Town of Paxton

Community Resilience Building Workshop

Summary of Findings

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FUSS & O'NEILL

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Overview

Extreme weather and natural and climate-related hazards are an increasing concern for the communities of Massachusetts, and there is a clear need to involve municipalities, corporations, organizations, and the State in increasing resilience at all levels. Recent storm events affecting the region have highlighted many of the vulnerabilities that towns and cities face. Hurricane Irene and Superstorm Sandy brought intense flooding to many municipalities and threatened (or destroyed) infrastructure across the state. Extreme temperatures at both ends of the spectrum have pushed the limits of communities' preparedness to protect both infrastructure and people. In coastal communities, the impacts of sea level rise are felt daily and further exacerbate the impacts of other extreme events. Current climate modeling indicates that all of these hazards are expected to increase in frequency and scale over the coming decades. The Municipal Vulnerability Preparedness (MVP) program provides support and a prescribed process for cities and towns in Massachusetts to plan proactively for resiliency and implement key climate change adaptation actions.

In 2019, the Town of Paxton was awarded a $25,130 MVP grant to fund the planning stage of this process and conduct additional listening sessions specifically focused on engaging the populations served by Anna Maria College and the Senior Center. The Town partnered with Fuss & O'Neill, a state certified MVP Provider, to complete a comprehensive, baseline climate change and natural hazard vulnerability assessment and develop a list of priority actions for the Town. This process involved the development of an MVP Core Team, which met on August 14, 2019 to determine initial concerns and worked to identify stakeholders within the municipality and set goals for the process. Those stakeholders were then invited to participate in a Community Resilience Building (CRB) workshop on September 18, 2019, engaging in a day-long, tried and tested process developed by The Nature Conservancy. The CRB methodology is an "anywhere at any scale" format that draws on stakeholders' wealth of information and experience to foster dialogue about the strengths and vulnerabilities within the Town. Workshop participants interacted at both large and small group levels, using an iterative process to gather input, synthesize ideas across groups, and ultimately develop a set of priority resilience and adaptation actions.

The CRB workshop's central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Develop prioritized actions for Paxton;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

Top Hazards and Vulnerable Areas

During the Community Resilience Building workshop, participants were asked to identify the top four natural hazards of concern for the Town of Paxton. Discussion of the top hazards built on earlier conversations that took place at the MVP Core Team Meeting and previous discussions that have informed the Town's Hazard Mitigation Plan. Extreme temperatures, both cold and heat, especially the increase in days over 90 degrees Fahrenheit, were identified as a hazard. Severe storms bringing intense wind were identified as a second hazard, while the collective impacts of ice and snow were seen as a third major hazard. Finally, severe weather events, such as Nor'easters and hurricanes, were identified as the fourth hazard. These four hazards have already had demonstrated impacts on the Town, and as climate change progresses, these hazards are expected to have ever greater consequences for infrastructure and environment, as well as for various societal elements. Specific areas of concern are identified below.

Top Hazards

- Extreme Temperatures
- Wind
- Snow and Ice
- Severe Weather Events

Areas of Concern

While many impacts are expected to be felt Town-wide, certain elements, locations, or community groups present particular concerns.

Neighborhoods/Communities
The Hills at Paxton Village, student population at Anna Maria College and Paxton Center School, municipal employees

Facilities
Department of Public Works Garage, Paxton Municipal Light Department, Paxton Center School, Town Hall, Senior Center, Anna Maria College, Richards Memorial Library

Dams
Asnebumskit Pond Dam, privately-owned dams

Infrastructure
Power grid, pump stations, communication towers, roads (Holden Road, Route 122, Route 31, Marshall Street/Hill Street), water supply infrastructure, private septic systems, culverts and bridges town-wide

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Current Concerns and Challenges Presented by Hazards

Major storm events have been a recurring threat to Paxton throughout its history, from hurricanes bringing wind, intense precipitation, and localized flooding, to winter storms delivering ice and snow. Recently, the Town has been experiencing an increasing regularity of storms, with the so-called 100 year storm now happening several times a year.

More intense storms delivering higher volumes of precipitation in a single event are expected to put significant pressure on dams, culverts, and other drainage infrastructure that were designed to handle smaller storms with more consistent distributions of precipitation. This problem manifests at points across the Town and is acute where the local drainage systems concentrate and discharge, especially at pinch points such as Davis Hill Road and Hill Street.

The Town is also noticing a shift in the type and timing of storms. Many storm events now encompass a mixture of rain, ice, and snow, making it more difficult to maintain safe, accessible roadways. The major ice storm that hit in December 2008 is also still fresh in residents' memories. The storm caused extensive damage to electrical infrastructure, leading to extended power outages in Paxton and surrounding communities. Not only was the Town affected by extensive power outages, but the DPW experienced difficulty responding to the situation. Mike Putnam, DPW Director, described the difficulty of getting equipment in and out of the DPW facility and how the effectiveness of the Department was hindered by the facility's non-central location. Employees would clear trees to open roads, only to have more trees fall behind them, effectively trapping them and exacerbating the difficulty of trying to keep roads clear. That same year, Michael Pingitore, Assistant Fire Chief, described how the Town experienced 30 structure fires in a week, more than 300% the average for an entire year. Colder temperatures bring an increased risk of structural fires, caused by space heaters, boiler problems, and increased use of unmaintained fire places or wood stoves.

Vulnerable populations, especially seniors, are a primary concern. They may have additional needs when it comes to transportation and sheltering in emergencies, including access to medication and electricity for oxygen pumps. Seniors may also be more difficult to reach during hazard events, as they may not have access to the internet or other common media used for emergency notification. The safety of municipal employees, including Light Department and DPW staff, as well as emergency responders, was also a main concern. During hazard events, staff place their own safety at risk to restore infrastructure and ensure public safety. Light Department staff described how their employees are out in 50 mph winds in cherry-pickers, exceeding the equipment's safety recommendations, to restore power to Paxton residents. Water Department employees noted similar concern, with employees getting wet while repairing water mains in -25 degree weather.

Extreme temperatures are also leading the Town to make greater use of heating and cooling shelters. The Senior Center and Paxton Center School were both used as designated heating/cooling shelters and were last opened in winter 2018 and summer 2019. Municipal leaders are eager to get the word out and increase transportation options so that more people, especially the elderly, are able to access these vital resources more often.

Although excessive heat is a concern, Paxton generally has not experienced the impacts of drought. Like many cities and towns across the Commonwealth, however, Paxton was impacted by the extended drought of 2016. The Town was subject to a mandatory water ban for nonessential outdoor water use.

Specific Categories of Concerns and Challenges

Infrastructural

Culverts and Bridges

Culverts and bridges are a concern Town-wide, particularly as many of Paxton's developed areas are in such close proximity to several brooks, ponds, and wetlands. Existing culverts and bridges were designed to accommodate historic patterns of precipitation and runoff, but are rapidly becoming inadequate as a result of climate change. While design standards have changed, the Town's infrastructure largely predates such changes, and thus has not kept up with new standards. As precipitation events become more intense and less predictable, undersized culverts are expected to pose a greater threat of failure and flooding. The Massachusetts Department of Transportation conducted assessments for four bridges in Town and identified one culvert as critical. The Town also contracted with the Nashua River Watershed Association in 2019 to conduct condition assessments of five additional culverts. One area of particular concern that was brought up by workshop participants is the vicinity of Marshall Street and Hill Street. This area has historically been prone to flooding, but it has become more apparent in recent years. It is a low-lying area near multiple failing culverts; portions of the street have been shut down in recent years, which has impacted through-traffic.

Roads

Roads in Paxton are vulnerable to flooding, as well as the impacts of snow and ice. In general, shifting weather patterns due to climate change are increasing the difficulty of maintaining those roadways. Potholes and sinkholes are becoming more problematic due to new patterns of freezing and thawing that occur repeatedly throughout the winter season. Participants also voiced concern about the amount of sand and salt needed to keep streets clear during the winter and the financial burden of purchasing increasing quantities of these materials. Roadway impacts due to hazard events in turn compromise the Town's ability to provide emergency services. Flooding along Holden Road (near Kauppila Pond Dam), Route 122 (near Eames Pond), Route 31 (near Thompson Pond), and Marshall Street/Hill Street (near Rasvall Pond Dam) were discussed by workshop participants, as these roads have been prone to flooding in the past.

Water Infrastructure

The Town's current water supply is piped in through one main trunk line from Worcester to Camp Street. From Camp Street, it crosses to two mains that transect Route 122–one 8" main and one 12" main, built in the 1930s. The Water Department maintains approximately 40 miles of line in total. Water is stored in two tanks with a total capacity of 1.2 million gallons: the Asnebumskit Hill tank (1 million gallon capacity) and the Maple Street tank (209,000 gallon capacity). The 1 million gallon tank is undergoing maintenance in fall 2019 and will be offline for at least six to eight weeks. During that time, the Town will rely on the Maple Street tank, which does not have a SCADA system and will therefore have to be monitored manually. Travis Thibault, Water Superintendent, expressed that any significant water needs during this time (such as a structure fire) would place considerable strain on the Town's ability to meet water needs. This critical infrastructure, as well as equipment, may be susceptible to hazards, especially flooding and extreme temperatures. Workshop participant Water Superintendent Thibault voiced concerns regarding the condition of the system's aging pipes and the fact that they are hydraulically undersized. Due to these factors, in the past few years, there have been multiple breaks on the 12" lines near West Street. These pipes are 10 to 11 feet underground (beneath the water table), and are difficult to locate and repair. The

replacement of these pipes and, in general, the aging water infrastructure, has been discussed as a priority for the Town.

Drinking Water Supply

The Water Department serves 1,330 customers, approximately two-thirds to three-fourths of Paxton's population, with the remainder of residents on private wells. Alternatives to the current water supply during emergency situations were also discussed as a topic of concern, as there are currently no mutual aid agreements in place for the Town to receive water. Workshop participant and Water Superintendent, Travis Thibault, discussed three current alternatives to the Town's water supply. The first would be to tie into Leicester wells on Grove Street, which would be limited as there is not enough water to supply both towns for an extended period of time. This option would also require both town boards to approve this measure before moving forward, and the water would not be treated beforehand (Leicester treats its water for arsenic and uranium while it is in the tank). Another option would be to open the Asnebumskit pump station. This pump station has not been used since 1997/1998 and pulls directly from the reservoir – water would need to be treated with chlorine before use. A third option would be to use water trailers. The need for back-up power supply at the Maple Street pump station was also brought up as a concern.

Water Supply for Fire Suppression

The Town does not have sufficient fire protection on the north side of Town, due to a lack of hydrants near Asnebumskit Hill, where critical communication towers, including cell towers, WSRS, and FAA towers, are located. Currently, water for firefighting must be trucked in or pulled from surrounding small ponds and swamps, which can be problematic during drought events. Water Superintendent Thibault and Assistant Fire Chief Michael Pingitore also voiced concerns over the Town's water ban affecting training and hydrant flushing for the Fire Department. The most recent water ban lasted for approximately one and a half years and impacted these activities.

Electrical Infrastructure

Communications and power lines can be knocked out by snow and ice, in addition to wind events, causing extensive impacts to the Town. Extreme heat also stresses the electrical system, as increasing use of air conditioning leads to a risk of brown outs and outages, particularly if heat impacts are region-wide. The heat also stresses the electrical system as a whole, as exposure to high temperatures decreases the life of transformers. The Paxton Municipal Light Department currently operates 10 miles of line, consisting of both overhead wires and underground electric lines. The Town receives power from two separate feeds– one from Rutland and one from Worcester. During the last heat wave in summer 2019, the Light Department had to upgrade 3-4 transformers. Workshop participants, including Tara Rondeau, General Manager of the Light Department, and David Renzette, Foreman for the Light Department, noted concern that the system was not built to handle the increasingly large load that it experiences today, which mostly derives from existing houses on the grid increasing their electricity consumption. Participants from the Light Department also cited the department's small staff size as a challenge in addressing issues such as power outages and tree trimming. Tree management is a major concern for the Light Department, as the small size of the Department also makes it difficult to meet trimming needs. Aside from lines, there were also concerns regarding flooding and melting ice negatively impacting transformers.

Buildings and Facilities

Workshop participants expressed concern about the impacts of heavy snow loads on the Town's aging, flat-roofed municipal buildings. Extreme temperatures are also impacting the ability to effectively heat or cool buildings. For example, buildings with brick and masonry facades absorb excessive heat from the urban environment and retain it during extremely hot days; these problems are made worse by a lack of adequate insulation in many of the Town's older buildings. Cooling capacity is an issue at locations Town-wide, but was noted in particular for the Town Hall, Senior Center, and Paxton Center School. These

buildings have air conditioning in certain rooms, but lack building-wide cooling capabilities, leaving staff, students, and seniors vulnerable to health problems amid high temperatures. At the other end of the temperature extreme, freezing temperatures have caused water lines that supply the Town Hall to freeze in the past. Additionally, recent engineering studies at the Town Hall and Senior Center indicate structural issues within both buildings. Participants voiced concerns that extreme storm events may exacerbate these structural issues. There has been discussion on relocating or rebuilding the Senior Center, although participant Julia Pingitore, Board of Selectmen, noted that despite the need for a new facility, it has been a difficult process, as the current Senior Center is registered as a historic building and potential redevelopment sites are limited in Paxton. There are also more general concerns about flooding risk for buildings Town-wide, as Paxton is on a high-water table, which has caused flooding issues in the past. The DPW facility has had issues with flooding in the past. The DPW is also not in a central location in Town, which makes it difficult to get equipment and people in and out during emergency situations, such as the 2008 ice storm.

Schools

Paxton is part of the Wachusett Regional School District (which covers grades 9 through 12); the Paxton Center School is the only school operated and maintained by the Town (grades K through8). Workshop participants noted that the school does not have centralized air conditioning (although some classrooms may have window units), leading to concern regarding the health of students in high temperatures. The heating system is also aging, and in the past, the school has had to evacuate due to oil fumes which were carried back inside the building because of cold, windy conditions. The Paxton Center School is also located on a high water table and has experienced flooding in classrooms during previous years. The Town's Capital Improvement Committee has a capital plan that includes funds to repair and reconstruct parts of the school, which is an ongoing process.

Dams

Workshop participants identified one municipally-owned dam, the Asnebumskit Pond Dam, as the primary dam of concern, although the group was not specifically aware of any known structural issues affecting the condition of the dam. There are also multiple dams in Town that are owned and maintained by the City of Worcester. There may be additional private dams in Town, although workshop participants were not aware of the number or location of these dams. As a result, the condition of privately-owned dams in Town is unknown. Understanding the Town's overall vulnerability to dam failure, where dam removals may be possible, and where improvements can be made to public and privately-owned dams, especially high-hazard dams, can increase the resiliency of the Town during hazard events.

Emergency Power Supply

A microgrid would allow buildings to continue receiving electricity even if the main power grid experienced an outage and would provide an alternative to the generators currently in use. A Town-initiated microgrid feasibility study was conducted in 2017, although the Town did not qualify for the grant it applied for at that time. There are numerous generators at municipal facilities throughout Town, which serve the Paxton Center School, the Public Safety Complex, the Communication Center, the Light Department, the pump station, the DPW facility, and the Maple Street Tank. Although there are numerous generators throughout Town, they are not fail-proof: In 2008, during the ice storm, the generator that served the Police and Fire departments went down, which hindered the departments' ability to communicate during the emergency. The generator at the Maple Street tank, which serves public communications, also went down in 2008, and again in 2018. Additionally, the generator at the pump station is tested under load quarterly, although the generator at the Highway Department is not.

Septic Systems

The entire Town, with the exception of Anna Maria College and the Hills Senior Community, is served by septic systems. Many of these septic systems are aging and were installed according to old zoning laws

(e.g., septic systems were allowed on lots as small as 12,000 square feet). Septic systems in Paxton are a concern due to increasing flooding and the potential for high groundwater to lead to septic failures and discharges of sanitary waste to the environment, posing a threat to both human health and the environment. Participants also noted concerns regarding power outages and their potential to impact the functionality of septic systems which rely on a power supply to operate pumps. A decade ago the Town attempted to run sewer lines through Town but residents objected.

Environmental

Water Quality

At the workshop, Water Superintendent Travis Thibault noted concern over the effect of increased temperatures on water quality, as it may encourage bacterial growth in the Town's water supply tanks. To address this issue, the Water Department is installing a mixer at the Asnebumskit Hill tank, with work slated to begin in September 2019. Additionally, participants discussed the Town-owned cemetery behind the First Congregational Church of Paxton, which has been brought in previous meetings for the Town's Hazard Mitigation Plan. The cemetery dates back to the 1800s, when vaults were not used for burials. As a result, embalming chemicals are able to leech into the soil, and participants expressed concerns over the impact this may have on groundwater quality.

Trees and Forests

Forests provide critical ecosystem services that help buffer the effects of climate change, from sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Street trees are likewise critical for infiltration of rainwater and provision of shade. However, trees and forests are also threatened by climate change. Wind and storms cause blowdowns, drought can contribute to die-offs, new invasive pests that are spreading through the Commonwealth (e.g., Emerald Ash Borer, Hemlock Wooly Adelgid, and Asian Longhorned Beetle) are eliminating certain tree species, and others are in decline due to shifting temperature and precipitation regimes that favor more southerly species. The Town's emergency services and Light Department also recognize that hazard events can convert trees from assets to threats, including fueling forest fires and causing downed power lines and blocking roads. The Town currently pays $1,000 for access to a bucket truck that is shared between six towns, although they do not have sufficient staff availability to perform the level of tree trimming necessary for hazard prevention and resilience.

Invasive Species

Invasive plants and animals are a source of concern in Paxton, as they are throughout the Commonwealth. Critical invasive insect pests already in the region include the Asian Longhorned Beetle, Hemlock Wooly Adelgid, and Emerald Ash Borer, all of which have the potential to do serious damage (both environmental and economic) to Massachusetts' forests and trees. These and other species already pose a significant challenge and have serious consequences for ecosystem health and resilience, and these impacts are likely to increase in response to climate change. Participants noted that in 2008, there were restrictions in place for transporting wood outside of parts of Worcester County, although the restricted area did not extend into Paxton. The Light Department also voiced concern over bittersweet, which can pull trees down onto lines or result in blown transformers if it creates a connection between the line and the ground. Warming temperatures will also bring new invasives to the area, and these will have an easier time gaining a foothold if the Town's natural ecosystems are simultaneously weakened due to changes in climatic conditions.

Beavers

Whereas the Town generally has some record of and control over man-made stream crossings or impoundments, beaver activity is often known only anecdotally, and can cause unpredictable problems

during heavy precipitation, when flooding occurs in unexpected locations. The Town struggles with trying to keep beaver impoundments from inundating critical areas with water; for instance, beavers have inhabited an area between Streeter Pond and Asnebumskit Pond (near Holden), which led to difficulty draining Asnebumskit Pond. The Pond is typically drained annually to prevent freezing damage to the cement dam and spillway–this past year, the Town was unable to lower the pond because of beaver dams and is concerned about the potential impact on the condition of the dam and spillway. Beavers were also noted to be an issue near Eame's Pond, Marshall Street, and Illig's Pond Dam.

Disposal of Hazardous Materials

Representatives from the Light Department, including Tara Rondeau and David Renzette, discussed concerns about the disposal of old electric poles coated with creosote and transformers, as well as the liability that accompanies their disposal. Participants also voiced concerns over the disposal of solar technology (including panels and batteries), and how this may become an increasing problem for the Town given the increasing popularity of solar and the Commonwealth's encouragement of cleaner energy,

Winter Road Treatment

The Paxton Department of Public Works has faced difficulties deicing roads and parking lots during recent winter storms that have encompassed a mixture of rain, ice, and snow, especially given the thaw/refreeze cycle that has been increasingly observed in recent years. These events have required more frequent applications of deicing materials to the roads. Deicing chemicals are easily washed off the road by rain and melting ice, and they end up concentrating in nearby waterbodies, soils and groundwater. Salt and deicing materials have negative effects on water quality, aquatic species, soils and vegetation. Freshwater aquatic plants and animals are adapted to a narrow range of low chloride levels and even a slight increase can have negative effects. Increased chloride concentrations in water can also alter the distribution of oxygen and nutrients in waterbodies which can stress aquatic organisms. Similar to freshwater aquatic plants, most land plants are adapted to low levels of chloride in the soil. Salt that accumulates in soils can stress vegetation and provide opportunities for nuisance invasive plants to establish. Finally, excess salt that enters the groundwater supply can lead to more expensive and intensive drinking water treatment requirements. While the Town is aware of the impacts of road salt, DPW Superintendent Mike Putnam also discussed finding a balance between winter salt use and maintaining road safety as the number one priority.

Open Space

Open space provides ecosystem services that help buffer the effects of climate change, from sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Open space is also critical in floodplains for providing a buffer and increased flood storage, near public water supplies to maintain high water quality and promote recharge, and to maintain overall habitat connectivity that will be vital to allowing ecosystems and individual species to adapt to a changing climate. Open space includes an extensive network of parks, playgrounds and other open space that provides many social, environmental, and economic benefits to the Town. Open space also provides important recreational opportunities and relief from stress. Participant Julia Pingitore noted that while there are properties that the Town is interested in purchasing to preserve open space, these actions have been limited by a lack of funds.

Societal

Vulnerable Populations

Certain populations, especially seniors, are known to be at higher risk during hazard events and may require support beyond emergency notifications. Seniors account for approximately 30% of residents in Paxton. The Hills, built in 2013, is the primary senior housing community in Paxton. It is a privately-owned, affordable housing facility with 50 units (with four units specifically reserved for low-income residents) and approximately 110 residents. The Hills has air conditioners in each room and has a back-up

generator that powers hallways and common areas during power outages, supplying power for oxygen needs. Workshop participant Ivette Casey, Property Manager at The Hills, expressed concern that this generator would only last a few hours in an emergency situation. During prolonged outages where the generator is not a viable option, seniors would have to be transported to emergency shelters. The senior population may be especially difficult to reach during emergency situations due to a lack of access to social media or CODE RED alerts. The Town is aware of this situation, and has made efforts to encourage senior preparedness during emergency situations through increased awareness and education. Workshop participant Sergeant William Lang from the Paxton Police Department discussed the Town's plans to hold an emergency preparedness workshop for seniors in fall 2019. The Fire Department also does well-being checks on seniors during hazard events. In addition to seniors, there may be other vulnerable populations in Town that face increased risk during hazard events. To help combat this issue during extreme temperatures, the Town currently has warming and cooling centers open to the public - the Town Library and Paxton Center School. The warming center was last opened for a week in winter 2018 and the cooling center in summer 2019.

Emergency Alert and Communications Systems

The Town deploys a CODE RED alert system to send mass messages to all registered users during emergency situations. This includes any land line, cellphone number, or email address that was registered by residents. The system also has a localized alert feature that can alert residents based on their location. The system is opt-in and the Town also pulls in contact information retrieved from a third-party to maximize the reach of the alerts. The Town estimates that approximately 80% of Paxton residents are a part of the CODE RED alert system, which currently is available for enrollment through registration online and in-person at Town events such as Paxton Days. In addition to CODE RED, local communication assets, such as the Paxton television station, play a role in ensuring that emergency information reaches everyone consistently and reliably, especially to populations that the CODE RED system does not reach or those who do not have regular access to the internet.

Emergency Shelters

The Paxton Center School and Anna Maria College are the two main emergency shelters in Paxton. The Town also has emergency supplies (blankets, cots, etc.) in storage, although they would need to be transported to the shelters in the case of an emergency. Workshop participants noted that Paxton is a "bedroom community," and in emergency situations, such as the 2008 storm, many residents left the area (e.g., booked hotels in Marlborough), which relieves some pressure on the capacity of the shelters. However, the senior community, which makes up 30% of Paxton, is less mobile during times of emergency and therefore more reliant on the shelters. The particular challenges of sheltering seniors were discussed, including getting them to leave their homes, providing appropriate transportation to shelters, and integrating the medical services they need at shelters. The shelters also provide important services, such as hot meals and showers, to residents who decide to stay in Town during these times. Participants noted that in 2008, many residents visited the centers to eat and bathe and returned home to sleep. The shelter was a resource for out-of-town populations, some of whom were without power for up to two weeks. It also provided an important hub for visiting emergency crews from surrounding communities (Concord, Hudson, Taunton, North Attleboro), as it was a central location to stay for the duration of their work. Anna Maria College was last used as a shelter in 2008 although it has been prepped (and not used) since then– the last time was January 2019. Participants also highlighted the Emergency Citizens Responders, a volunteer organization, as an important resource for the Town during emergency events as they help prepare and staff shelters during events.

Anna Maria College

Anna Maria College (AMC) has approximately 600 residential students and 300-400 commuters. Given the large commuter population and the fact that many faculty and staff live in neighboring communities

(Holden, Worcester, Shrewsbury, etc.), there was concern over the commute that students, faculty, and staff face in hazard events. Due to Paxton's high elevation, weather can be considerably different from nearby communities, such as Worcester–as workshop participant Mike Putnam, DPW Superintendent, said of Paxton, "it's a whole different world up here". This may lead to challenges as commuters are not prepared or expecting inclement weather, such as black ice, when driving into Town. Additionally, as mentioned above, the College is a valuable resource during hazard events, as AMC has an agreement with the Town to make its facilities available to residents during emergencies. Workshop participant Andrew Klein, Vice President of Student Affairs at AMC, noted concern over the single-access road leading to the college. This may be problematic if the road becomes blocked or inaccessible, especially during hazard events and emergency situations where AMC serves as a shelter.

Pests and Disease Control

Climate change is affecting pests and disease vectors both through changing precipitation conditions and changing temperature conditions. Warmer, wetter conditions lead to increased mosquito populations, while the absence of sufficient periods of cold means that pest populations that would historically have been killed off or reduced are able to survive the winter and emerge in greater numbers the following season. Further, as the Massachusetts climate begins to look more like the climate of the mid-Atlantic and southern states, we are seeing new types of diseases show up in existing pests (e.g. mosquitoes carrying West Nile Virus, Eastern Equine Encephalitis (EEE), or Zika and ticks carrying Rocky Mountain Spotted Fever). 2018 marked the Commonwealth's highest ever incidence of West Nile Virus diagnosis and 2019 marked record levels of EEE across the state (at the time of the workshop, Paxton was classified as a community of "moderate" concern for EEE by the Massachusetts Department of Public Health). Workshop participant Sheryl Lombardi, Town Services Coordinator, noted an increase in reports of Lyme disease over the past five years, averaging one to two reports per month. These changes present a major public and animal health challenge in terms of education, prevention, and treatment. Paxton is not currently part of a mosquito control district and is not in a spray zone, although the possibility has been discussed by the Town. Workshop participants also noted how beaver dams lead to standing water in Town, which leads to increased mosquito populations.

Provisions, Medicine, and Fuel

Maintaining access to essential supplies like groceries, medicines, and fuel (for vehicles, heating, and generators), as well as critical medical care and drug treatment during emergencies, was a concern for workshop participants. It was acknowledged that power outages or road closures which affect access to these services could have extensive impacts on residents throughout the Town. These issues are exacerbated for vulnerable populations, such as seniors. Workshop participants expressed concern about the lack of a pharmacy and a gas station in Town, which are approximately five miles away and therefore difficult to access during hazard events. There have been gas stations in Town in the past, although none are currently operating. Participants noted the lack of a gas station not only as a concern for residents for fueling during hazard events, but also as a vulnerability in terms of fueling municipal and emergency vehicles. There is one grocery store in Town, Paxton Market, which residents noted as an asset during storms and emergency situations as it usually remains open, allowing residents access to food. ATMs and access to cash during emergency situations were also discussed, as residents ran into problems obtaining money during the 2008 storm. Additionally, although there are no hospitals or medical centers located in Paxton, the Town owns its own ambulance service to transport patients to nearby medical facilities.

Economic Revitalization

A revitalized downtown core could potentially increase the Town's resiliency, both from an economic perspective, and in terms of the ability to access resources, such as a gas station, during a hazard event. The Town has previously discussed a Master Plan to encourage economic revitalization, although pushback from residents has delayed these plans indefinitely.

Stress on Emergency Services

Paxton's Fire, Police, Light, and Public Works departments bear much of the burden of responding to the increased human threats that result from climate-induced hazards. An ever larger percentage of the departments' time and resources are being devoted to handling things like traffic accidents and injuries that result from ice or other dangerous conditions and activities to protect property and maintain traffic flows during storm events, and Public Works is relied upon to clear roads and maintain access throughout the Town. Mike Putnam, DPW Superintendent, discussed the increasing stress on DPW to respond during inclement weather events, noting that the DPW typically handles roads first and facilities second, although this is becoming increasingly difficult to balance given the limited resources of the DPW. Sergeant William Yang and Assistant Fire Chief Michael Pingitore also discussed the increased stress on the 911 system caused by an influx of calls regarding power outages. There is concern that these calls could detract from actual emergencies, which may be lost in a flood of calls. Participants also discussed assets that could help relieve some of the stress on emergency services. Paxton's Fire and Police Departments have a formal mutual aid agreement with surrounding communities, but many climate hazards are expected to have regional effects, in which case resources from neighboring communities may not be available. The Emergency Citizen Responders group is also available to aid with shelter preparation and alleviate the burden from the Fire and Police departments.

Local Agriculture

Unpredictable climate and weather conditions are taking a toll on agriculture locally and across the region. Climate change is expected to result in a longer growing season for New England, which can be beneficial for some crops but may lead to issues with others, for instance, by allowing additional time for blight or other crop diseases to develop. Early melt of snow pack, drought, excessive rain, and changing temperatures may all affect agriculture and livestock at varying scales. Although agriculture is not wide-spread in Town, participants noted that Cournoyers Farm is a resource to the community. The farm grows a variety of agricultural products for local consumption, and there is concern over ensuring that the farm remains financially viable and able to respond to climatic pressures.

Employee Safety

The safety of employees from multiple municipal departments, including the Department of Public Works, Water Department, and Light Department was discussed as a topic of growing concern given predicted increases in extreme weather events. During storms and inclement weather events, staff routinely place their safety at risk in order to serve residents, whether it is by restoring electric lines during windy periods or fixing water main breaks in freezing temperatures. There was a discussion on finding a balance between employee safety and service to residents, as these departments feel they are under increasing pressure to restore services as quickly as possible. This pressure is only expected to increase as the frequency and intensity of storms increases in the future. Water Superintendent Travis Thibault recalled Water Department employees working on fixing a water main break on MLK Day–as Travis said, "doing water main repairs, I don't care about what you're doing, you're getting wet"–the temperature was 25 degrees below zero with wind chill. Workshop participants from the Light Department noted similar safety concerns, especially when sending employees out for repairs during hazard events. They noted that it is not unusual for employees to be repairing lines in a cherry-picker in 50 mph winds and 10 degree F weather, which exceeds the safety limit of the equipment. Power is typically restored within four to five hours of an event, although the pressure is increasing to have residents; power back online sooner. A need for ensuring employee safety in hazard events, while also serving residents, was highlighted as critically important for the Town. Town staff also noted that they had reached out to OSHA regarding these safety concerns, but that emergency situations are often exempted from typical safety protocols.

Emergency Evacuation Routes
Emergency evacuation routes for surrounding communities pass through Paxton. Workshop participants noted that "pinch points" are known to block roads that would be used as evacuation routes, and that flooding during extreme storms may affect all but one route for emergency evacuation–residents have seen water nearly overtopping Route 122 and have observed a pinch point on Davis Hill.

Transportation and Commuting
The issue of transportation came up during the workshop in the context of societal concerns. Paxton is primarily a bedroom community, with many of its residents commuting outside the Town for work and into Town for work/study at Anna Maria College. If a storm or flooding event were to cut off access to major roadways, this could leave residents either stranded away from home or unable to get to work, with potentially substantial economic impacts.

Development-Related Traffic Patterns
The increased pressure on road clearing from downed trees, snow, ice, and other storm-related causes was also discussed, as the Town feels increasing pressure to keep roads clear. This is especially important for Paxton, as the Town has seen through-traffic dramatically increase in recent years due to new developments in neighboring towns such as Holden and Rutland. This through-traffic also includes out-of-town emergency vehicles that need to pass through Paxton to reach critical destinations including hospitals, medical centers, and emergency care centers.

Current Strengths and Assets

While the Town recognized a number of vulnerabilities, workshop participants identified key strengths as well. Paxton has a number of systems in place to facilitate emergency communications and information transfer, and the Town has obtained specialized equipment to help ensure that emergency services can be provided in a wide range of conditions. The Town has also established memorandums of understanding and mutual aid agreements that will support resiliency during hazards.

- Paxton has an existing Town **Facebook page and Twitter account** that serve as an information hub for residents.
- Police and Fire have **access to local broadcasting equipment** for TV and radio transmissions.
- The Town operates a **CODE RED Emergency Alert system** that can be used to share information relevant to short-term hazards or expected long-term hazards.
- The Town completed a **microgrid feasibility study** in 2017.
- The Town's capital plan funds **repairs and upgrades for the Paxton Center School.**
- The Town has existing **structural studies** that provide baseline information on municipal buildings.
- The Light Department is planning to install **meters to locate and track power outages**, outlined in the department's five-year plan.
- The Town has **mutual aid agreements** for police and fire services.
- The Town has an up-to-date **Hazard Mitigation Plan**.
- There are several **emergency shelters** in place, including the Paxton Center School and Anna Maria College, to house and feed residents during emergencies.
- The Town is planning an **emergency preparedness program for seniors**.
- The Town has short-term **heating and cooling centers**.
- The **Light Department has a dual connection** with Rutland and Worcester.
- There are **multiple generators at municipal facilities** throughout Town.
- A **Light Department carbon reduction plan** is in development.
- The Town is pursuing **Water Department energy efficiency upgrades**.
- MASSDOT **identified a bridge in critical condition** to be repaired/replaced**.**

- The Town has an existing **survey of five road/stream crossings** conducted by the Nashua River Watershed Association.
- The Water Department is installing a **mixer at the Maple Street water tank** to maintain water quality and prevent bacteria growth.
- The Hills is equipped with a generator to **provide power to seniors in an outage** in common areas.
- Paxton has **a van to provide senior transportation to shelters**.
- The Town has access to **radio towers for emergency mass-messaging**.
- Paxton has a **Town ambulance service** to transport residents to medical facilities.
- Paxton is joining the **Wachusett Regional Dispatch Center** in Holden.
- The Town is installing **fiber-optic for 911** to enhance emergency communications.
- The Light Department conducts **educational programs for schools and the elderly** to increase awareness on emergency preparedness and electricity outages.

Top Recommendations to Improve Resilience in Paxton

Participants at the CRB workshop identified a number of recommendations to address vulnerabilities and increase resiliency in three main topic areas: infrastructure, environment, and society. The need for resiliency efforts to keep roadways open, including preparing for and responding to closures driven by flooding, downed trees, or wind impacts, were a primary theme of the workshop that emerged in both the small and large group discussions. This concern is reflected in a divergent group of priorities that include improvements to and/or relocation of the DPW facility, tree and forest management, and infrastructure improvements. Providing sufficient protections and planning for vulnerable populations and municipal employees in the Town was a second major theme.

Highest Priority

- **Conduct a Town-wide field inventory of bridges and culverts** for increased flooding resiliency and storm-hardening, including design of priority re-sizing or replacement projects. Green infrastructure, Low-Impact Design, and other nature-based solutions should be integrated with hard-infrastructure improvements to establish approaches that will be robust in the face of natural hazards and climate-change scenarios and that will meet the Massachusetts stream crossing standards. This effort would add to the limited number of assessments that the Town has already completed and allow for accurate prioritization of structures for repair or replacement.

- **Assess green infrastructure opportunities for stormwater management** to develop a list of specific priorities, assess feasibility and cost, rank priority projects in terms of climate resilience potential, and develop concept designs for key projects. Review Town regulations and update as necessary to support green infrastructure and low-impact development and encourage green infrastructure to be incorporated into all roadway projects.

- **Develop a stormwater infrastructure retrofit plan** to assess opportunities for water quality improvements, with a particular focus on reduced pollutants to reservoirs. Evaluate feasibility and cost, rank priority projects in terms of pollutant and stormwater runoff reduction potential, and develop concept designs for key projects.

- **Conduct a comprehensive assessment of water infrastructure**, including assessment of aging lines and pump stations, such as the main on West Street, establish priority actions for replacement, and explore potential funding sources. Assessments should build on already ongoing work with increased coordination to facilitate progress toward actionable projects and improvements.

- **Replace the water line in the West Street area.** Ensure that the design raises the line above the water table and has sufficient capacity to eliminate the existing restriction on new development, and is protected from breakages due to temperature extremes.

- **Obtain a back-up power supply for the pump station** at the Maple Street Tank through a replacement generator or microgrid connection.

- **Design and construct a new DPW facility,** building on the Town's current funding of the first phase of schematic design. A redesigned facility should include water recapture, vehicle wash bay, on-site fueling station, resilient back-up power, and appropriate salt storage.

- **Identify funding for a new DPW facility and replacement DPW equipment** to increase the effectiveness and reliability of the department while protecting employee safety.

- **Construct a fueling station for use by DPW and emergency vehicles,** including DPW, Police, and Fire vehicles and equipment, which would serve as a resource during emergency events and during everyday operations. A fueling station would also expand the types of vehicles available to purchase, as the DPW is currently limited to purchasing diesel-fueled vehicles (the DPW only has a diesel tank).

- **Conduct robust education and outreach to build awareness of Town resources** and make Town residents aware of the many planning efforts, sources of emergency information, mutual aid agreements, shelters, evacuation routes, etc. which are focused on making the Town more resilient to climate change impacts. Ensure that all residents have transportation options and know how to access these resources when they are needed.

- **Educate residents on self-sufficiency and appropriate expectations for emergency response**. Include information on FEMA's recommendations for self-sufficiency. Encourage preparedness and self-sufficiency of residents through resources such as emergency or 72-hour kits. Educate residents on timelines and processes for repairs to electrical infrastructure and road clearing. Encourage smart decision making around staying off the road during winter storms.

- **Evaluate opportunities to provide improvements at critical facilities, especially emergency backup power**, including feasibility of green power and battery storage. Town-wide, there are a number of buildings and facilities (including the Maple Street tank, Paxton Center School, The Hills, etc.) in need of backup power systems to protect public buildings and infrastructure from freezing and improve services for residents who may lose power during emergencies or hazard events.

- **Expand the Town's emergency communications system** to enroll more residents in the Town's CODE RED system and Facebook page for emergency updates. Engage social and charitable organizations in developing communications networks to reach vulnerable populations before, during and after hazards events. Spread awareness to residents on what classifies as an "emergency" and when it is appropriate to call 911.

- **Develop a regional forestry program** with a trained arborist for comprehensive tree management and to help identify, remove, and replace problem trees, preserve intact forests and street tree cover, and provide guidance and resources for gradually moving toward more climate-resilient trees and forest communities (e.g. species that will tolerate warmer temperatures). Build on the existing resource-sharing relationship among the six towns that currently utilize the bucket truck. Simultaneously plan for the removal of excess standing dead wood and selective thinning to create space for more evenly aged forest stands and greater long-term resiliency, as well as to reduce the risk to electrical infrastructure.

- **Locate funds for hazard tree removal** individually or as a part of a regional-effort.

- **Develop a comprehensive forest management program** to identify and remove hazard trees and to proactively manage trees and vegetation that impact power lines. Plan for the removal of

excess standing dead wood and selective thinning to create space for more evenly aged forest stands and greater long-term resiliency. Focus on increasing stormwater infiltration and aquifer recharge, developing forests as effective carbon sinks, and improving habitat for native species. Simultaneously evaluate existing land use regulations and develop requirements for new development to encourage appropriate plantings and limit tree removal.

- **Enter into formal agreements or MOUs** with neighboring towns to provide options for water supply during emergency situations.

- **Maintain funding for repairs to the Asnebumskit water tank**.

- **Evaluate feasibility of re-establishing a redundant public water supply at Asnebumskit Pond** to increase the resiliency of the water system in hazard events. Identify options and costs for appropriate water treatment facility. Determine whether existing pumps could be reused/upgraded.

- **Revisit the recommendations of the 2017 microgrid feasibility study.** Consider acquiring land to provide the necessary space for implementation,

- **Implement the Light Department's plan to install new electric meters** that will feed information about outages to the system and help to pinpoint locations and causes of outages, as identified in the Department's five-year plan.

- **Develop procedures and policies and conduct training** that focuses on the safety of employees, especially during hazard events or emergences. Purchase gear or equipment as necessary to protect employee safety.

Moderate Priority

- **Develop an inventory of privately-owned dams and conduct dam assessments** to identify where other aging dams may pose a threat of failure and flooding, or where removal may have significant positive impacts on stream habitat and aquatic organism passage or for increasing flood storage and flood control possibilities.

- **Replace and update the Town's aging fleet of fire vehicles** to phase out older vehicles (many of which are 18 years old or older) and improve response time and reliability during hazard events.

- **Enlist in W.A.R.N. (Water/Wastewater Agency Response Network)** to develop a support network for the Town regarding water and wastewater utilities during hazard events and emergency situations. W.A.R.N. is a state-wide network that provides aid and emergency assistance, including staff, materials, and equipment, to help restore service to the Town.

- **Develop comprehensive plan for beaver management** to mitigate against unpredictable flooding/impoundment impacts. Establish creative engineering solutions, identify suitable areas for beaver relocation or where beaver activity may be creating flood storage that contributes to resiliency, and consider the development of special legislation to give the Town authority to address problematic beaver dams on private property. Specific focus should be on strategies for addressing beaver dams near the Asnebumskit Pond dam to allow for proper lowering of the pond to protect the dam. As a part of the beaver management plan, increase public awareness

on both the positive and negative impacts of beaver dams for resiliency. Focus on beaver dams that produce standing water as they increase the risk of mosquito-related diseases.

- **Continue to explore options for a new Senior Center** to alleviate concerns over infrastructure issues at the current center and to provide air conditioning for seniors.

- **Education and training for municipal employees** to increase awareness to emergency plans, evacuation routes, sheltering options, the CODE RED system, and what classifies as an emergency.

- **Purchase a back-up transformer** to reduce the Light Department's reliance on neighboring towns during hazard events. As temperatures increase, it negatively impacts the lifespan of the transformer; acquiring a backup in advance of an emergency is more cost effective in terms of money and labor required.

- **Assess mosquito/tick/pest control options,** including cost/benefit analysis of membership in a mosquito control district versus options for the Town to manage control independently, integrated pest management approaches, determination of future risks due to increase in type and quantity of pests/disease vectors due to climate change, and development of an education and outreach program. Outreach should include programs targeted at medical providers to increase awareness of new diseases and encourage early testing. Purchase additional personal protective equipment (PPE) for municipal employees as necessary and ensure that appropriate monitoring is being done to provide safety information to employees and residents Town-wide,

Lower Priority

- **Acquire open space** consistent with Town planning priorities and focused on areas that will create flood resiliency through increasing storage capacity in floodplains and/or infiltration capacity in uplands. Explore funding options to allow for acquisition.

- **Test Town generators under load quarterly** to verify their capacity to function properly during emergency events.

- **Develop comprehensive invasive species management** from inventory stage through management planning and implementation to address existing invasive populations that threaten features such as open space or forests, both of which contribute to resiliency, as well as anticipate new invasives that are likely to move into the area as climates shift.

- **Conduct strategic planning to support regional agriculture** in the face of climate change. All of the identified hazards (flooding, drought, extreme temperatures, storm events) have the potential to significantly impact agricultural production, with corresponding threats to livelihoods and food availability.

- **Evaluate alternatives to sand and salt** for winter road maintenance, focusing on effectiveness, environmental impacts, and costs. Determine whether additional training or equipment is necessary to implement best practices Town-wide and in reduced salt areas.

- **Conduct outreach to residents regarding winter road maintenance** to build understanding of the impacts of deicing materials, encourage safe winter driving practices, and evaluate support for various alternative winter maintenance approaches.

- **Review Town bylaws related to residential solar** to evaluate options for decommissioning fees and to outline standard protocols for battery disposal.

- **Increase maintenance of catch basins and conveyances** and develop public education and outreach on appropriate operation and maintenance (O&M) of stormwater BMPs on private properties. Review and improve maintenance schedule and budgets, keep up with regular maintenance of publicly-owned structures, and increase frequency of street sweeping and catch basin cleaning as needed.

- **Install central air conditioning** in the Town's school to protect children from the impacts of increasing heat as seasonal weather patterns become more unpredictable and average temperatures and days over 90 degrees F increase.

- **Pursue public facilities upgrades that would increase resiliency,** especially at Town Hall and the Senior Center, through actions such as window replacement and insulation replacement/installation.

- **Install a SCADA system at the Maple Street tank** to provide constant monitoring and reduce the reliance on manual checks.

- **Educate owners of private septic systems** about the importance of having systems pumped out and keeping them in good working condition in order to prevent risks to public health and the environment from systems that become overwhelmed during periods of heavy precipitation.

- **Develop a neighbor-to-neighbor program** to facilitate identification of and support for vulnerable populations and promote assistance between neighbors, especially during emergencies and hazard events.

- **Identify funding opportunities for septic system owners** to replace aging systems, such as no-interest loans.

- **Pursue designation as a Massachusetts Green Community.**

- **Conduct a soil evaluation** for the cemetery behind the First Congregational Church of Paxton to determine any potential contaminants of groundwater.

- **Increase alerts on local television** advising residents not to call 911 during certain events to reduce the load on emergency responders and the call center.

- **Inventory existing emergency supplies** and explore storage options to facilitate transporting these supplies to Anna Maria College during hazard events.

- **Conduct a feasibility study on an additional egress route to Anna Maria College** to increase accessibility especially during hazard events.

- **Continue efforts for the economic development plan** to draw in resources such as pharmacies and gas stations, which would serve as important resources during hazard events and emergency situations. Support existing businesses like Paxton Market to ensure their economic viability since they provide vital resources during hazard events.

- **Pursue funding sources for cleanup of contaminated sites** where reuse or redevelopment may be possible but is currently hindered by environmental conditions.

- **Support the Light Department in developing a plan for disposal of hazardous materials** including used transformers and creosote-containing poles as these are replaced and upgraded**.** Coordinate with the Commonwealth to determine if there are resources, protocols, or a list of recommended vendors that handle disposal.

- **Advocate for changes to state policy around road closures** to decrease thresholds for snow emergencies, making it easier for DPW and emergency response to keep people off the roads during hazardous conditions.

- **Confirm that Anna Maria College has adequate sewer capacity** to serve as a shelter during prolonger emergency events if it were housing Town residents in addition to its usual population.

CRB Workshop Participants

All workshop invitees are listed below; attendees are indicated with an asterisk.

Name	Position/Organization
Carol Riches*	Town Administrator
Sheryl Lombardi*	Town Services Coordinator
Travis Thibault*	Superintendent, Water Department
Michael Putnam*	Superintendent, DPW
Mark Savasta	Police Chief, Paxton Police Department
William Lang*	Sergeant, Paxton Police Department
Guy Bibeau	Lieutenant, Paxton Police Department
Tara Rondeau*	General Manager, Paxton Municipal Light Department
Jeff Cormier	Recreation Director
Jay Conte	Fire Chief, Paxton Fire Department
Michael Pingitore*	Assistant Fire Chief/Emergency Manager, Paxton Fire Department
David Renzetti*	Foreman, Paxton Municipal Light Department
Cindy Love	COA Director
Wayne Curran*	Sanitary Inspector, Board of Health
James Robert	Tree Warden
Shawn Rickan	Paxton Center School Principal
Yvette Orell*	Light Board, Light Department
Mia McDonald	Conservation Agent
Andrew Klein*	Vice President of Student Affairs, Anna Maria College
Michael Miers	Anna Maria College Faculty
Julia Pingitore*	Board of Selectmen
Ivette Casey*	Property Manager, The Hills
Mr. Purcell	Paxton Center School Science Teacher
Mr. Wahlstrom	Paxton Center School Science Teacher
Daryl McCall	Wachusett Regional School District Superintendent
	Library Director
	Historic District Representative
	Planning Board Representative
	Cultural Council Representative

*** indicates attendees**

Citation

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CRB Workshop Project Team

Name	Organization	Role
Carol Riches	Town Administrator	Project Coordinator/ Core Team Member
Sheryl Lombardi	Town Services Coordinator	Core Team Member
Tara Rondeau	General Manager, Light Department	Core Team Member
Travis Thibault	Superintendent, Water Department	Core Team Member
Mike Putnam	Superintendent, DPW	Core Team Member
Michael Pingitore	Assistant Fire Chief/Emergency Manager, Paxton Fire Department	Core Team Member
Guy Bibeau	Lieutenant, Paxton Police Department	Core Team Member
Julianne Busa	Fuss & O'Neill	MVP Lead Facilitator
Sarah Hayden	Fuss & O'Neill	MVP Facilitator/Scribe

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Many thanks to the MVP Core Team members, CRB workshop participants, and to Carol Riches who acted as the local Project Coordinator. Thanks to the Town of Paxton Senior Center for providing a meeting space for the Core Team Meeting and to Anna Maria College for providing space for the CRB Workshop and catering breakfast and lunch.

Funding for the CRB Workshop was provided through a Massachusetts MVP grant.

Appendix A

Final Risk Matrix

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

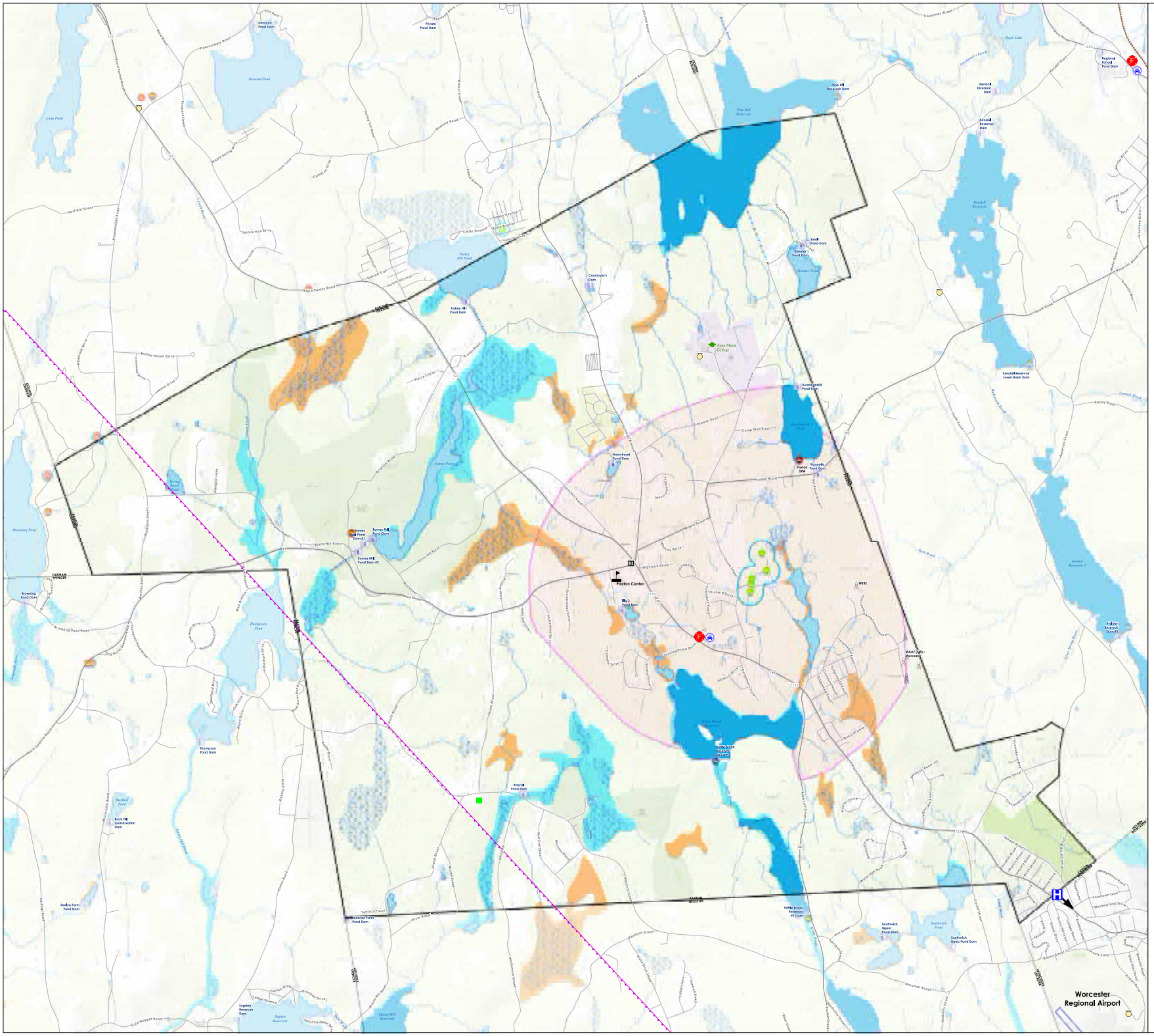
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Extreme Temperatures	Wind	Snow and Ice	Severe Weather Events	Priority H - M - L	Time S hort L ong O ngoing
Infrastructural									
Culverts and Bridges	Town-Wide	Town, State	S	Existing survey of five road/stream crossings conducted by the Nashua River Watershed Association, and MASSDOT has already identified a bridge in critical condition to be repaired/replaced.				N/A	O
			V	Conduct a Town-wide field inventory of bridges and culverts for increased flooding resiliency and storm-hardening, including design of priority re-sizing or replacement projects. Green infrastructure, Low-Impact Design, and other nature-based solutions should be integrated with hard-infrastructure improvements.				H	S
Roads	Town-Wide	Town	V	Assess green infrastructure opportunities for stormwater management to develop a list of specific priorities, assess feasibility and cost, rank priority projects in terms of climate resilience potential, and develop concept designs for key projects. Review Town regulations and update as necessary to support green infrastructure and low-impact development and encourage green infrastructure to be incorporated into all roadway projects.				H	S
			V	Increase maintenance of catch basins and conveyances and develop public education and outreach on appropriate operation and maintenance (O&M) of stormwater BMPs on private properties.				L	L/O
Water Infrastructure	Town-Wide	Town	S	Water Department is pursuing energy efficiency upgrades.				N/A	O
			V	Conduct a comprehensive assessment of water infrastructure and establish priority actions for replacement. Explore potential funding sources.				H	S
			V	Replace the water line in the West Street area. Ensure that the design raises the line above the water table and has sufficient capacity to eliminate the existing restriction on new development and is protected from breakages due to temperature extremes.				H	S
			V	Maintain funding for repairs to the Asnebumskit water tank.				H	O
			V	Evaluate feasibility of re-establishing a redundant public water supply at Asnebumskit Pond to increase the resiliency of the water system in hazard events. Identify options and costs for appropriate water treatment facility. Determine whether existing pumps could be reused/upgraded.				H	L
			V	Install a SCADA system at the Maple Street tank to provide constant monitoring/reduce the reliance on manual checks.				L	S
Drinking Water Supply	Town-Wide	Town	V	Develop MOUs with neighboring towns to provide options for emergency water supply.				H	S
			V	Enlist in MA W.A.R.N. to develop a support network for the Town regarding water and wastewater utilities during hazard events and emergency situations.				M	S
Water Supply for Fire Suppression		Town	S	Fire Department has MOUs with regional towns.				N/A	O
			V	Conduct a comprehensive assessment of water infrastructure and evaluate feasibility of re-establishing redundant water supply.				N/A	O
Electrical Infrastructure	Town-Wide	Town/Paxton Municipal Light Department	S	The Paxton Municipal Light Department is planning to install meters to locate and track power outages, outlined in the department's five-year plan, and is developing a carbon reduction plan. The Department also has a dual connection with Rutland and Worcester.				N/A	O
			V	Implement the Light Department's plan to install new electric meters that will feed information about outages to the system and help to pinpoint locations and causes of outages.				H	S
			V	Purchase a back-up transformer to reduce the Light Department's reliance on neighboring towns during hazard events.				M	S
Buildings and Facilities	Town-Wide	Town	S	The Town has existing structural studies that provide baseline information on municipal buildings.				N/A	O
			V	Design and construct a new DPW facility, building on the Town's current funding of the first phase of schematic design. A redesigned facility should include water recapture, vehicle wash bay, on-site fueling station, resilient back-up power, and appropriate salt storage.				H	S
			V	Identify funding for a new DPW facility and replacement DPW equipment to increase the effectiveness and reliability of the department while protecting employee safety.				H	S
			V	Construct a fueling station for use by DPW and emergency vehicles, including DPW, Police, and Fire vehicles and equipment, for emergency events and during everyday operations. A fueling station would also expand the types of vehicles available to purchase, as the DPW is currently limited to purchasing diesel-fueled vehicles.				H	S
			V	Pursue public facilities upgrades that would increase resiliency, especially at Town Hall and the Senior Center, through actions such as window replacement and insulation replacement/installation.				L	L
			V	Pursue designation as a Massachusetts Green Community.				L	L
Schools	Paxton Day School	Town	S	The Town's capital plan funds repairs and upgrades for the Paxton Center School.				N/A	O
			V	Install central air conditioning in the Paxton Center School to protect children from the impacts of increasing heat as average temperatures and days over 90 degrees F increase.				L	L
Dams	Town-Wide, Asnebumskit Pond	Town, Private	V	Develop an inventory of privately-owned dams and conduct dam assessments to identify where other aging dams may pose a threat of failure and flooding, or where removal may have significant positive impacts on stream habitat and aquatic organism passage or for increasing flood storage and flood control possibilities.				M	L
Emergency Power Supply	Town-Wide	Town	S	The Town completed a microgrid feasibility study in 2017. There are also multiple generators throughout Town.				N/A	O
			V	Obtain a back-up power supply for the pump station at the Maple Street Tank through a replacement generator or microgrid connection.				H	S
			V	Evaluate opportunities to provide improvements at critical facilities, especially emergency backup power, including feasibility of green power and battery storage.				H	L
			V	Revisit the recommendations of the 2017 microgrid feasibility study. Consider acquiring land to provide the necessary space for implementation.				H	L
			V	Test the Highway Department generator under load quarterly to verify their capacity to function properly during emergency events.				M	S
Septic Systems	Town-Wide	Private	V	Educate owners of private septic systems about the importance of having systems pumped out and keeping them in good working condition in order to prevent risks to public health and the environment from systems that become overwhelmed during periods of heavy precipitation.				L	L
			V	Identify funding opportunities for septic system owners to replace aging systems, such as no-interest loans.				L	L
Societal									
Vulnerable Populations	Town-Wide	N/A	S	The Town is planning an emergency preparedness program for seniors. The Hills is equipped with a generator to provide power to seniors in an outage in common areas, and there is a van to transport seniors to shelters.				N/A	O
			S	The Town has short-term heating and cooling centers.				N/A	O
				Develop a neighbor-to-neighbor program to facilitate identification of and support for vulnerable populations and promote assistance between neighbors, especially during emergencies and hazard events.				L	S
			V	Continue to explore options for a new Senior Center to alleviate concerns over infrastructure issues at the current center and to provide air conditioning for seniors .				M	L
Emergency Alert and Communications Systems	Town-Wide	Town	S	Paxton has an existing Town Facebook page and Twitter account that serve as an information hub for residents as well as CODE RED Emergency Alert system that can be used to share information relevant to short-term hazards or expected long-term hazards. The Police and Fire Departments have access to local broadcasting equipment for TV and radio transmissions and access to radio towers for mass-messaging. The Town is also installing fiber-optic to enhance emergency communications.				N/A	O
			V	Expand the Town's emergency communications system to enroll more residents in the Town's CODE RED system and Facebook page for emergency updates. Engage social and charitable organizations in developing communications networks to reach vulnerable populations before, during and after hazards events. Spread awareness to residents on what classifies as an "emergency" and when it is appropriate to call 911.				H	S
			V	Educate and train municipal employees and residents to increase awareness of emergency plans, evacuation routes, sheltering options, the CODE RED system, and what classifies as an emergency.				M	S
			V	Increase alerts on local television advising residents not to call 911 during certain events to reduce the load on emergency responders and the call center.				L	S
Emergency Shelters	AMC, Paxton Day School	Town, Private	S	There are several emergency shelters in place, including the Paxton Center School and Anna Maria College, to house and feed residents during emergencies.				N/A	O
			V	Conduct robust education and outreach to build awareness of Town resources and make Town residents aware of the many planning efforts, sources of emergency information, mutual aid agreements, shelters, evacuation routes, etc. Ensure that all residents have transportation options and know how to access these resources when they are needed.				H	O
			V	Inventory existing emergency supplies and explore storage options to facilitate transporting these supplies to Anna Maria College during hazard events.				L	O
Anna Maria College	AMC	AMC	V	Conduct a feasibility study on an additional egress route to Anna Maria College to increase accessibility especially during hazard events.				L	L

Pests and Disease Control	Town-Wide	N/A	V	Assess mosquito/tick/pest control options, including cost/benefit analysis of membership in a mosquito control district versus options for the Town to manage control independently, integrated pest management approaches, determination of future risks due to increase in type and quantity of pests/disease vectors due to climate change, and development of an education and outreach program. Purchase additional personal protective equipment (PPE) for municipal employees.	M	S
Provisions Medicine, and Fuel	Town-Wide	Private	S	Paxton has a Town ambulance service to transport residents to medical facilities.	N/A	O
			S	The Paxton Municipal Light Department conducts educational programs for schools and the elderly to increase awareness on emergency preparedness and electricity outages.	N/A	O
			V	Develop a neighbor-to-neighbor program to facilitate identification of and support for vulnerable populations and promote assistance between neighbors, especially during emergencies and hazard events.	L	S
Economic Revitalization	Town-Wide	Private	V	Continue efforts for the economic development plan to draw in resources such as pharmacies and gas stations, which would serve as important resources during hazard events and emergency situations. Support existing businesses like Paxton Market to ensure their economic viability since they provide vital resources during hazard events.	L	L
			V	Pursue funding sources for cleanup of contaminated sites where reuse or redevelopment may be possible but is currently hindered by environmental conditions.	L	L
Stress on Emergency Services	Town-Wide	Town	S	The Town has mutual aid agreements for police and fire services and is joining the Wachusett Regional Dispatch Center in Holden. Paxton also has an up-to-date Hazard Mitigation Plan.	N/A	O
			V	Educate residents on self-sufficiency and appropriate expectations for emergency response. Include information on FEMA's recommendations for self-sufficiency. Encourage preparedness and self-sufficiency of residents through resources such as emergency or 72-hour kits. Educate residents on timelines and processes for repairs to electrical infrastructure and road clearing. Encourage smart decision making around staying off the road during winter storms.	H	S
			V	Replace and update the Town's aging fleet of fire vehicles to phase out older vehicles (many of which are 18 years old or older) and improve response time and reliability during hazard events.	M	L
Local Agriculture	Conoyers Farm	Private	V	Conduct strategic planning to support regional agriculture in the face of climate change.	L	L
Employee Safety	Town-Wide	Town	V	Develop procedures and policies and conduct training that focuses on the safety of employees, especially during hazard events or emergences. Purchase gear or equipment as necessary to protect employee safety.	H	S
Emergency Evacuation Routes	Town-Wide	Town, State	V	Conduct robust education and outreach to build awareness of Town resources and make Town residents aware of the many planning efforts, sources of emergency information, mutual aid agreements, shelters, evacuation routes, etc. Ensure that all residents have transportation options and know how to access these resources when they are needed.	H	S
			V	Educate and train municipal employees and residents to increase awareness of emergency plans, evacuation routes, sheltering options, the CODE RED system, and what classifies as an emergency.	M	S
Transportation and Commuting	Town-Wide	Town, State	V	Advocate for changes to state policy around road closures to decrease thresholds for snow emergencies, making it easier for DPW and emergency response to keep people off the roads during hazardous conditions.	L	S
Development-Related Traffic Patterns	Town-Wide	Town, State	V	No specific priority action identified.		
Environmental						
Water Quality	Town-Wide	Town, Private	S	The Paxton Municipal Water Department is installing a mixer at the Maple Street water tank to maintain water quality and prevent bacteria growth.	N/A	O
			V	Develop a stormwater infrastructure retrofit plan to assess opportunities for water quality improvements, with a particular focus on reduced pollutants to reservoirs. Evaluate feasibility and cost, rank priority projects in terms of pollutant and stormwater runoff reduction potential, and develop concept designs for key projects.	H	S
			V	Conduct a soil evaluation for the cemetery behind the First Congregational Church of Paxton to determine any potential contaminants of groundwater.	L	S
Trees and Forests	Town-Wide	Town, Private	V	Develop a regional forestry program with a trained arborist for comprehensive tree management and to help identify, remove, and replace problem trees, preserve intact forests and street tree cover, and provide guidance and resources for gradually moving toward more climate-resilient trees and forest communities. Build on the existing resource-sharing relationship among the six towns that currently utilize the bucket truck.	H	L
			V	Locate funds for hazard tree removal individually or as a part of a regional-effort.	H	O
			V	Develop a comprehensive forest management program to identify and remove hazard trees and to proactively manage trees and vegetation that impact power lines. Focus on increasing stormwater infiltration and aquifer recharge, developing forests as effective carbon sinks, and improving habitat for native species.	H	L
Invasive Species	Town-Wide	Town, Private	V	Develop comprehensive invasive species management from inventory stage through management planning and implementation to address existing and future invasive populations that threaten features such as open space or forests.	L	L
Beavers	Town-Wide, Asnebumskit, Eame's Pond, Marshall Street, Illig's Pond Dam	Town, Private	V	Develop comprehensive plan for beaver management to mitigate against unpredictable flooding/impoundment impacts. Specific focus should be on strategies for addressing beaver dams near the Asnebumskit Pond dam to allow for proper lowering of the pond to protect the dam. Increase public awareness on both the positive and negative impacts of beaver dams for resiliency. Focus on beaver dams that produce standing water as they increase the risk of mosquito-related diseases.	M	S
Disposal of Hazardous Materials	Town-Wide	Town	V	Review Town bylaws related to residential solar to evaluate options for decommissioning fees and to outline standard protocols for battery disposal.	L	S
			V	Support the Paxton Municipal Light Department in developing a plan for disposal of hazardous materials including used transformers and creosote-containing poles as these are replaced and upgraded. Coordinate with the Commonwealth to determine if there are resources, protocols, or a list of recommended vendors that handle disposal.	L	L
Winter Road Treatment	Town-Wide	Town, Private	V	Evaluate alternatives to sand and salt for winter road maintenance. Determine whether additional training or equipment is necessary.	L	S
			V	Conduct outreach to residents regarding winter road maintenance to build understanding of the impacts of deicing materials, encourage safe winter driving practices, and evaluate support for various alternative winter maintenance approaches .	L	S
Open Space	Town-Wide	Town	V	Acquire open space consistent with Town planning priorities and focused on areas that will create flood resiliency through increasing storage capacity in floodplains and/or infiltration capacity in uplands. Explore funding options to allow for acquisition.	L	L

Appendix B

CRB Workshop Base Map



PAXTON, MA

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

- Town Hall
- Police Station
- Fire Station
- School
- Private University
- Communication Tower
- Substation
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Emergency Surface Water
- Dams
- Underground Storage Tanks
- State Route
- Non-numbered Road
- Powerline
- Landing Strip/Airport
- Railroads - Active Service
- Perennial Stream
- Intermittent Stream
- Shoreline
- Aqueduct
- Pond, Lake, Ocean
- Reservoir
- Wetland
- Wellhead Protection Zone I
- Wellhead Protection Zone II

Flood Zone Designations

- 1% Annual Chance of Flooding
- 0.2% Annual Chance of Flooding

N
W E
S

0 0.25 0.5 1
Miles

Data sources:
MassGIS - Infrastructure, Hydrology, and Administrative Data
ESRI - World Topographic Map - Base Map

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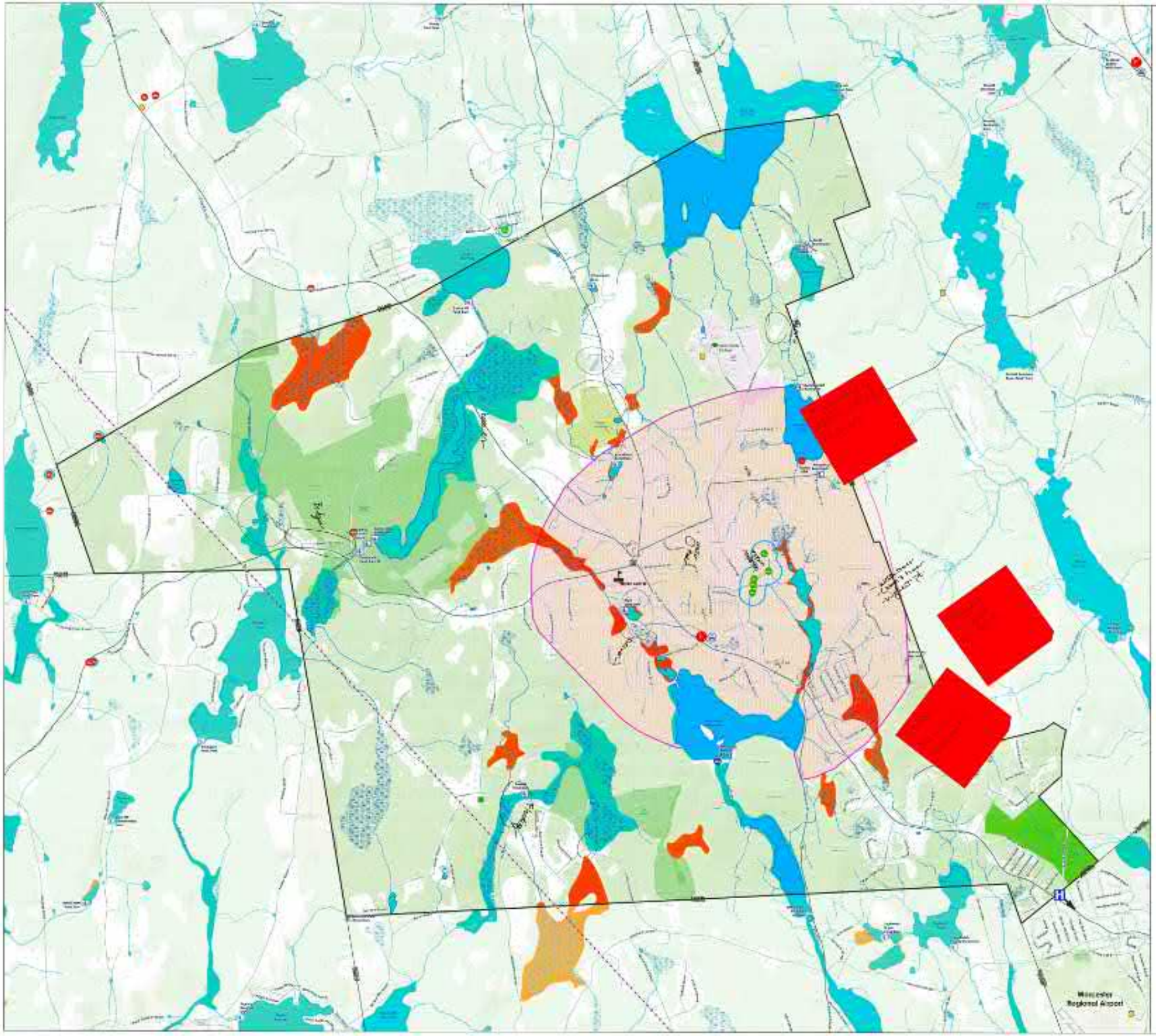
Appendix C

CRB Workshop Outputs:
Participatory Mapping Exercise & Risk Matrices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0.2% Annual Chance of Flooding
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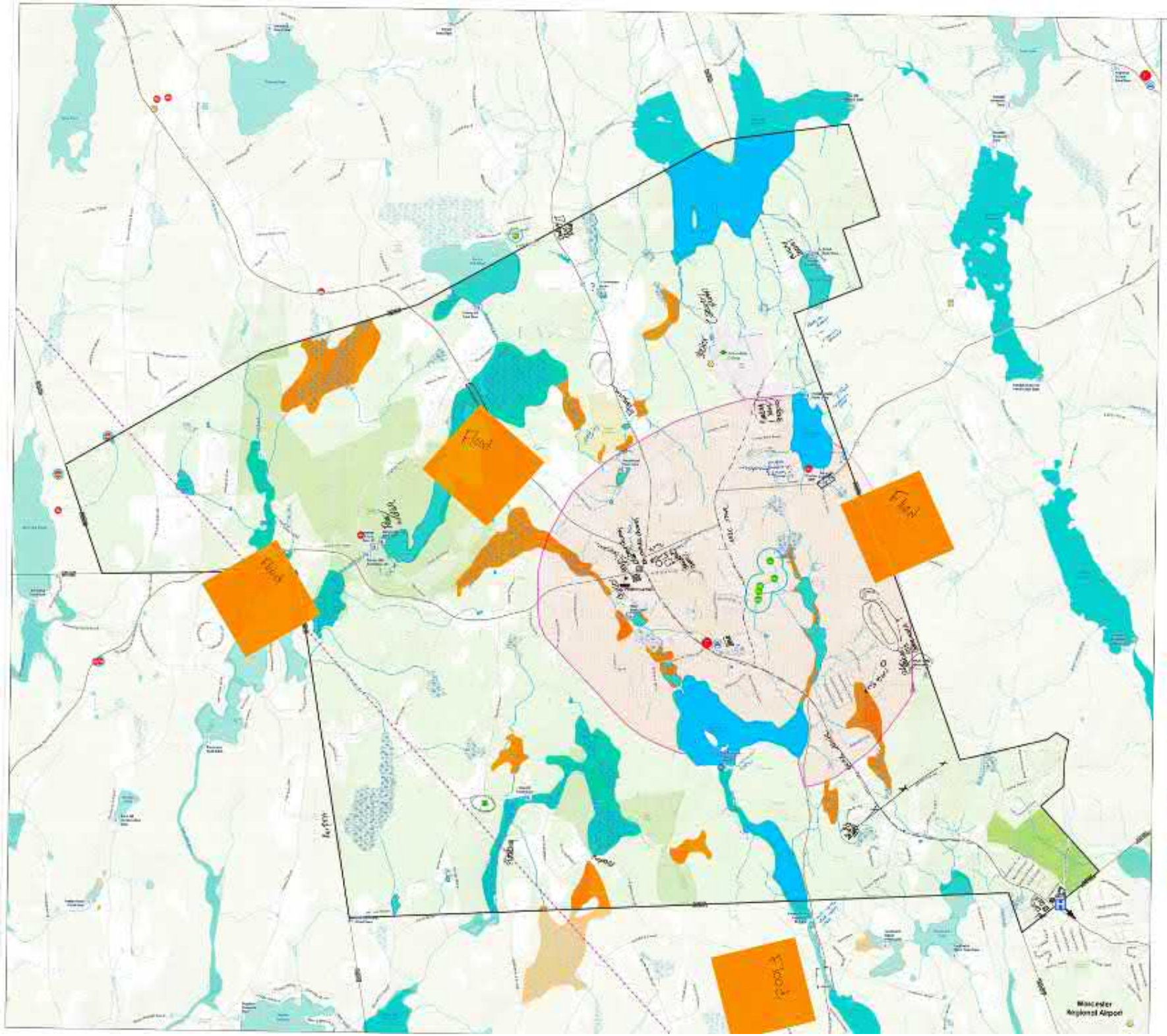
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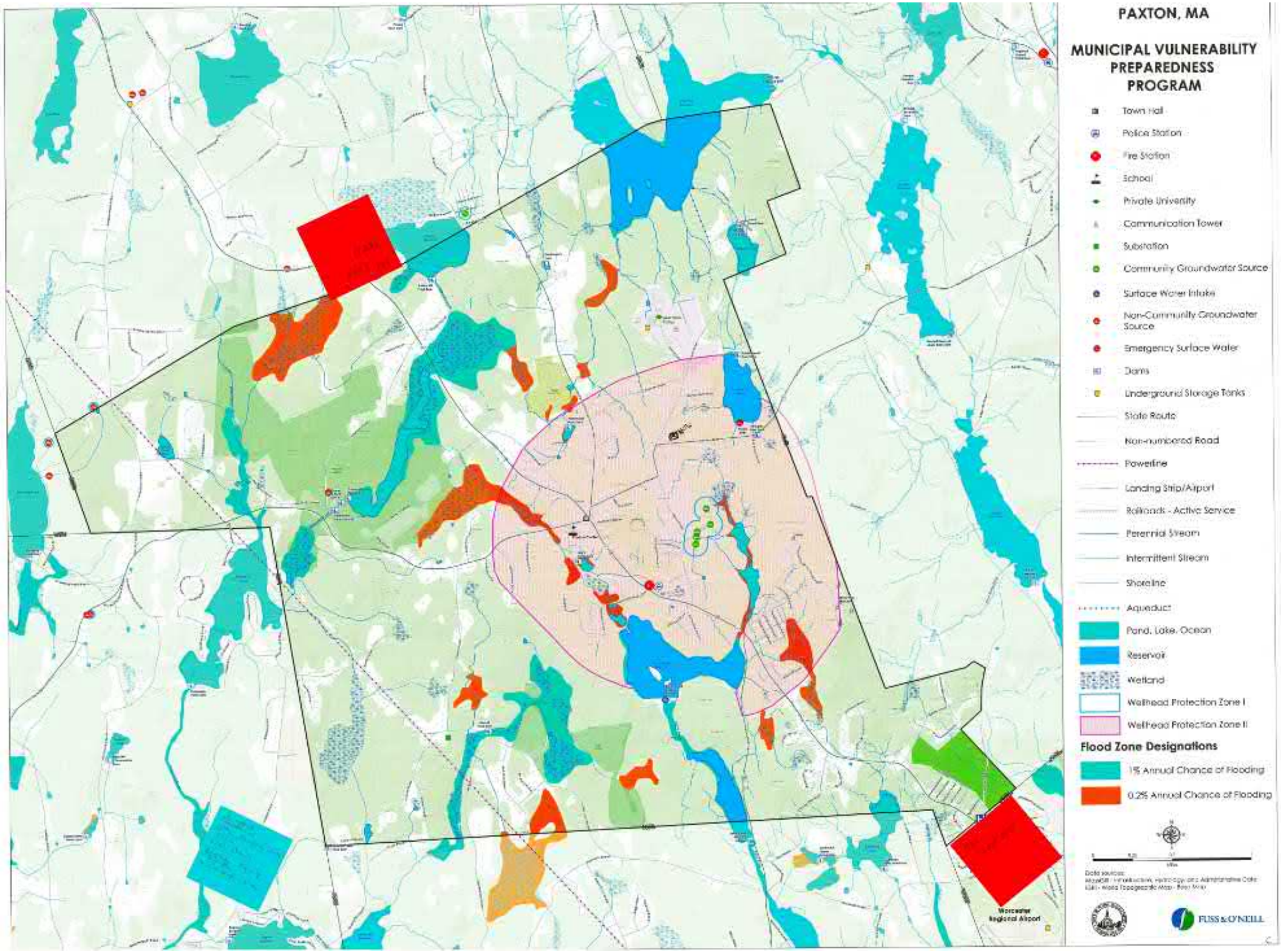
Flood
Flood
Flood
Flood
Worcester Regional Airport
FUSS & O'NEILL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1% Annual Chance of Flooding
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Worcester Regional Airport
FUSS & O'NEILL

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

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	Extreme Temperatures	Wind	Snow/Ice	Severe Weather Events	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Dam - Ashuelumsket	Ashuelumsket	Town	V/S	funding for replacement (back-up water supply)	pollution - contamination			M-L	
* Roads			V	additional + replacement of equipment; Keeping clear maintenance				H	
Culverts / Bridges			V/S	more pressure on - failure - have existing inventory of more critical	flooding - loss of roads	- MassDOT inspections of 4 / critical → move to concepts/designs/ permitting/implement		H	
Shelter locations			V/S	current locations are good but maybe need more / churches					
DPW buildings			V	consider replacement - inadequate facility funding!				H	
Power			V	generators - solar possibilities	- Micro grid?	Self sufficiency	- several locations	H	
Societal Stormwater systems; Nurseries, farm + businesses (due to climate) - Town-wide		Private	V	V evaluate areas of significant drainage					
Fuel			V	need a gas station!	Emerg. vehicles	look into fuel tanks		H	
Food			V	refrigeration if power out; availability					
Transportation - access			V	lack of ...	vulnerable residents - medical needs need for vehicles				
Communications			V	getting word out initially but ongoing is an issue; limited equipment					
AMC - population			V/S	communication during incident					
The Hills / Cemetery's (3)			S	cooling + heating center	- look into preserving of cemeteries				
Environmental Public Education - Preparation - Self Sufficient									
Drinking water / Wastewater			V	Flooding	feasibility study for Townwide sewer system - septic systems lots of variances for systems close to [illegible]		- funding	M	
Title V Systems			V/S	access to state septic loan program - 5% interest rate - but only 2.5/yr → [illegible]					
Forestry Plan - Mngt.			V	more tree removal in populated areas; inadequate funding for removal				L	
Beavers	SW area of Town / Naukeag		V	Comprehensive Beaver Management Plan → culvert replacement where appropriate					
Open Space			V/S	can't act on Ch 61 opps for acquisition; - zoning in place for land					

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, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Societal									
Ambulance Service	Town-wide	Town	S	Town Service - since 2018					
Environmental									

8-1

Community Resilience Building Risk Matrix

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

Features	Location	Ownership	V or S	Extreme Temperatures	Wind	Snow/Ice	Severe Weather Events	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Roadways / access / egress	[illegible] St & [illegible] St & Hannigan	Town of Paxton	V	buckling	downed trees/lines	road clearing	Flooding pinch points	H	O
Dams / culverts	Reservoirs	Worcester / DCR	V				Flooding	M	O
Communications / Antennas	[illegible] St	Private FAA	V/S	overheating	downed	downed		H	O
Light dept	Pleasant St	[illegible] State	V	safety concerns for workers		flat roof		L	O
Power supply	[illegible]	Light Dept			downed lines	downed lines	Substation flooding	H	O
DPW / water mains	Holden Rd	town	V	safety concerns for workers		flat roof		L	O
Public Safety Complex	Pleasant St	town	V/S	safety concerns for workers			high water table light tank	L	O
Pumping stations / water storage tanks / [illegible] communication	[illegible] St	town	V/S	tanks - growth of bacteria low - freezing	vulnerability - height/land (towers)	collapse of stormwater storage tank + pump station	tornado damage	H	O
Societal									
Town hall	town center	town	V	no A/C (at local population daily)	Structural	Structural	Structural	H	S
Senior Center	West St	town	V	no A/C	Structural	Structural	Structural	M	S
PCS	West St	town	V	no A/C		flat roof			
Paxton Market	56	private	V/S	primary grocery		flat roof			
Banks	[illegible] St	private	V/S				Cash availability	L	O
Hills Senior Housing	Grove St	private	V/S	? no central air	3 story building trees	access	high population elderly population	M	O
Environmental									
Cemetery behind cong church	behind cong church	town owned	V				washing of embalming materials	L	O
reservoirs / Dams	[illegible]	Leicester Worcester							
Mosquitos / ticks / longhorned beetles	Townwide	/	V	↑ mosquitos			↑ rain = ↑ mosquitos/[illegible]		
beaver dams	[illegible] Pond	Town owned	V	↓ [illegible] → affects water level needed to [illegible]			rain - [illegible] water levels		O
Forested areas	Several	privately owned	V	Brush / Forest Fires →	↓ downed trees		flooding & [illegible]		
Septics	throughout town	privately owned	V				overcoming leach field		

B-2

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, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority	Time
								H-M-L	Short Long Ongoing
Infrastructural									
Dispatch	Public Safety / Hidden	Tucson → regional	V/S						
Mutual aid agreements			S	- Police fire ems → surround communities - Water - NEPP - water → Lucson ← no permanent connection					→ create new agreements where needed
Societal									
Communications - Mass	Roadside		V/S					H	S
Environmental									

Community Resilience Building Risk Matrix

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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, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Extreme temperatures (hot/cold)	Wind	Snow/ice	Severe weather events (tornadoes, nor'easters, etc.)	Priority H-M-L	Time Short Long Ongoing
Infrastructural					→ Regional Forestry Division				
Downed Power lines	All Town	Utility	V		Tree Maint. Underground	→	→	H	O
Overheating/Overload transformer Loss	Substation	Utility	V	- New Transformer - Added Alarms - Increase Load			- Backup Transformer	L	O
Cleared Roads (ice, snow, trees etc.)	All Town	Town	V	- New highway garage - Proactive fuel system cold weather	- Tree maint. - Snow Fences	→ Equipment prepared Adequate materials		H	O/S/L
Water Supply (Dewing & Safety)	All Town	Town/ Water	V/S	- new water system replacement well - Replace water lines and pipes - Adequate Equipment - Maintenance regimen	pipes	→	→	H	O/S/L
Generators (operational)	All Town	Town/ Utility	V			→	→	H	S
Societal									
The Hills at Paxton Village	Grove St.	Hills	V/S	- Generator/Boiler maintenance - AC Replacement		→	→	L	O
Shelters (Residents + Employees)	Anna Maria Paxton Senior Center	College/ Town	V/S			Training →	→	L	S/O
Employee Safety	All Town Depts.	Town Wide	V	- Procedures/Policy - Proper Gear - Training - Preparation	→	→	→	H	O/S/L
Resident Expectations	All Town	Town wide	V	- Education - Communication (Newsletters)	→	→	→	M	O
Senior Center	West St.	Town	V	- New Facility - Major Update	→	→	→	M	L
Communications	All Town	Town wide	S	- Fiber Optic - TV Channel - Programs Email/Kids	→	→	→	H	O/L
Environmental									
Vegetation Overgrowth	All over Town	Town	V		Regional Forestry Division	→	→	H	O/L
Wildlife	All over Town	Self	V	- Lighting - Fencing - Open Space Management	→	→	→	L	L
~~Reduce~~ Salt areas	Rte 66 Rte 31	Town	V			- Reduce - Training - Adequate storage - Purchasing Equipment	→	L	O/L/S
Ticks/Mosquitos	All Town	Town	V	- Spray - Equipment (PPE)	→	→	→	L	S
Disposal Haz. materials	All Town	Town	V	- Evaluate disposal options/facilities - Proper Equipment	→	→	→	L	O/L
Solar/Battery Disposal			V	- Evaluate options - Cost benefit analysis clean energy	→	→	→	L	L

Appendix D

CRB Workshop Presentation Materials

Boston Firefighters, January 4, 2018 (Reuters)

Moore State Park (Paul Nguyen)

Municipal Vulnerability Preparedness Program
Community Resilience Building Workshop
Town of Paxton

September 18, 2019

Community Resilience Building Workshop

Agenda

- CRB Team and participant introductions
- Introduction to Massachusetts Municipal Vulnerability Preparedness Program (MVP)
- Introduction to Climate Change and the Town of Paxton
- Discussion by Paxton participants on status of current planning and risks
- Introduction to CRB Workshop process

- Large group
  - Determine top four hazards

- Small work groups (Using Risk Matrix)
  - Identify Paxton's vulnerabilities and strengths
  - Prioritize response actions

- Lunch

- Large group
  - Report out from small groups
  - Determine overall priority actions for the Town

- Discussion on next steps
- Conclusion

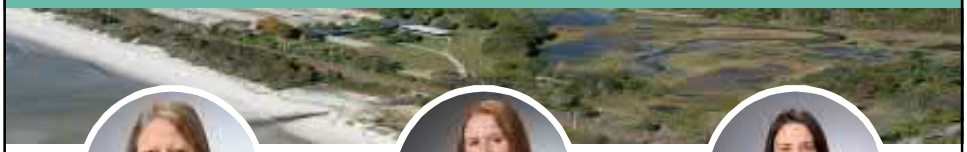
Fuss & O'Neill Overview

Fuss & O'Neill is a leading MVP consultant in assisting Massachusetts communities secure grant assistance, achieve designation as a Massachusetts Municipal Vulnerability Preparedness (MVP) community, and execute their MVP priority projects.

The MVP team is experienced in local government, environmental services, civil site engineering, stormwater management, and emergency management.

Fuss & O'Neill assisted new MVP communities secure more than $3.15 in MVP Action Grants in the program's first and second funding rounds.

MVP Project Team



Julie Busa, PhD

Julie is a senior environmental scientist in the Water Environment and Natural Resources group of Fuss & O'Neill. She is a Certified Senior Ecologist with over 10 years of experience in the areas of global biodiversity and forest conservation, sustainability, and ecological modelling. Julie works extensively with municipalities on MS4 compliance and the MVP program.

Sarah Hayden

Sarah is an environmental scientist in the Water Environment and Natural Resources group of Fuss & O'Neill. She has a background in environmental science as well as a strong foundation in business administration and environmental economics. Sarah works with municipalities on MS4 compliance and the MVP program.

Sarah Frazar

Sarah is an environmental scientist in the Water Environment and Natural Resources group of Fuss & O'Neill. She has a background in wetland, watershed and ecosystem sciences and geographic information systems (GIS). Sarah works with municipalities on MS4 compliance and the MVP program.

Paxton's MVP Program - $25,130

- Grant Supports Climate Change Vulnerability Assessments and Resiliency Planning
- MVP Comprehensive Approach
  - Infrastructure
  - Society
  - Environment
- Expanded Scope: additional listening sessions

MVP designation leads to enhanced standing in future funding opportunities

MVP Action Grant

- Grant supports priority actions identified at Community Resilience Building Workshop
- $25,000 - $2M available (up to $5M for regional projects)
- Up to $7M available statewide
- Local match of 25% - can be in-kind
- Next funding round anticipated late September 2019

Only those communities which have completed the CRB workshop are eligible to apply

Terminology

Climate Change

The Change in Usual Climate Conditions

- Rising Temperature
- Changing Precipitation/ Rainfall Amount and Intensity
- Sea Level Rise

Town of Paxton – Blackstone, Chicopee, and Nashua Basins

Rising Temperature

Blackstone Chicopee Nashua	Observed Baseline 1971-2000	Projected Change in 2030s			Projected Change in 2050s			Projected Change in 2070s			Projected Change in 2090s		
Average Annual Temperature (°F)	48.20 46.16 46.78	2.17 2.24 2.20	to	4.23 4.48 4.44	2.88 3.03 2.99	to	6.29 6.40 6.39	3.52 3.58 3.54	to	9.05 8.97 9.02	3.78 4.01 3.90	to	11.06 10.98 10.95
Annual Days with Maximum Temperature over 90°F (Days)	4.69 3.34 4.37	5.41 4.84 5.83	to	15.55 15.43 17.04	7.80 7.78 8.93	to	28.89 28.70 29.98	9.95 9.27 10.40	to	51.17 49.25 49.93	12.23 11.38 12.50	to	70.36 68.89 69.88
Annual Days with Minimum Temperature below 32°F (Days)	142.52 161.76 156.4	-10.35 -10.68 -10.61	to	-26.51 -28.08 -28.20	-17.60 -19.27 -18.80	to	-38.76 -37.67 -38.26	-0.71 -21.85 -21.68	to	-54.14 -52.49 -53.63	-22.84 -23.39 -22.97	to	-65.55 -62.50 -63.67

Town of Paxton – Blackstone, Chicopee, and Nashua Basins

Changing Precipitation

Blackstone Chicopee Nashua	Observed Baseline 1971-2000	Projected Change in 2030s			Projected Change in 2050s			Projected Change in 2070s			Projected Change in 2090s		
Total Annual Precipitation (Inches)	47.13 46.64 45.89	0.26 -0.23 0.43	to	5.53 4.66 4.88	1.35 1.14 1.15	to	6.79 5.98 6.29	2.49 1.76 2.26	to	8.67 7.03 7.87	1.62 1.37 1.25	to	8.71 7.67 8.38
Annual Consecutive Dry Days (Days)	16.63 15.63 16.21	-0.36 -0.56 -0.41	to	1.48 1.44 1.65	-0.34 -0.93 -0.79	to	2.05 1.97 1.71	-1.00 -1.12 -0.75	to	2.42 1.97 2.13	-0.59 -0.69 -0.64	to	2.92 2.74 2.82

Climate Change Impacts - Temperature

- Economic
  - Winter Recreation
  - Snow and Ice
- Agricultural
  - Longer Growing Season
- Health
  - Increased Pests
  - Heat Stroke
- Infrastructure
  - Road Buckling
  - More Potholes
  - Power Outages
- Environment
  - Change in Habitat

Climate Change Impacts - Precipitation

- Economic
  - Dangerous Floods
  - Lost Work Time
- Agricultural
  - Excessively Wet Spring
  - Drought
- Health
  - Flood/High Water-related Deaths
  - Emergency Response Delays
- Infrastructure
  - Road Washout
  - Environment
  - Sewer System Overflows
  - Compromised Bridges
- Changes in Habitat

Stakeholder Updates

MVP Program

- Identify Top Four Hazards
  - Review MVP Sectors
  - Maps as tool
  - List infrastructure, societal, environmental feature
  - Determine whether a vulnerability or strength
  - Identify actions to reduce vulnerability or reinforce strength
  - Prioritize actions
  - Report Out
- Finalize Prioritization Plan

Climate Change Hazards

- Flooding
- Extreme Precipitation Events
- Heat Waves
- Drought
- Snow/Ice
- Wildfire
- Tornadoes
- Hurricanes
- Nor'easters
- Other

Risk Matrix


Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

Features	Location	Ownership	V or S					Priority	Time
Infrastructural									
Societal									
Environmental									

MVP Sectors

- Infrastructure
  - Evacuation routes
  - Schools
  - Roads, bridges, dams
  - Water and wastewater
  - Septic systems
  - Hospitals
  - Commercial Buildings, churches
  - Utilities: electric, gas
  - Factories
  - Emergency management facilities

MVP Sectors

- Societal
  - Emergency shelters
  - Senior housing
  - Schools and campuses
  - Economically challenged populations
  - Evacuation plans
  - Animal shelters
  - Hospitals, pharmacies
  - Grocery stores
  - Utilities: electric, gas
  - Homeless
  - Other

MVP Sectors

- Environmental
  - Drinking water supply
  - Rivers and streams
  - Parklands
  - Agriculture
  - Title V systems
  - Stormwater management
  - Open spaces
  - Flood plains
  - Forest
  - Other

Community Resilience Building Workshop

Next Steps:

- Public Review of Priorities
- Monitor and Update
- Annual Review

Community Resilience Building Workshop

Questions?