - M - L	Time S Short L Long O Ongoing
Infrastructural									
Whitin Reservoir Dams: Legal action against water district? Ridge trail emergency overlow reconnection	Whitin Resrvoir	Private	V	X	X			H	L, O
Sutton High Hazard Dams could impact town	Sutton	Town	V	X	X			H	L, O
Sewage treatment (water volume): Coordination on water levels with Whitin water district	Whitin Resrvoir	Private	V		X				
Route 16 (Highway Department, Fire Station): Study road levels or culvert replacement, Centerville Brook salt. Water main breaks from ground temp difference.	Route 16	Town	V	X		X		H	O
North St Bridge: study bridge upgrade. Replace spillway	North St	Town	V	X		X		H	S
Wells/ water supply: Study new well locations, update wter source protection codes/ purchase land. Study water interconnection with Sutton.	SW Main St	Town	S		X			H, M	S, L
Causeway: Upgrade culverts	Whitin Resrvoir	Private	V	X				M	
National Grid, Tree maintenance: Lately not doing a good job of maintenance. Can Town set priority areas? Work with other towns to apply pressure on National Grid, or even set up a regional grid/ power & light company. Study microgrid for the town.	Town-wide	Private	V			X	X	H	S, O
Limited geographic coverage of water system (firefighting): Update policies for new development to require cisterns? Dry hydrants at surface water	West side of town	State, Town, Private	V		X			M	S, L, O
Gilboa St water main: Replace	Gilboa St.	Town	V	X	X			M	S, M
Septic systems in outlying areas: package water treatment plant study	West and south of town	Private	V	X	X			M	
Trunk Line Trail: Study use for improved fire/ emergency access	Town-wide	State, Town	S		X			L	
Back-up generators: Consider updating to solor and batteries	Town-owned buildings	Town	S	X	X	X	X	L	L
Wallace St culvert	Wallace St	Town	V	X		X			S
Shelters: high school, elemetary school	Davis St	Town	S	X	X	X	X		
Societal									
Community participation: Community outreach improvement	Town-wide		V	X	X	X	X	H	O
Whitin Watershed District	Whitin Reservoir	Town, Private	V	X	X			H	
Campgrounds: Check on communication in case of emergency	Oak St	Private	V	X	X	X	X	H	S
Resistance to spending	Town-wide	Town	V	X	X	X	X	M	O
Riddle Brook senior housing: education, outreach to vulnerable population	West St.	Private	V	X	X	X	X	M	S, O
East Douglas neighborhood: education, outreach to vulnerable population	East Douglas	Town, Private	V & S	X	X	X	X	M	S, O
Wallum Lake Terrace: education, outreach to vulnerable population	Birch Hill Rd	Private	V	X	X	X	X	M	S, O
Cottage Colony: education, outreach to vulnerable population	NW Main St	Private	V	X	X	X	X	M	S, O
Fire Station/ volunteers: increase staffing as needed	Town-wide	Town	S	X	X	X	X	M	O
Coordination with Sutton: Study w/ Sutton, Uxbridge, Northborough, hydrology	Town-wide	Town	S	X	X	X	X		S, M
High school & Elementary school are shelters	Davis St.	Town	S	X	X	X	X		O
Mutual aid	Town-wide	Town	S	X	X	X	X		O
Code Red	Town-wide	Town	S	X	X	X	X		O
Subdivision regulations regarding fire protection: Cistern regulations are being discussed	West side of town	Private	V		X				O
Environmental									
Landfill (earth cap), located upstream of wells: Study moving well fields because of contamination concerns	Main St	Town	V	X	X			H	S
Insect disease: Education about risks of insect-borne disease. Short term, mosquito spraying. Encourage infiltration of water. Bat & possum breeding, turkeys.	Town-wide		V	X	X			H	O
Street trees: Inventory and prioritize removal/ pruning of unhealthy trees	Town-wide	Town	V	X	X	X	X	H	S, O
DCR Land: Forest management, selective clearing, removal of dead material	Douglas State Forest	State	V & S		X			M	O
Wastewater treatment plant outlet: Gilboa Pond wetland improvement study (to improve wastewater treatment water quality at outlet)	Gilboa Pond	Town	V	X	X			M	S
Old pipeline: Apply for funding to maintain/ clear it: Need agreement of Buckeye	See Map	Buckeye/ Mobil	V	X	X			L	L
Solar farms runoff: Current requirements for managing runoff may need future update with increased rain	See Map	Private	V	X		X		L	O
Whitin Reservoir: See infrastructure section	Whitin Reservoir	Watershed District	V	X	X				
Forests: Take action on forestry plans, update them	Town-wide	Private	V & S		X	X	X		O, L
Surface water	Town-wide	State, Town, Private							
Local Farms	Town-wide	Private	S						
Invasive species	Town-wide								

Community Resilience Building Risk Matrix

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Douglas Table 4

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

V = Vulnerability **S** = Strength

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

Features	Location	Ownership	V or S	Flood	Drought	Winter Storm	Wind Event	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Culvert at Route 16 in front of Fire Station: Investigate flooding issues & develop a solution	Route 16	Town	V	X		X		H	S
Whitin Reservoir Dam: Make more efficient, determine ownership, emergency management plan	Northwest Main St.	Water District	V	X	X			H	L
SW Drain: Develop stormwater management plan	Police Dept	Town	V	X		X		H	S
Municipal buildings/ equipment: Maintain equipment, keep up to date	Main St (Fire) Depot St (Police)	Town	V	X	X	X	X	H	O
Commercial development: Perform a water & sewer feasibility study	Davis St, Uxbridge line	Private	V &S	X	X			H	S
Power lines: Increase tree trimming budget	Town-wide	Town, Private	V			X	X	H	O
Private wells: complete town-wide water conservation study	Town-wide	Private	V	X	X			H	L
Public water: complete town-wide water conservation study	Town-wide	Town	V	X	X			H	L
Senior center/ Adult social center: Assign alternate locations/ ADA compliance	Gleason Court	Town	V & S	X	X	X	X	M	S
Wallis St Causeway: elevate causeway	Whitin Reservoir	Town/ Water District	V	X		X		M	L
Earthen Dam: elevate causeway	Northwest Main St.	Water District?	V	X				M	L
Webster Rd/ Route 16: Maintain proper treatment for storms	Route 16	Town	V &S			X		M	O
Douglas Public Schools: Maintain code red system	Gleason Court, Davis St	Town	V	X	X	X	X	M	O
Societal									
Jenkes Store (Historic): Historical preservation architectural study for improvements/ ADA	Main St	Douglas Historical Soc	S					H	O
EEE: Educate public on prevention techniques	Town-wide		V	X	X			H	O
Riddle Brook: Develop an evacuation plan	13 West St	Private	V & S	X	X	X	X	M	S
Commercial development	Davis St	Private	S						
Lake Manchaug Campground: Ensure proper notification is maintained	Oak St	Private/ Staruk		X	X	X	X	M	O
Environmental									
Douglas State Forest: Improve relations with DCR regarding assistance and funding.	Douglas State Forest	State	V & S	X	X	X	X	H	S
Planned Development/ Residential: Review and reassess development regulations.	Southeast corner of town	Private	S	X	X			H	O
Commercial Development: Assess ability for the town to absorb the use of town services (water/ sewer).	Davis St	Private	V & S	X	X			H	O
Beaver Dam: Continue working with DCR on management of beaver dams.	Wallis Pond, & town-wide	State		X	X				O
Riddle Brook: Perform engineering study on earthen berm.	13 West St	Private	V	X				M	L
EEE: Monitor and educate residents	Town-wide		V	X	X			H	O