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TOWN OF MILFORD, MASSACHUSETTS

COMMUNITY RESILIENCE BUILDING WORKSHOP
SUMMARY OF FINDINGS REPORT

GRANT ID: Municipal Vulnerability Preparedness Grant Program

June 2018
File No. 01.0173590.00

PREPARED FOR:
Town of Milford, Massachusetts
52 Main Street
Milford, Massachusetts

GZA GeoEnvironmental, Inc.
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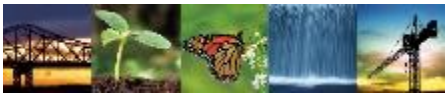

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GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

249 Vanderbilt Avenue
Norwood, MA 02062
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June 29, 2018
File No. 01.0173590.00

Mr. Michael Dean
Town Engineer
Town of Milford, MA
52 Main Street
Milford, MA 01757

Re: Community Resilience Building (CRB) Workshop Summary of Findings Report
Milford, MA

Dear Mr. Dean:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide the Community Resilience Building (CRB) Workshop Summary of Findings Report for the Town of Milford's review and comment, pursuant to our contract with the Town for services related to the Municipal Vulnerability Preparedness (MVP) Program Workshop.

The Town held its CRB Workshop on Tuesday June 19, 2018, in Milford Town Hall Room 3 at 52 Main Street in the Town of Milford. Thirteen (13) stakeholders comprised of town staff and local organization representatives participated in the workshop.

This report summarizes the findings of the CRB Workshop and includes a discussion of: 1) top hazards and vulnerable areas; 2) current concerns and challenges presented by hazards; 3) current strengths and assets; and 4) top recommendations to improve resilience.

The Town will still need to host a listening session to fulfill the last requirement of the MVP grant program prior to October 30, 2018. We will be in touch with you soon to discuss this item.

We appreciate your trusting in us for this project and thank you for this opportunity. If you should have any questions, please do not hesitate to contact Sam Bell at 781-278-3847 or at samuel.bell@gza.com.

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

Thomas Jenkins, P.E.
Principal-in-Charge

Samuel J. Bell, CFM
MVP Lead Facilitator

Jennifer Burke, P.E.
Senior Project Manager

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APPENDICES

1.0 EXECUTIVE SUMMARY

On June 19, 2018, the Town of Milford completed the Community Resilience Building (CRB) Workshop based on the Nature Conservancy's CRB guidance. A total of thirteen participants attended the workshop. In preparation for the CRB Workshop, the Core Team with assistance from GZA GeoEnvironmental, Inc. (GZA) identified and invited forty stakeholders including local/state officials and local/regional representatives from the Milford Regional Medical Center, Chamber of Commerce, Public Utilities, 495 MetroWest Partnership, Charles River Watershed Association and others. The Workshop's central objectives were to:

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

Below is a summary of the CRB Workshop Results with an emphasis on the top hazards, specific areas of concern, and top adaption action priorities

Top Natural and Climate Related Hazards

- Severe Winter Weather (snow storms, blizzards, ice storms)
- Severe Weather (thunderstorms, high winds)
- Severe Winter Weather (extreme cold)
- Flooding (urban drainage, inland/riverine, etc.)

Specific Categories of Concern

- Vulnerability of Roadway Network
- Drinking Water Supply and Wastewater; Dams
- Vulnerability of Highway Department Facilities
- Electrical Supply

Top Adaptation Action Priorities

- Maintain roadway access and power at the Milford Regional Medical Center (MRMC) and Milford High School. Conduct a flood drainage and design study to identify flood mitigation alternatives along roadways providing access to the MRMC and Milford High School.
- Improve existing Emergency Preparedness Plan to include evacuation routes, listings of available preparedness resources such as generators and pumps, potential public-private partnerships for supplies, and other relevant information. To support the plan update, develop a public education and awareness program to improve the preparedness of residents, community organizations, business and property owners.
- Create a formal emergency preparedness shelter plan to included items such as 1) transportation options for vulnerable populations (elderly, homeless, those without resources), 2) needs assessment for food and water, medical supplies and power redundancy, and 3) identification of potential other locations for public shelter facilities that may be needed in the future for warming or cooling centers.
- Conduct a flood vulnerability and design study for the Church to Water Street area.

2.0 OVERVIEW

The Town of Milford is one of hundreds of municipalities in the Commonwealth of Massachusetts that are proactively addressing their community's need to increase resilience and adapt to future impacts from extreme weather events and natural hazard events. Natural disasters can cause loss of life and damage properties and infrastructure, affecting the local, state, and national economic, social, and environmental wellbeing. Over the last decade Milford has experienced impacts from multiple natural hazards in the form of "nor'easters", severe winter weather, severe weather, and flooding in 2009, 2012 2013, 2015, and 2018. The Town has taken an active approach in addressing impacts from natural hazards through the development of the Town's multi-natural hazard mitigation plan. However, the recent impacts from hurricanes Sandy and Irene in New England have increased the urgency and opened the need for municipalities, states, and the nation to not only mitigate natural hazards, but also to increase resilience to address extreme weather and climate change vulnerability. Just in the last year the Commonwealth experienced significant impacts from multiple winter storms that resulted in property damages and utility disruption such as power outages that extended from the coast to inland communities in the MetroWest region.

It is also an important reminder that in 2017 other parts of the country experienced devastating impacts to infrastructure and social, ecological and economic networks caused by hurricanes Harvey, Irma, and Maria. Based on the 2013 National Oceanic and Atmospheric Administration's *2013 Technical Report Regional Climate Trends and Scenarios for the U.S. National Climate Assessment*, New England is expected to experience increased levels of precipitation and increased temperatures as well as a likely increase in extreme weather events. These projected changes will increase the vulnerability of areas already at risk to such hazards in Milford today and potentially increase the exposure of less vulnerable areas in the future. In consideration of these factors, the Town of Milford is taking the necessary steps to build on the results of the Town's FEMA-approved MHMP to develop climate adaptation and resilience priorities as outlined in this Community Resilience Building Summary Findings Report.

On June 8, 2017, the Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs (EEA) selected the Town of Milford as one of 71 communities in the Commonwealth to receive a Municipal Vulnerability Preparedness (MVP) program grant. The purpose of the grant is to provide financial assistance to communities to create a comprehensive, baseline climate change vulnerability assessment and to develop prioritized actions for dealing with climate-related and natural hazards using a field-tested approach, known as the Community Resilience Building (CRB) Workshop guide. This CRB Workshop guide includes a six-step approach (see Community Resilience Building Guide for more details) to conduct a vulnerability assessment and develop prioritized actions as per EEA requirements for communities to become designated as an "MVP Community." Receiving MVP designation will enable the Town of Milford to apply for future MVP Action grants and will increase Milford's standing for future funding opportunities from the Commonwealth such as the Dams and Seawalls Grant Program.

The Milford CRB Summary of Findings Report is the culmination of the work completed by the Town of Milford in completing the six-step CRB approach. On June 19, 2018 the Town completed the CRB Workshop at Milford Town Hall which is located at 52 Main Street, Milford, Massachusetts. The Workshop's central objectives were to:

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

This report summarizes the findings of the CRB Workshop, identifies top natural and climate change related hazards and vulnerabilities, strengths and assets, and top recommendations to improve resilience for the Town of Milford in the following sections.

In addition to completing the CRB 6-step process, the Town of Milford is in the process of scheduling and conducting a Public Listening Session to present the results of the CRB Workshop prior to October 30, 2018 as per EEA requirements.

On June 15, 2018, FEMA approved the Town's most recent Multi-Hazard Mitigation Plan Update (HMPU) pending local adoption by the Town of Milford. The plan update, once adopted, will be in place for a period of approximately five (5) years. The findings summarized in this report will be used to support the implementation of the HMPU by the Town. Milford has taken an active role in identifying and implementing natural hazard mitigation actions to address localized flooding as presented below in the images of Godfrey Brook. The Town was successful in applying for a FEMA Hazard Mitigation Grant Program (HMGP) grant to increase the hydraulic capacity of the culvert at Church Street on Godfrey Brook. The Core Team envisions building on this legacy through the preparation of this report to assist Milford in becoming more resilient to the impacts from future extreme weather and natural hazard events.

Godfrey Brook Culvert Replacement at Church Street (HMGP Grant #1813-22)

Godfrey Brook Culvert Replacement at Church Street (HMGP Grant #1813-22)

3.0 SUMMARY OF FINDINGS

3.1 TOP HAZARDS AND VULNERABLE AREAS FROM TOWN OF MILFORD

As part of the Community Resilience Building Workshop, participants were called upon to confirm the top natural hazards for the Town of Milford as previously identified by the Core Team and the recent Multi-Hazard Mitigation Plan Update. The participants were also asked to identify other hazards if they disagreed with any of the top four (4) hazards that had previously been identified by the Core Team.

Hazards identified in the Town's newest HMPU and discussed with the Workshop group included: severe winter weather hazards (ice, snow, blizzards, extreme cold), severe storms (thunderstorms, high winds, hurricanes, nor'easters, tornadoes), flooding (urban drainage, riverine, inland, dam failures, ground failures, ice jams), fire (wildfire, urban fire), geologic hazards (earthquakes, landslides), and climate change (including extreme heat and cold, severe storms).

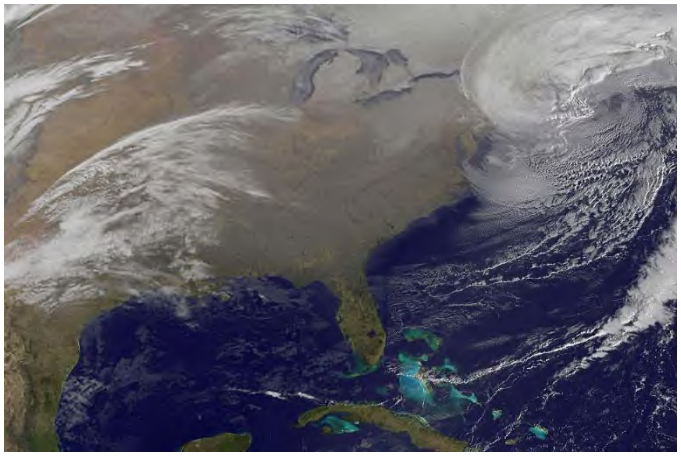
The participants identified severe winter weather (snow and blizzard events, ice storms), severe weather (thunderstorms, high winds), severe weather (extreme cold), and flooding (from urban drainage or riverine/inland) as the top natural hazards of concern.

3.1.1 Top Hazards and Vulnerable Areas

Top Hazards

During the CRB Workshop, stakeholders were asked to confirm the top natural hazards for the Town of Milford based on the natural hazards recently identified by the Core Team during the preparation of the HMPU. Through an interactive discussion of the natural hazards, the community stakeholders confirmed the following hazards as the top hazards of concern in the Town of Milford, based on past events and potential for future damages/impacts:

- Severe Winter Weather (snow storms, blizzards, ice storms);
- Severe Weather (thunderstorms and high winds);
- Severe Winter Weather (extreme cold);
- Flooding (urban drainage, inland/riverine, etc.).



NOAA's GOES-13 satellite shows two low pressure systems coming together to form a giant nor'easter centered right over New England (Image Ref. EPA)

Downed Tree from Colonial Road at Congress Street from March 2018 Nor'easter (Image Ref. Daily News and Wicked Local Photo/Kathleen Culler

Vulnerable Areas of Concern

The following areas and facilities were identified as potentially vulnerable during group discussions at the CRB Workshop:

Neighborhoods: (Primarily for flooding potential) Church Street to Water Street, area near Milford Regional Medical Center, neighborhoods along major brooks and Charles River.

Ecosystems: (Primarily for flooding and storm damages that can affect residents and water supply) Milford Pond, Echo Lake, areas along brooks/rivers that flood, need for vegetation management to prevent storm damages to power/access to critical areas and facilities.

Transportation: Roads surrounding critical facilities such as Milford High School (emergency shelter), Milford Regional Medical Center (emergency services), Church Street to Water Street, the need for transportation for the Town's elderly and other vulnerable populations to shelters and for transportation for medical workers during emergencies

Infrastructure: Wastewater treatment plant, Highway Department headquarters building and fuel tanks, Echo Lake Dam, Milford Water Company wells and facilities, Birch Street Fire Station, assisted living and nursing homes, and schools and daycare centers (particularly Milford High School which is a shelter).

3.2 CURRENT CONCERNS AND CHALLENGES PRESENTED BY HAZARDS

The Town of Milford has many concerns and challenges with respect to future impacts from extreme weather events and natural hazards. Several participants noted that over the last five years Milford has experienced impacts from numerous nor'easters combined with other winter storm events including the blizzard of 2013 (Nemo), back-to-back-to-back snow storms in 2015, and multiple nor'easters in 2018. Nemo resulted in damaging gusts up to 60 miles per hour (MPH) in parts of Worcester County. Several of the winter storms resulted in extensive snowfall amounts especially the three consecutive snow storms in 2015 that severely stressed the Town's snow removal operations and snow storage capacity. Flooding from a variety of sources was also a key concern of workshop group participants. Participants noted that the challenges resulting from flooding caused by a dam break at Echo Lake Dam would significantly impact the Town's public infrastructure and facilities that could result in a disruption of public services especially at the Highway Department on the banks of the Charles River. This concern is important to note because Echo Lake Dam is designated as a high hazard dam as per the Massachusetts Dam Safety Regulations.

Participants also expressed concerns regarding the challenges that flooding could have on access to the Milford Regional Medical Center and nursing homes resulting from overtopping of roadways that provide primary access to the hospital. In addition to access challenges, many participants shared concerns of potential loss of power to nursing homes and the public shelter located at Milford High School.

SPECIFIC CATEGORIES OF CONCERNS AND CHALLENGES

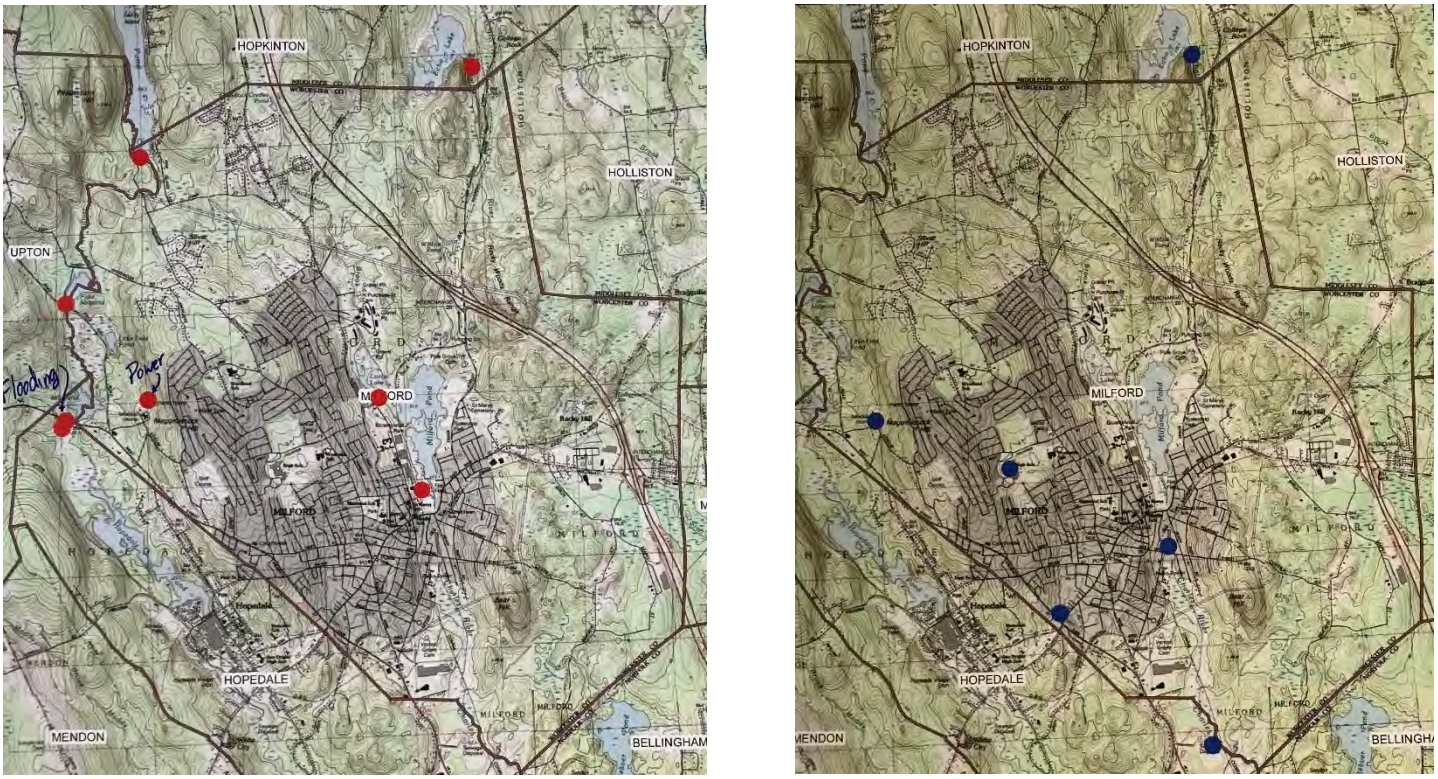
The following subsections describe the Workshop participants' identified concerns and challenges, organized by category.

3.2.1 Vulnerability of Roadway Network

One of the concerns identified by participants was the vulnerability of the Town's roadway network during and after emergency events. The participants expressed concerns over the critical need to maintain roadway access for emergency vehicles to reach those in distress and in need of emergency response (fire, police, EMT, etc.) and then for those emergency response vehicles to be able to reach the hospital. There is also a need to keep roads accessible to allow the public to reach a safe route to evacuate or to reach emergency shelters and other critical needs (medicine, gas, food, etc.). The need was also mentioned to reach the Highway Department, as much of the heavy equipment needed for recovery operations in the town is stored at this location.

3.2.2 Drinking Water Supply and Wastewater, Dams

The participants identified the Milford Water Company's drinking water supply as a key vulnerability. The Milford Water Company provides the Town's water through a water supply reservoir (Echo Lake) located in Hopkinton, just north of Milford, and through a series of wells, including the Clark Island wellfield within Milford Pond and the Godfrey Brook wells. Participants cited a past event where the water company was unable to provide potable water to residents and bottled water had to be provided. The participants identified concerns over a potential dam failure at Echo Lake, which would not only jeopardize the surface water supply at this location but could also jeopardize the ability to treat and distribute water from the plant along Dilla Street and potentially jeopardize operations at the Clark Island wellfield downstream in Milford Pond.



A Comparison of Mapped Vulnerabilities and Strengths identified by the Milford CRB Workshop Teams on the Base Maps.

Several participants also identified other dams in town as a vulnerability for potential dam breach and cited the need for review and evaluation.

Similar to the water supply issue, the Workshop participants identified the current wastewater facility's flood-prone location as a potential key vulnerability and suggested the potential need for a study to determine its vulnerability and potential protection methods.

3.2.3 Vulnerability of Milford Highway Department

The vulnerability of the Highway Department facility, which is located on land directly adjacent to the Charles River, was also discussed. The Highway Department maintains fuel tanks at this location and the vulnerability of the building, yard, and tanks to potential flood damages, and potential resulting environmental damages due to fuel spillage, was identified as a vulnerability. As stated above, there was also a strong concern over the ability to access the Highway Department to reach critical heavy equipment needed for response during a natural hazard-based emergency. The need to maintain the Highway Department equipment and personnel and to have the facility operational during an emergency was cited as a key concern, as was the need to relocate the facility or at least its fuel tanks to a more resilient location.

3.2.4 Electrical Supply

The need to have a resilient electrical transmission and distribution system was identified by participants as critical, with the understanding that this category of concern is largely controlled by another entity (power supplier/distributor). However, the group cited specific items that could be controlled, such as the need for an Emergency Preparedness Plan, and strong contacts with National Grid, the local supplier, to reinforce Town priorities for power restoration to hospitals, healthcare facilities, nursing homes, the emergency shelter, etc. The need for the Town to identify locations with generators that could be useful in emergencies was also cited.

3.3 CURRENT STRENGTHS AND ASSETS IN THE TOWN OF MILFORD

Milford's CRB and MHMP Core Team is a key strength to the Town as many team members have taken an active role over the last decade in working together to better understand the community's vulnerabilities and to identify suitable natural hazard mitigation options to reduce impacts from future natural hazards. Each of the core members who served on the recent update of Milford's HMPU were also members of the CRB Core Team. Many of the team members have close to twenty years each of institutional knowledge having worked for the Town of Milford in various capacities that has enabled the Town to successfully implement key priorities outlined in the Town's previous MHMP. The Town plans to leverage the Core Team member's local knowledge and understanding of state and federal funding sources in actively implementing actions resulting from the CRB workshop.

Participants identified both the Milford Public High School and the Milford Regional Medical Center as key assets and strengths. Milford HS serves as the public shelter for residents and community members during extreme weather events. Milford Regional Medical Center is a full-service, acute care medical center that can assist in providing medical care to residents and neighboring communities during natural hazard and extreme weather events. Lastly, the Town of Milford's essential services (e.g. fire, police, emergency response) and facilities are critical strengths and assets, respectively, for the community. Essential services facilities are in areas less vulnerable to riverine and urban drainage flooding as well as fire hazards that will enable public safety officials to better assist the community during major hazard events. Several

members of the Core Team provide essential services to the community daily and can assist the community in the implementation of future actions designed to assist the Town in recovering more quickly to future natural hazards and extreme weather events.

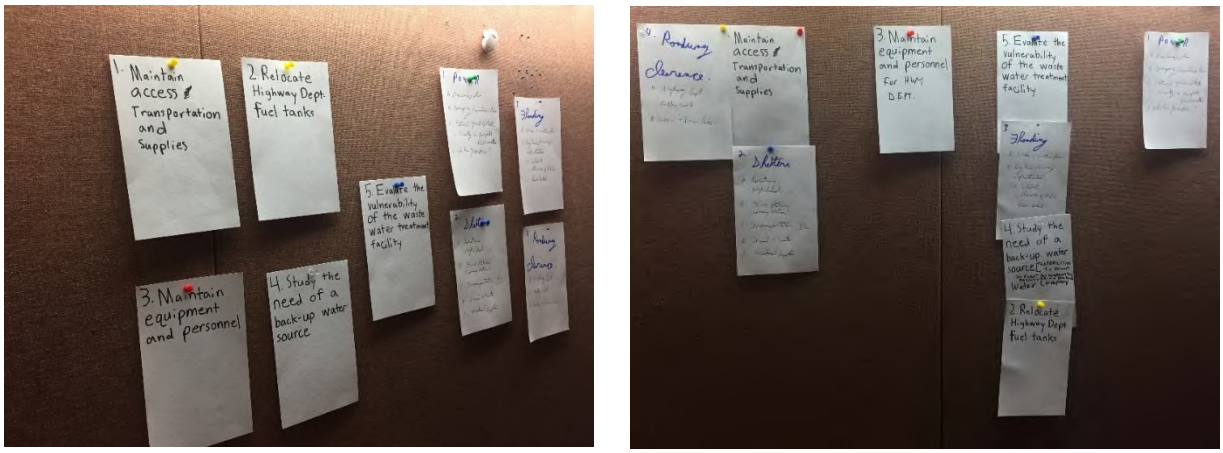
The following items were identified as strengths during discussions at the CRB Workshop:

- The Town's personnel and leadership, which have a strong knowledge of the town and how improvements can be made cooperatively in terms of resilience planning and operations.
- The Town has strong and experienced police and fire departments which are familiar with the potential hazards in town and have been represented throughout the HMPU and MVP CRB Workshop processes. The Town is also host to a regional medical facility, which is a strength for disaster response.
- The participants all cited the importance of the Highway Department operations and equipment and the need to maintain those assets in the event of a disaster, but also the importance of maintaining infrastructure to prevent or mitigate potential hazards.

- Some facilities in town participate in Massachusetts Long Term Care Mutual Aid Plans (MASS-MAP plans) for nursing facilities and Healthcare Mutual Aid Plans (HMAP) for evacuation and resources/assets and the need to maintain this initiative for these facilities.
- The town's use of Milford High School which is not located in a flood vulnerable location was cited as a strength in the community.

3.4 TOP RECOMMENDATIONS TO IMPROVE RESILIENCE TO HAZARDS

The Workshop discussions all circled back on the need for the Town to protect, maintain, and improve critical infrastructure to make it more resilient against natural hazards. The group also identified the need for additional planning



Top Recommendations and Actions to Improve Resilience identified during the Milford CRB Workshop

to help develop or maintain various emergency preparedness plans and the need to conduct studies to determine requirements to keep critical facilities operational during floods, power loss, and other major events.

3.4.1 Highest Priorities

- Maintain roadway access and power at the Milford Regional Medical Center (MRMC) and Milford High School. Conduct a flood drainage and design study to identify flood mitigation alternatives along roadways providing access to the MRMC and Milford High School.
- Create a formal emergency preparedness shelter plan to included items such as 1) transportation options for vulnerable populations (elderly, homeless, those without resources), 2) needs assessment for food and water, medical supplies and) power redundancy) and 3) identification of potential other locations for public shelter facilities that may be needed in the future for warming or cooling centers.
- Improve existing Emergency Preparedness Plan to include evacuation routes, listings of available preparedness resources such as generators and pumps, potential public-private partnerships for supplies, and other relevant information. To support the plan update, develop a public education and awareness program to improve the preparedness of residents, community organizations, business and property owners.
- Conduct a flood vulnerability and design study for the Church to Water Street area.

3.4.2 Moderate Priorities

- Maintain access to roadways for the Highway Department to be accessible and functional. To assist in achieving this goal participants recommended to conduct a study to review resilience of the Highway Department and to identify potential options such as either moving the existing Highway Department Facilities to a less vulnerable location in the long-term and/or at the very least to move their fuel tanks/fueling station to another location with less flood vulnerability. Both options were cited as important and something that should be pursued.
- Study the vulnerability of the wastewater treatment facility to potential flooding impacts and, if needed, create a plan to mitigate hazards.
- Create more coordination with the local power supplier/distributor.
- Conduct vegetation and other infrastructure maintenance to reduce hazard risks (flooding, power loss).
- Study areas previously identified as flood prone for risk and design and implement needed drainage improvements. Consider long-term planning for drainage infrastructure maintenance and improvements (beaver control, culvert cleaning and replacement, etc.).
- Evaluate/study risks related to Town and private dams, including Echo Lake Dam.

3.4.3 Low Priorities

- Evaluate/study the vulnerability of Route 140 near the Hopedale Town Line
- Study the vulnerability of Milford Water Company's water supply sources to various natural hazards and create a plan to mitigate hazards or look at backup supply options.
- Conduct a flood/dam break analysis study for Echo Lake Dam to identify alternatives to prevent dam failure.

4.0 LIST OF PARTICIPANTS

The following departments, organizations, and other entities were invited to participate in the CRB Workshop process:

(Note that * indicates those that attended the workshop)

Name	Department/Organization	Position
Richard Villani	Town of Milford – Town Administrator and Selectman's Office	Town Administrator
David Condrey	Milford Water Company	Manager
Scott Crisafulli*	Town of Milford – Highway Department	Highway Surveyor
Michael Dean*	Town of Milford – Office of Planning and Engineering	Town Engineer
Larry Dunkin	Town of Milford – Office of Planning and Engineering	Town Planner
Vin Farese	Milford Water Company	
John Mainini	Town of Milford – Sewer Department	Director of Operations
Thomas O'Loughlin	Milford Police Department	Chief of Police
James Falvey*	Milford Police Department	Sargeant
William Touhey, Jr.*	Milford Fire Department	Chief
Mark Nelson*	Milford Fire Department	Deputy Chief
William Kingkade, Jr.	Town of Milford – Town Administrator and Selectman's Office	Chairman, Board of Selectmen
William Buckley	Town of Milford – Town Administrator and Selectman's Office	Member, Board of Selectmen
Michael Walsh	Town of Milford – Town Administrator and Selectman's Office	Member, Board of Selectmen
Joseph Arcudi	Town of Milford – Parks Department	Chairman, Parks Commission
Michael Bresciani	Town of Milford – Parks Department	Parks Director
Paul Pellegrini*	Town of Milford – Parks Department	Member, Parks Commission
David Consigli	Town of Milford – Zoning Board of Appeals	Chairman
Andrew Diorio	Town of Milford – Information Technology Department	Information Technology Manager
Kenneth Evans	Town of Milford – Health Department	Chairman, Board of Health
Michael Giampietro	Town of Milford – Conservation Commission	Chairman
Patrick Kennelly	Town of Milford – Planning Board	Chairman
Rudolph Lioce III	Town of Milford – Sewer Commission	Chairman
Matthew Marcotte*	Town of Milford – Building and Inspections Department	Building Commissioner
Erika Robertson*	Town of Milford – Building and Inspections Department	Asst. Zoning Enforcement Officer
Paul Mazzuchelli	Town of Milford – Health Department	Health Officer
Kevin McIntyre	Town of Milford - Milford Public School District	Superintendent
Christophe Morin	Town of Milford – Finance Committee	Chairman
Patricia Morrill*	Milford Housing Authority	Executive Director

Name	Department/Organization	Position
Christopher Pilla	Town of Milford – Treasurer's Office	Town Treasurer
Edwin Roth	Milford Council on Aging	Chairman
Zachary Taylor	Town of Milford – Town Accountant's Office	Finance Director
Robert Andreola	Milford Historical Commission	Chairman
Senator Ryan Fattman	Commonwealth of Massachusetts Legislature	State Senator, Worcester and Norfolk counties
State Representative Brian Murray	Commonwealth of Massachusetts Legislature	State Representative, 10th Worcester District
Laura O'Callaghan	Milford Area Chamber of Commerce	President, CEO
Edward Kelly	Milford Regional Medical Center	CEO
	Milford Power, LLC	
Michael Isabella*	Countryside Health Care of Milford	Executive Director
Kathy Keeling*	Countryside Health Care of Milford	
William Arruda*	Countryside Health Care of Milford	
Alissa Suitum	Blair House of Assisted Living	Director of Community Relations
Beth Patras	Cornerstone	Executive Director
	Whitcomb House (c/o Capital Senior Living)	
Peter Bertonazzi*	Shine Program/Milford Senior Center	
Julie Dyer Wood	Charles River Watershed Association	Director of Projects
Paul Matthews	495 MetroWest Partnership	Executive Director
Jessica Strunkin	495 MetroWest Partnership	Deputy Director

5.0 RECOMMENDED CITATION

GZA (2018). Town of Milford, Massachusetts Community Resilience Building Workshop Summary of Findings Report.

6.0 CRB WORKSHOP PROJECT TEAM: ORGANIZATION AND ROLE

Town of Milford:

Richard Villani (Core Team Member)

Scott Crisafulli (Core Team Member)

Michael Dean (Core Team Member, Facilitator)

Larry Dunkin (Core Team Member)

John Mainini (Core Team Member)

Milford Police Department:

Thomas O'Loughlin (Core Team Member)

Milford Fire Department:

William Touhey, Jr. (Core Team Member)

Milford Water Company:

David Condrey (Core Team Member)

Vin Farese (Core Team Member)

GZA GeoEnvironmental, Inc.:

Sam Bell (Lead Facilitator)

Tom Jenkins (Facilitator)

Jennifer Burke (Facilitator)

Rosalie Starvish (Support)

7.0 ACKNOWLEDGEMENTS

Special thanks to the Town of Milford for their commitment and dedication to this process and for providing the facility for the workshop; particularly, the Core Team Members identified and Michael Dean for leading this project for the Town.

This project was made possible in part through funding from the Massachusetts Executive Office of Energy and Environmental Affairs through a Municipal Vulnerability Preparedness (MVP) Program Grant with in-kind contributions from the Town of Milford.

Appendix A

CRB List of Attendees

Community Resilience Building

Town of Milford, Massachusetts
Community Resilience Building Workshop
June 19, 2018, 9 AM-1 PM
Town Hall Room 3, 52 Main Street, Milford, MA 01757

~ Sign In Sheet ~

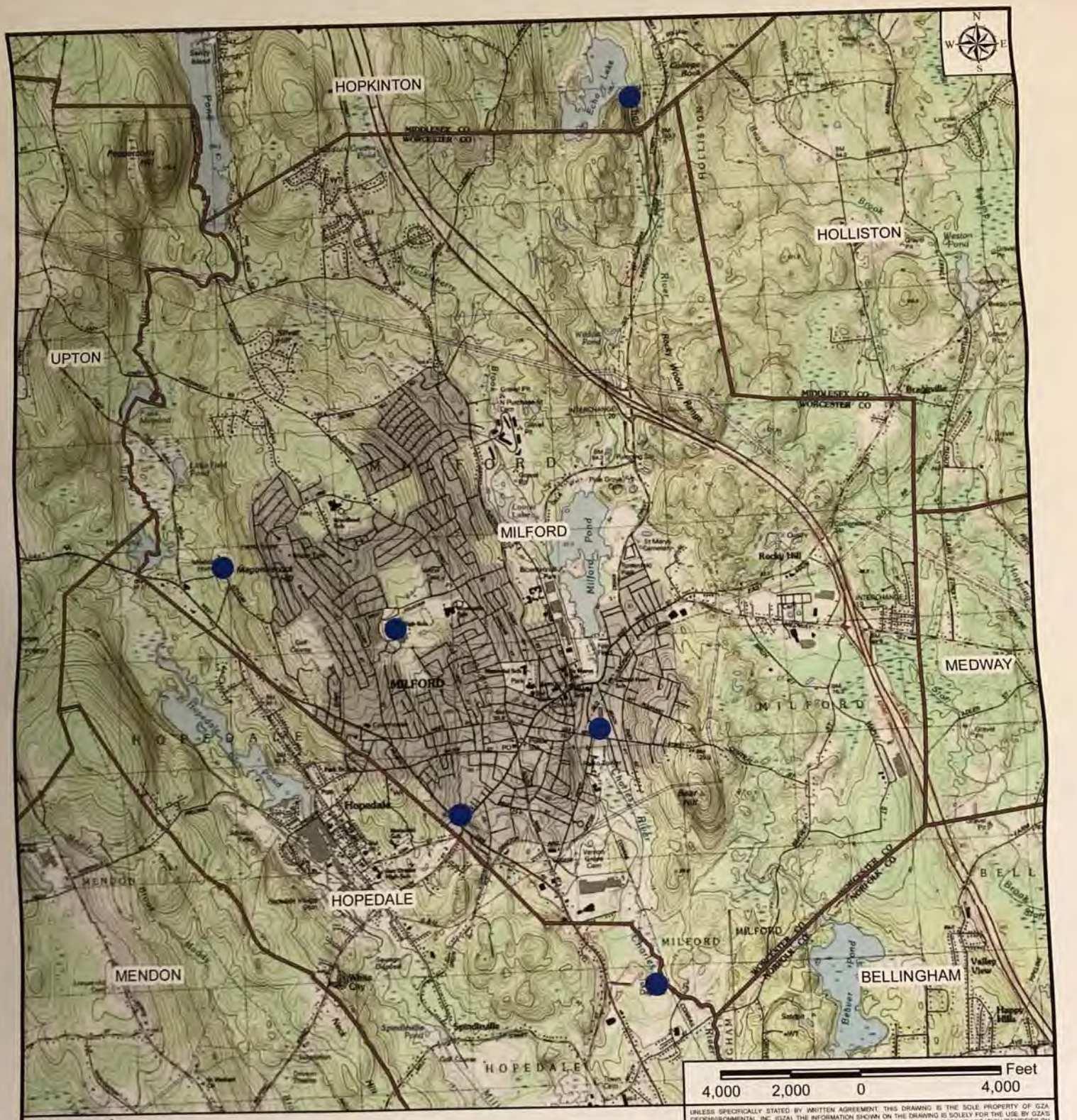
Name (Please print)	Department/Group	Email Address
Kathy Keeling	Countryside Health Care	Keelingk@Countrysidehc.org
Michael Isabella	Countryside Health Care	isabellam@countrysidehc.org
William Morreale	CountrySide Health Care	annedad@countrysidehc.org
Peter Bertonazzi	Shine/Milford Senior Ctr	pdbertonazzi@gmail.com
Paul Pellegrini	Parks Dept.	paulpelly@yahoo.com
Bill Touhey	Fire Dept / EMS	wTouhey@milfordfire.org
PAT MORRILL	MILFORD Housing Authority	pmorrill@milfordhousing.org
Michael Dean	Engineering	mdean@townofmilford.com
Mark Nelson	Fire Department	mnelson@milfordfire.org
Erika Robertson	Building Dept/Zoning	eROBERTSON@TOWNOFMILFORD.com
Scott J Crisafulli	Highway Dept	scrisafulli@townofmilford.com
James Falvey	Milford Police	jfalvey@milfordpolice.org
Matt Marcotte	Buildings Dept	MMarcotte@Townofmilford.com

THANK YOU FOR YOUR PARTICIPATION IN THIS PROCESS TO STRENGTHEN OUR COMMUNITY'S RESILIENCE!

www.CommunityResilienceBuilding.org

Appendix B

Participatory Mapping Maps and Risk Matrices



Legend

Town Boundaries

Feet

4,000 2,000 0 4,000

Multi-Hazard Mitigation Plan

USGS Topographic Plan

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI (USGS TOPO MAPS).
REMAINING DATA FROM MASSGIS (2016).

FIGURE 1

DATE: September 2017
PROJECT NO. 15.0166551.00
DRAWN BY: JRB
CHECKED BY: TEJ

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

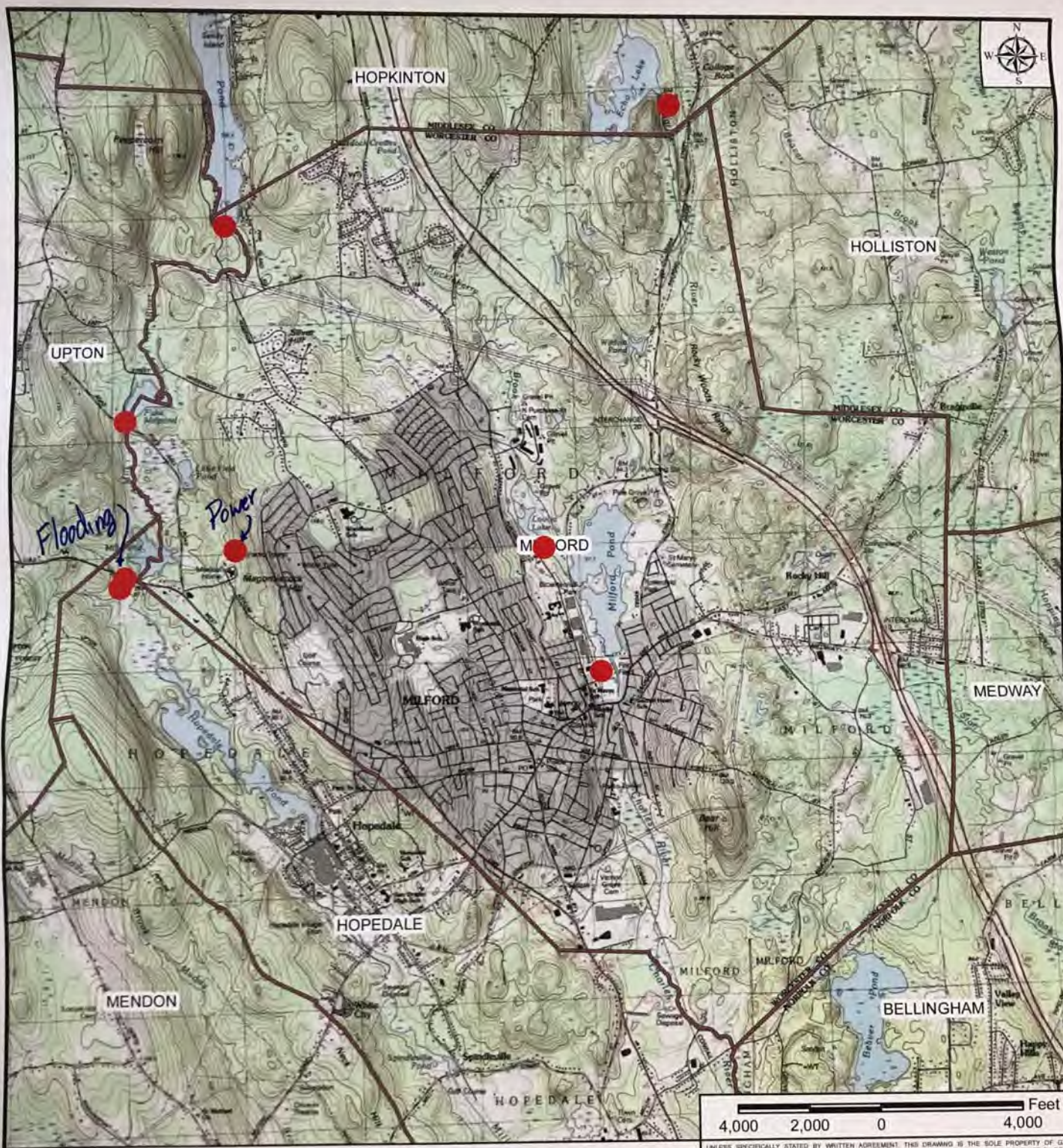
H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

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

Features	Location	Ownership	V or S	Winter Storms	Severe Weather	Flood	Extreme Cold	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
High School (shelter)	Milf	town	S	maintain access	"	available pumps	Transportation supplies	H	O
Hospital	Milf	Priv	S	maintain access			staff Transport	H	O
Birch St Fire	Milf	town	VS	maintain access		available pumps	wear gloves	M	L
Highway	Milf	town	V	Maintain equip + personnel (relocate ASAP)	"	Relocate Department	"	M	O
* Echo Lake Dam	Hopk	Priv	V			Prevent dam failure		L	L
Water Comp	Milf	Priv	V			add water storage back water pump relocate facility		L	L
Societal									
Environmental									
Highway	Milf	town	V			relocate fuel pumps relocate facility		M	L
Sewer Plant	Hopedale	town	V			study How to Protect - evaluate		M	L

Town of Milford, MA
52 Main Street
Milford, MA 01757

GZA GeoEnvironmental, Inc.
249 Vanderbilt Ave.
Norwood, MA 02062



Legend

Town Boundaries

Feet

4,000 2,000 0 4,000

Multi-Hazard Mitigation Plan

USGS Topographic Plan

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI (USGS TOPO MAPS).
REMAINING DATA FROM MASSGIS (2016)

FIGURE 1

DATE	PROJECT NO.	DRAWN BY:	CHECKED BY:
September 2017	15.0166551.00	JRB	TEJ

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	* Severe Winter Snow & Blizzards Ice Storms	* Severe Weather High winds/ Thunderstorms	* Flood Urban Drainage	* Sever Winter Extreme Cold	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Trees - Vegetation - Winter Storm	Countryside	?	V					M	O
Flooding Rt. 140/Hopedale Town Line	Rt 140/Hopedale		V			Not Frequente This Location		L	S
Dams -	Milford		V			Evaluations/study		M	L
Power -	Country Side Milford Highschool		V	MASS-MAP Plans (Nursing Facilities) Emergency Plans/Backup Plan	Proper Contact @ N. Grid			H	O
Hospital - Flooding	Hospital		V			Drainage Designs		M	O
Church St. To Water - Flooding	Water Street		V			Drainage Design		H	S
Societal									
Food	In General		V	3-Day Supply	Shelters	Supply		H	S/O
Shelters	Milford High		S (V Power)	Fuel - Power Source				M	O
Elderly	In General		V	Transport - Education Shelter Agreements				M	O
Homeless			V	Shelter				M	O
Transport (Medical employees,				-Ambulance- -Police				H	O
Evacuation Plan/ Route				Educate Public				M	O
Environmental									
Beaver Dams						Trapping Program		M	O

Sewer Plant

Appendix C

CRB Workshop Presentation

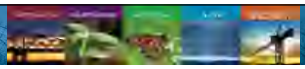
Town of Milford
Community Resilience Building Workshop

Proactive By Design.
Our Company Commitment



June 19, 2018

COMMUNITY RESILIENCE BUILDING WORKSHOP



Workshop Overview

- Planning Process
- Characterize Hazards (Large Team)
- Identify Community Vulnerabilities and Strengths (Small Team)
- Identify and Prioritize Community Actions (Small Team)
- Determine the Overall Priority Actions (Large Team)

PLANNING PROCESS

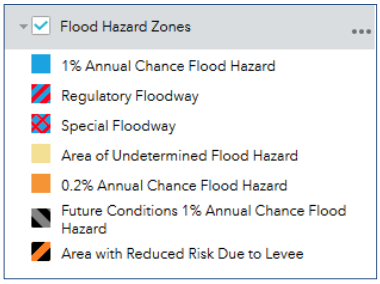
Local Team	
Town Administrator	Rick Villani
Town Engineer	Michael Dean
Town Planner	Larry Dunkin
Highway Surveyor	Scott Crisafulli
Milford Sewer Department	John Mainini
Milford Water Company	David Condrey, Vin Farese
Milford Police Department	Tom O'Loughlin
Milford Fire Department	William Touhey, Jr.

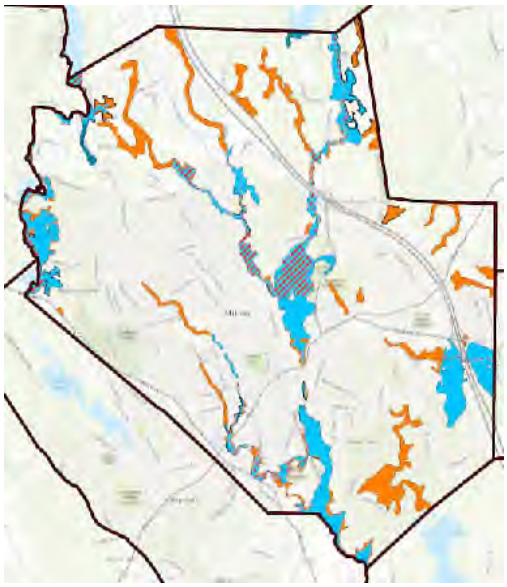
COMMUNITY RESILIENCE BUILDING WORKSHOP

HAZARDS CHARACTERIZATION

Flooding

- Riverine Flooding
- Urban Drainage Flooding
- Ground Failures
- Ice Jam





HAZARDS CHARACTERIZATION

Severe Weather

- Hurricanes/ Tropical Storms/ Nor'easters
- High Winds/ Thunderstorms/ Tornadoes/ Microburst
- Extreme Heat/ Droughts

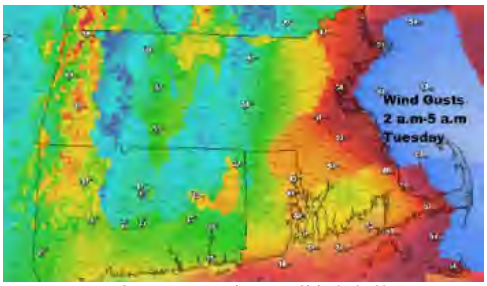
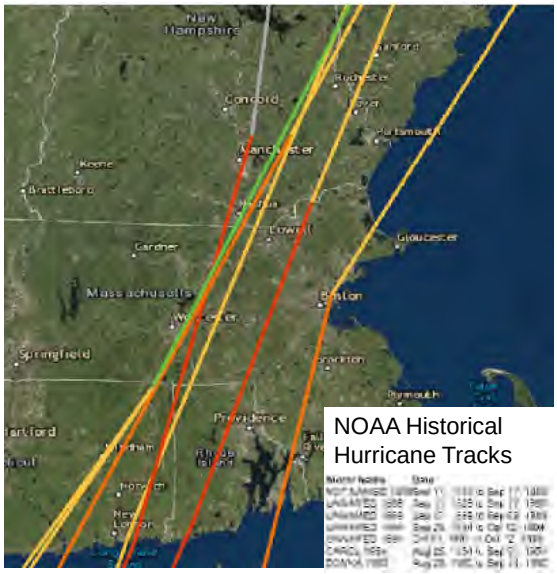


Image Source: Dave Epstein, Boston Globe 01-24-2017



NOAA Historical Hurricane Tracks

COMMUNITY RESILIENCE BUILDING WORKSHOP

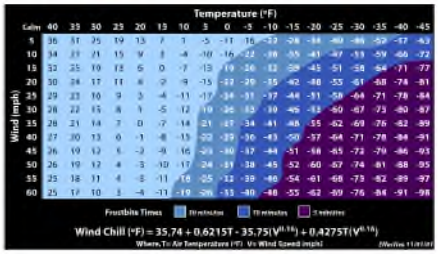
HAZARDS CHARACTERIZATION

Severe Winter Weather

- Snow and Blizzards
- Ice Storms
- Extreme Cold

2013 Image of Nemo: NASA's Earth Observatory 2013

Wind Chill Chart



HAZARDS CHARACTERIZATION

Fire

- Urban Fire
- Wildfire

Brush fire on I-495 in Andover and Lawrence.
(Image Credit: Dustin Fitch)

COMMUNITY RESILIENCE BUILDING WORKSHOP

HAZARDS CHARACTERIZATION

Climate Change Impacts

- Increased storm frequency and severity,
- Increased temperature
  - More days over 90 degrees F
  - Fewer days below freezing
- Increased precipitation
- More climate extremes (wet and dry periods)
- Changes in natural flora and fauna
- Erosion, flooding, water pollution

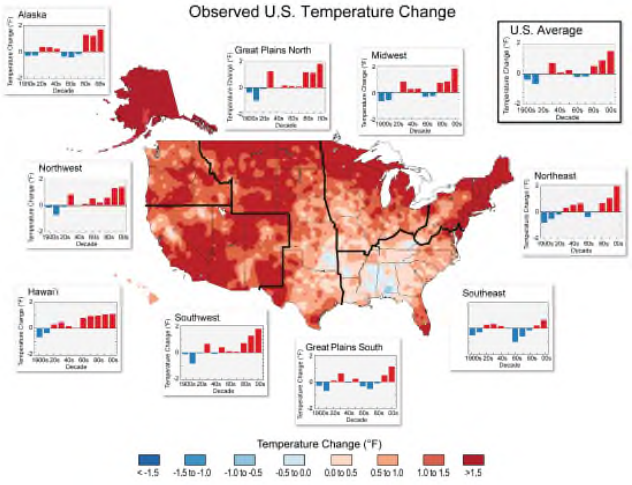


Image Ref: Kenneth E. Kunkel, Cooperative Institute for Climate and Satellites – NC, 2013

HAZARDS CHARACTERIZATION

Temperature Changes

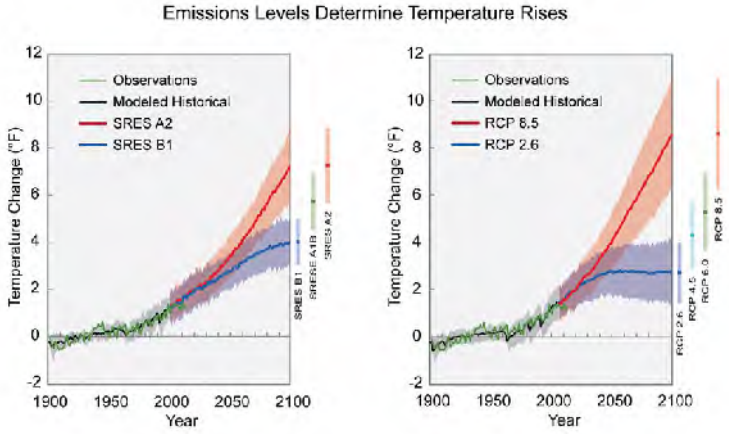


Image Ref: Kenneth E. Kunkel, Cooperative Institute for Climate and Satellites – NC, 2013

COMMUNITY RESILIENCE BUILDING WORKSHOP

HAZARDS CHARACTERIZATION

Precipitation Changes

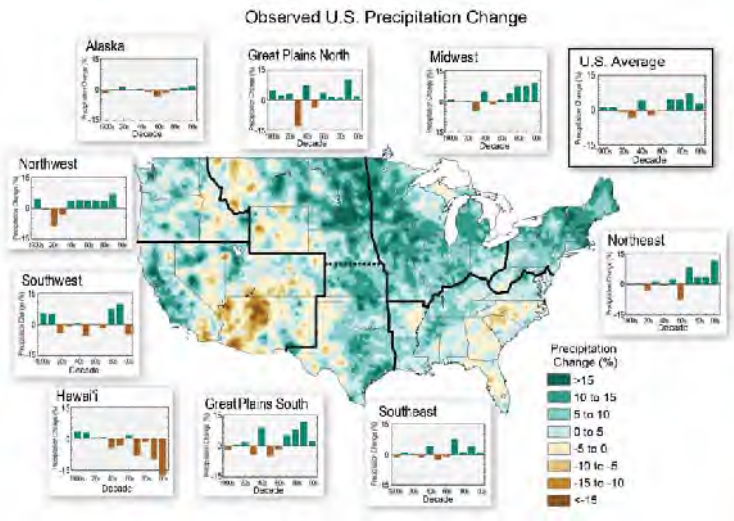


Image Ref: Peterson et. al. 2013

HAZARDS CHARACTERIZATION

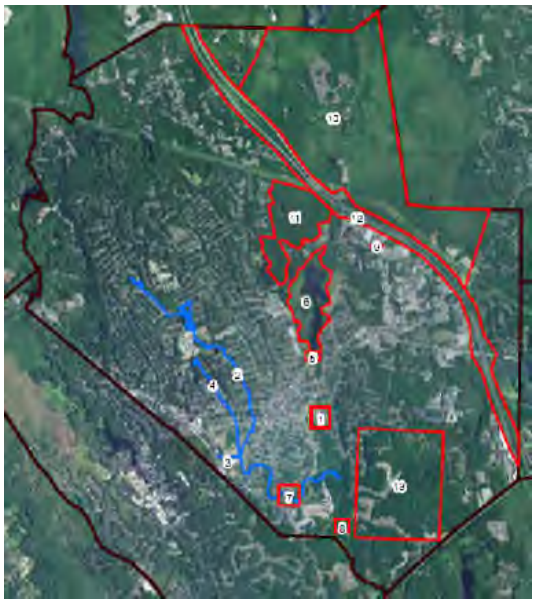
Locally Identified Hazards

- Flooding
- Fire

Hazard Areas — Brooks — Town Boundaries

ID	Hazard Area	Hazard Type
1	Beach St./Central St.	Flooding
2	Godfrey Brook	Flooding
3	Hospital Brook	Flooding
4	O'Brien Brook	Flooding
5	Milford Pond Dam	Flooding
6	Milford Pond	Flooding
7	Depot St. at National St.	Flooding

ID	Hazard Area	Hazard Type
8	Charles River at Howard St.	Flooding
9	Quarry behind Lowes	Flooding
10	Cedar St. Area	Fire
11	Town Forest and Shadow Brook	Fire
12	I-495 Corridor	Fire
13	Bear Hill	Fire



NATURAL HAZARDS RISK ASSESSMENT

- Exposure Analysis
- Historical Analysis

RISK ASSESSMENT

Exposure Analysis

ID	Hazard Area	Hazard Type
1	Beach St./Central St.	Flooding
2	Godfrey Brook	Flooding
3	Hospital Brook	Flooding
4	O'Brien Brook	Flooding
5	Milford Pond Dam	Flooding
6	Milford Pond	Flooding
7	Depot St. at National St.	Flooding

ID	Hazard Area	Hazard Type
8	Charles River at Howard St.	Flooding
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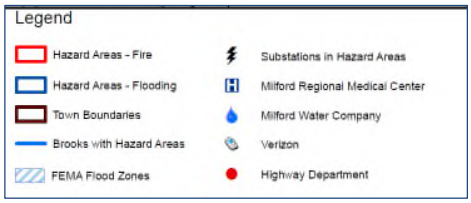
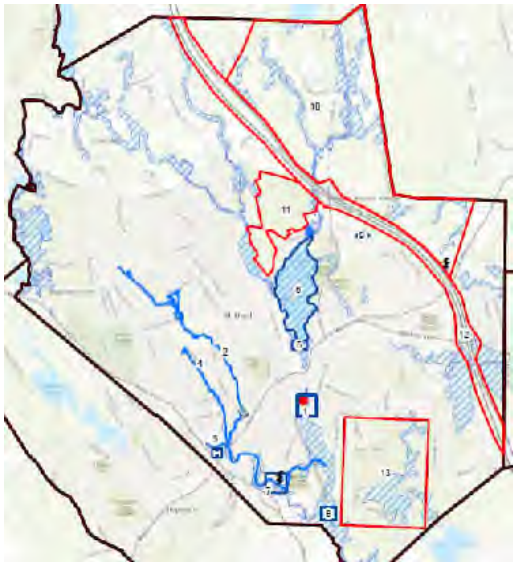




COMMUNITY RESILIENCE BUILDING WORKSHOP

RISK ASSESSMENT

Historical Analysis - Disaster Declarations - Worcester County

Disaster Declarations	Date
FEMA DR 4214 - Severe Winter Storm, Snowstorm & Flooding	April 13, 2015
FEMA DR 4110 - Severe Winter Storm, Snowstorm & Flooding	April 19, 2013
FEMA DR 4051 - Severe Storm & Snowstorm	January 6, 2012
FEMA DR 1994 - Severe Storms & Tornadoes	June 15, 2011
FEMA DR – 1895 - Severe Storm & Flooding	March 29, 2010
FEMA DR – 1813 - Severe Winter Storm & Flooding	January 5,2009

Natural Hazards Index Analysis

Likelihood/Frequency		
Point Value	**Category**	**Characteristics**
0	Very Low	Events that occur less often than once in 100 years (Less than 1% probability per year)
1	Low	Events that occur from once in 50 years to once in 100 years (1% to 2% probability per year)
2	Medium	Events that occur from once in 5 years to once in 50 years (2% to 20% probability per year)
3	High	Events that occur more frequently than once in 5 years (Greater than 20% probability per year)

Severity/Magnitude		
Point Value	**Category**	**Characteristics**
0	Minor	Limited and scattered property damage, limited damage to public infrastructure and essential services not interrupted, limited injuries or fatalities.
1	Serious	Scattered major property damage, some minor infrastructure damage, essential services are briefly interrupted, some injuries and/or fatalities.
2	Extensive	Widespread major property damage, major public infrastructure damage (up to several days for repairs), essential services are interrupted from several hours to several days, many injuries and/or fatalities.
3	Catastrophic	Property and public infrastructure destroyed, essential services stopped, numerous injuries and fatalities.

Impact Area Assessment		
Point Value	**Category**	**Characteristics**
1	small	In unpopulated areas, without structures or critical facilities
2	Medium	In unpopulated areas, but with structures or critical facilities
3	Large	In close proximity to population/structures and critical facilities

Hazard Index Scale

- Likelihood/Frequency
- Severity/Magnitude
- Impact Area Assessment

COMMUNITY RESILIENCE BUILDING WORKSHOP

Primary Hazards Identified Based on Hazard Index Analysis Results

1. Severe Winter Weather
   - Snow and Blizzards
2. Severe Weather
   - High winds/Thunderstorms
3. Severe Winter Weather
   - Ice Storms
4. Flood
   - Urban Drainage
4. Severe Winter Weather
   - Extreme Cold

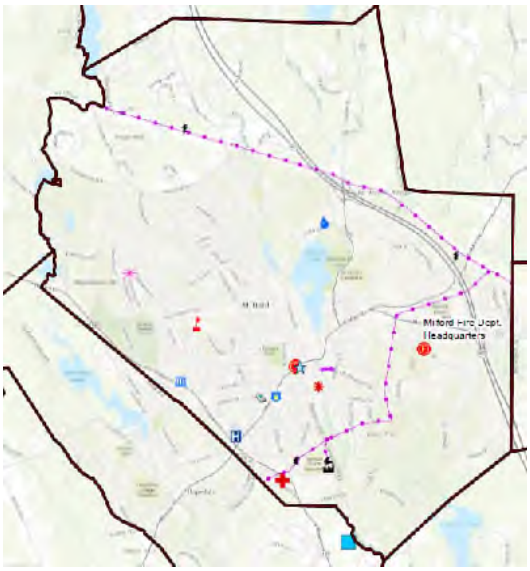
Hazard	Hazard Type	Average
Snow and Blizzards	Severe Winter Weather	7.5
High Winds/Thunderstorms	Severe Weather	7.4
Ice Storms	Severe Winter Weather	7.1
Urban Drainage Flooding	Flood	7.0
Extreme Cold	Severe Winter Weather	7.0
Hurricanes/Tropical Storms/Nor'easters	Severe Weather	6.9
Urban Fire	Fire	6.8
Extreme Heat/Droughts	Severe Weather	6.7
Tornadoes/Microburst	Severe Weather	6.6
Riverine Flooding	Flood	6.5
Wildfire	Fire	5.4
Earthquakes	Geologic Hazards	4.9
Dam Failures	Flood	3.8
Ground Failures	Flood	3.1
Ice Jam	Flood	1.8
Landslide	Geologic Hazards	1.8

COMMUNITY RESILIENCE BUILDING WORKSHOP

COMMUNITY ASSETS

Essential Services

- Town Boundaries
- Town Hall
- Milford Police Dept. and Emergency Op. Ctr.
- Fire Stations
- Milford Water Company
- Wastewater Treatment Plant
- Fresenius Kidney Care
- Emergency Shelter-Milford High School
- Highway Department
- Milford Power
- Powerline
- Substation/ Generating Station
- Verizon
- Communications Tower
- Milford Regional Medical Center
- Registry of Motor Vehicles
- Milford District Court

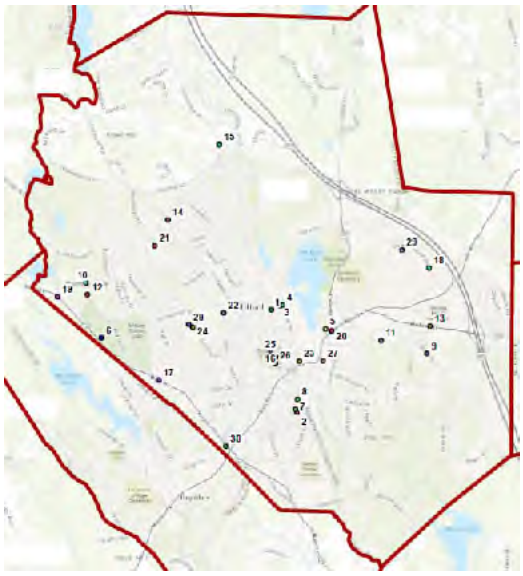


COMMUNITY RESILIENCE BUILDING WORKSHOP

COMMUNITY ASSETS

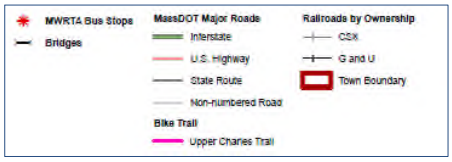
Support, High Occupancy, and Vulnerable Populations

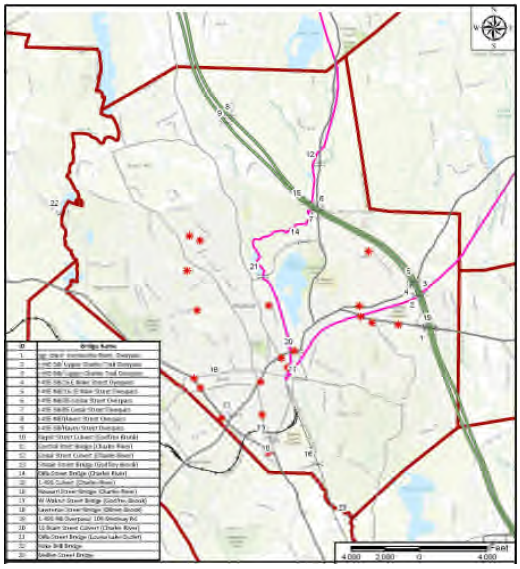
Id	Name	Id	Name
ELDERLY HOUSING		15	Little Stars
1	Greenleaf Terrace	16	Mother Hubbard
2	Fairfield Court	17	The Children's Korner
3	Birmingham Court	18	Rise and Shine Academy
4	Milford Housing Authority	19	Kids and Co West
5	Maher Court	20	Tracey and Becky Daycare Center
ASSISTED LIVING		**SCHOOL**	
6	Whitcomb House	21	Woodland School
7	Blair House Long Term Care Facility of Milford	22	Brookside School
8	Blair House of Milford Assisted Living	23	Milford Middle East School- Closed
9	Cornerstone	24	Milford High School
NURSING HOME		25	Memorial School
10	Countryside Health Care	26	Stacy Middle School
11	Sunbridge Care and Rehab for Milford	27	Milford Catholic Elem School
12	Geriatric Authority of Milford	28	Shining Star Early Childhood Center
CHILDREN'S DAYCARE		29	Evergreen Center School
13	Kids and Co	**HOSPITAL**	
14	Kinder Kare	30	Milford Regional Medical Center



ASSETS INVENTORY

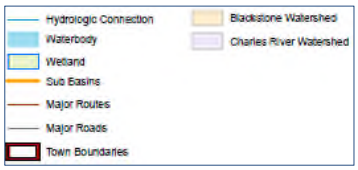
Transportation

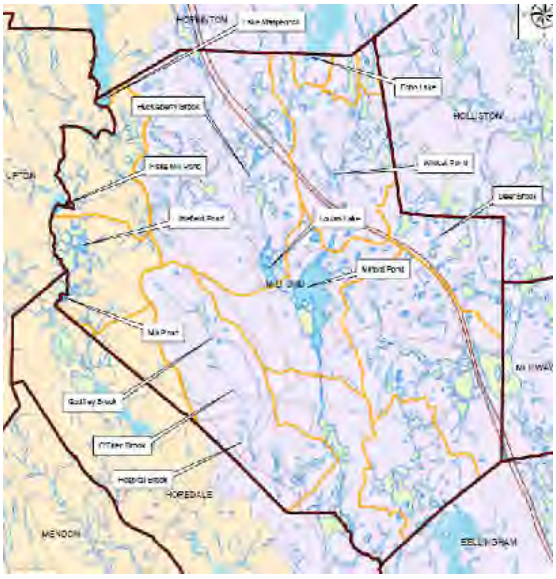




COMMUNITY ASSETS

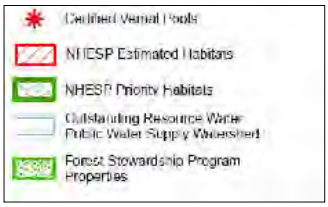
Water Resources

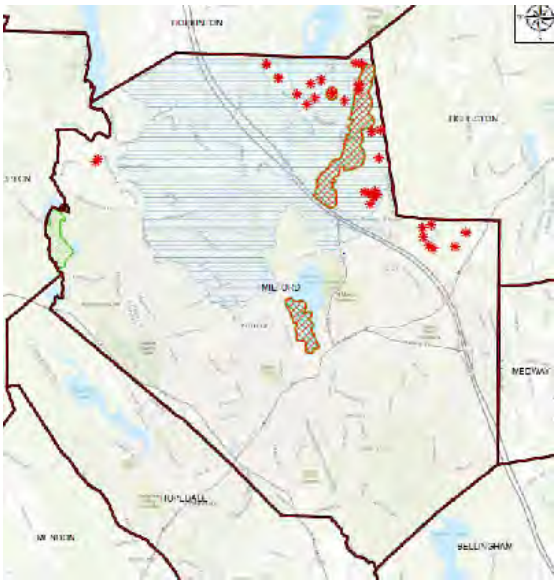




COMMUNITY ASSETS

Natural Resources





Proactive By Design.
Our Company Commitment

Questions?

Tom Jenkins (thomas.jenkins@gza.com)

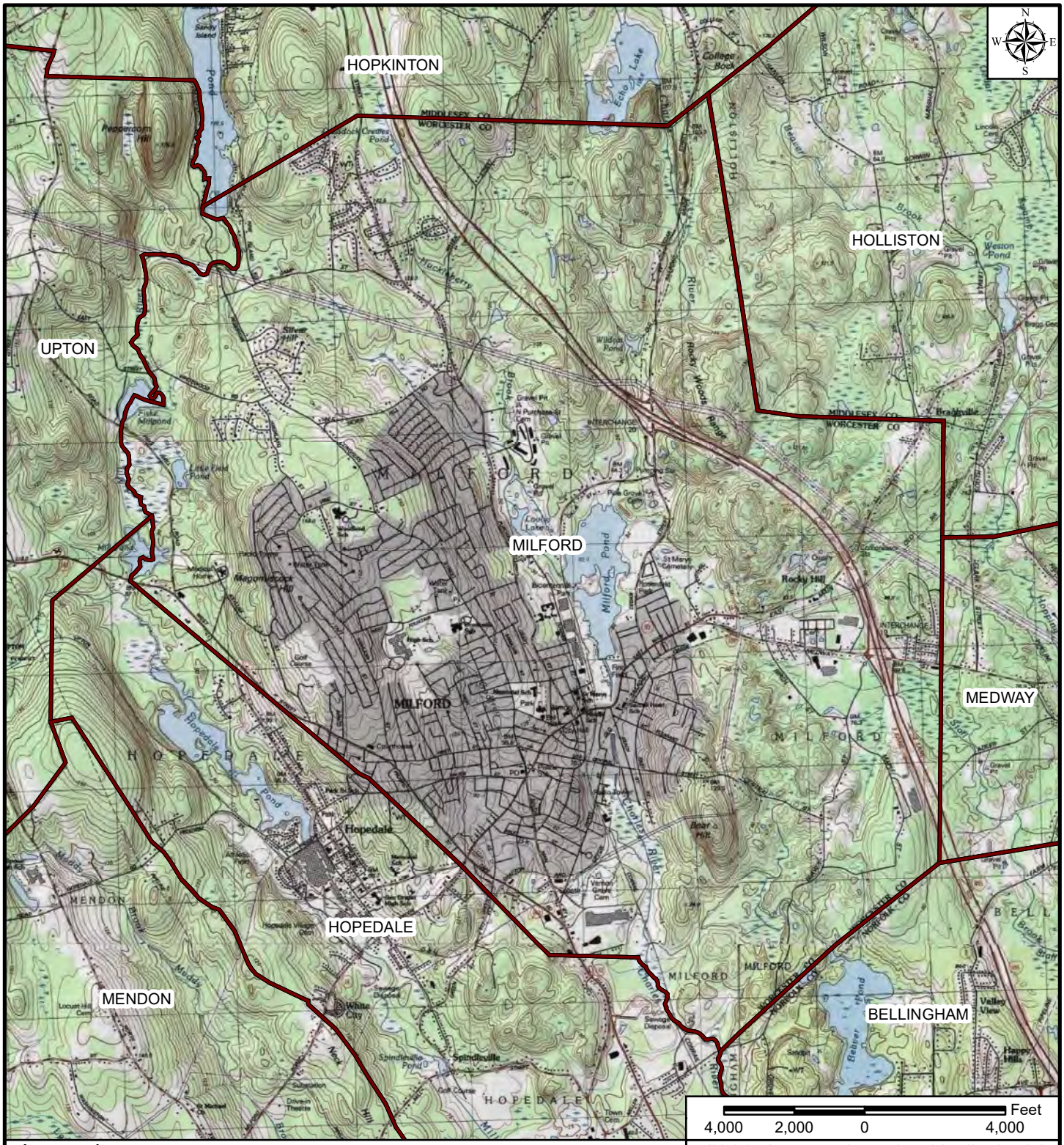
Sam Bell (samuel.bell@gza.com)

Jennifer Burke (jennifer.burke@gza.com)

Rosalie Starvish (rosalie.starvish@gza.com)

Appendix D

Base and Supporting Risk/Asset Maps



Legend

Town Boundaries

4,000 2,000 0 4,000 Feet

Multi-Hazard Mitigation Plan

USGS Topographic Plan

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI (USGS TOPO MAPS), REMAINING DATA FROM MASSGIS (2016).

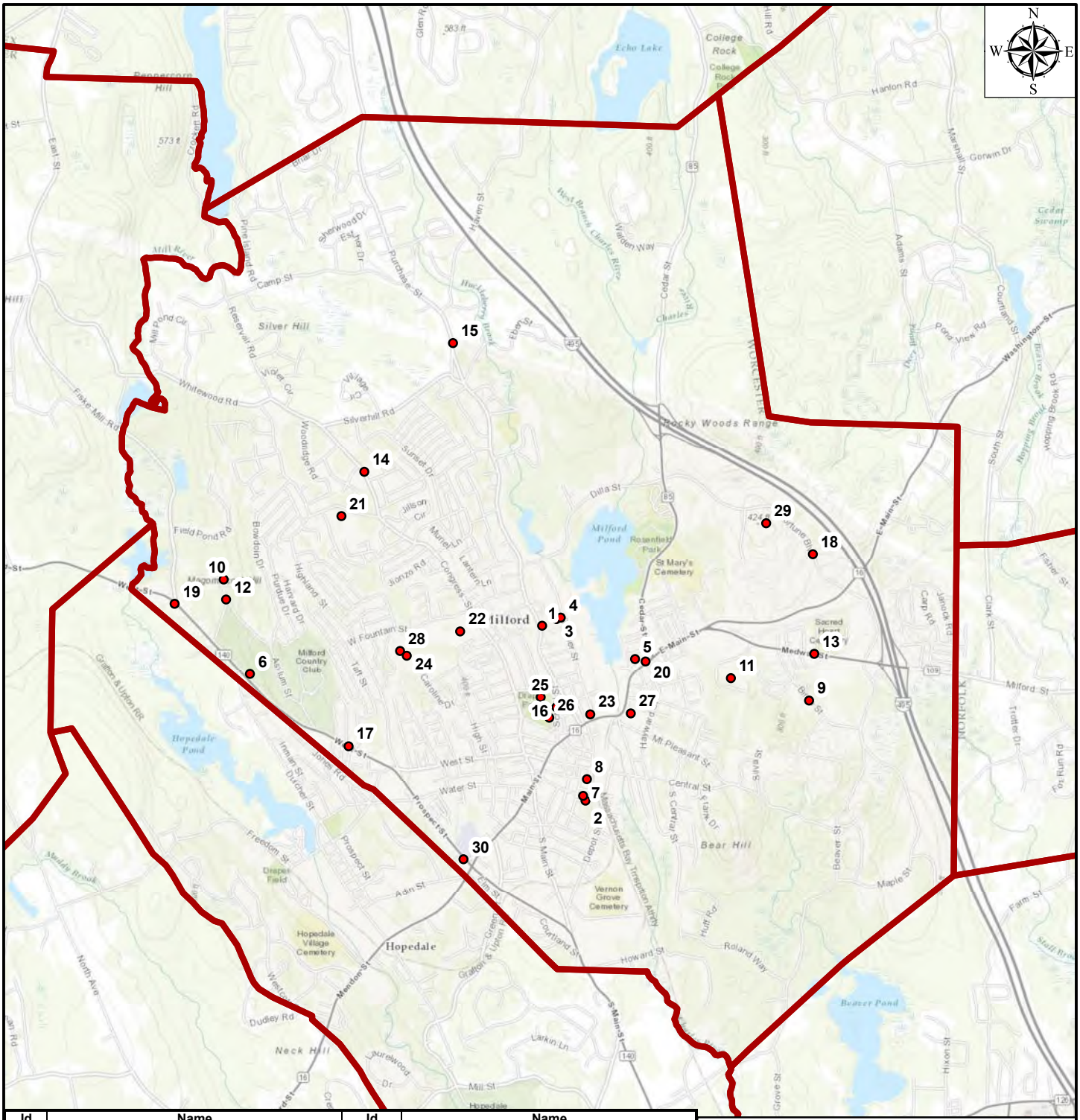
FIGURE 1

DATE: September 2017

PROJECT NO. 15.0166551.00

DRAWN BY: JRB

CHECKED BY: TEJ



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13	Kids and Co	**HOSPITAL**	
14	Kinder Kare	30	Milford Regional Medical Center

Feet

4,000 2,000 0 4,000

Multi-Hazard Mitigation Plan

Support, High Occupancy, and Vulnerable Populations

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

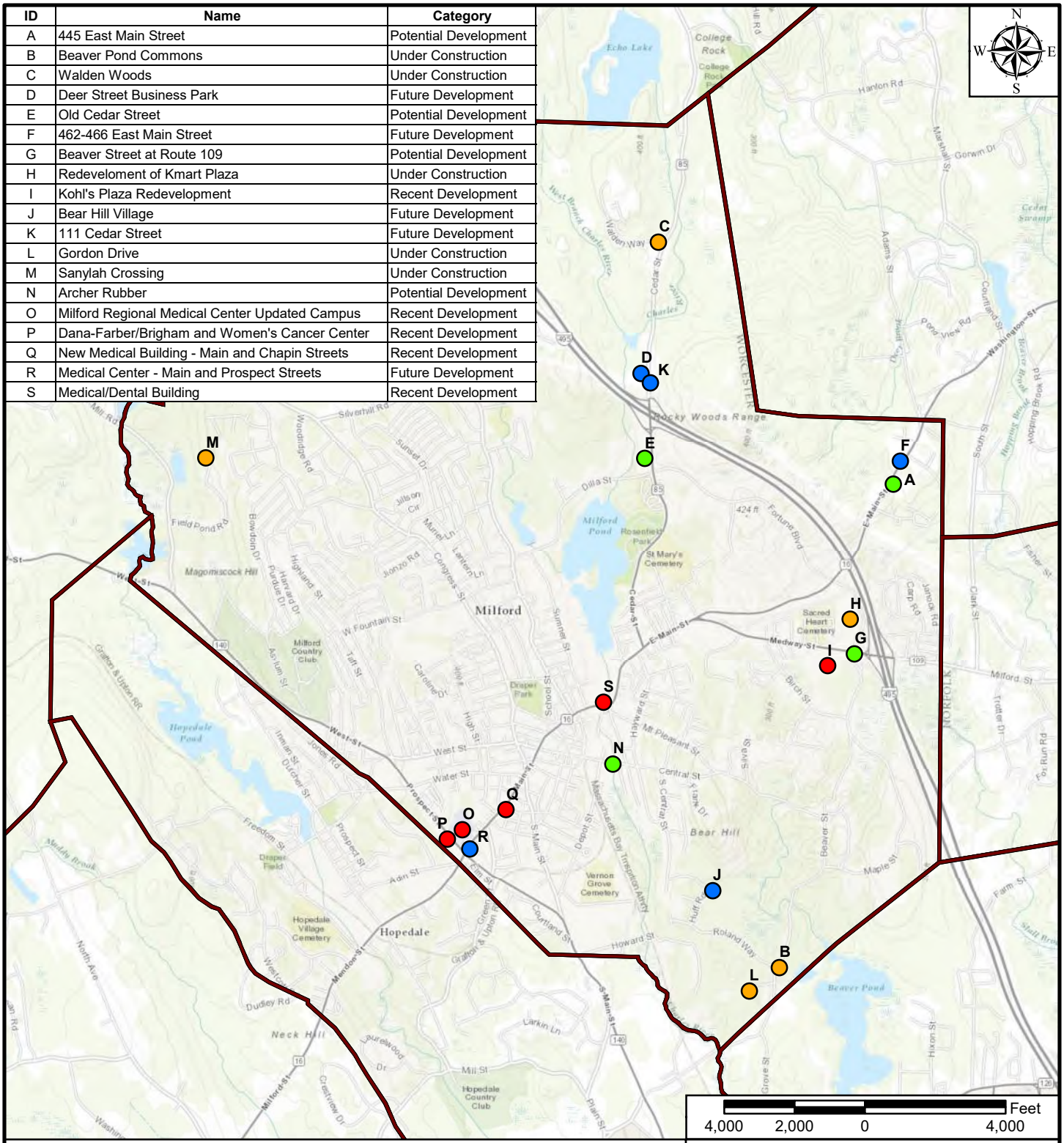
PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI, TOWN BOUNDARY, LTC, HOUSING AND SCHOOL DATA FROM MASSGIS (2016)

DATE: September 2017
PROJECT NO. 15.0166551.00
DRAWN BY: ARD
CHECKED BY: TEJ

FIGURE
4

ID	Name	Category
A	445 East Main Street	Potential Development
B	Beaver Pond Commons	Under Construction
C	Walden Woods	Under Construction
D	Deer Street Business Park	Future Development
E	Old Cedar Street	Potential Development
F	462-466 East Main Street	Future Development
G	Beaver Street at Route 109	Potential Development
H	Redevelopment of Kmart Plaza	Under Construction
I	Kohl's Plaza Redevelopment	Recent Development
J	Bear Hill Village	Future Development
K	111 Cedar Street	Future Development
L	Gordon Drive	Under Construction
M	Sanylah Crossing	Under Construction
N	Archer Rubber	Potential Development
O	Milford Regional Medical Center Updated Campus	Recent Development
P	Dana-Farber/Brigham and Women's Cancer Center	Recent Development
Q	New Medical Building - Main and Chapin Streets	Recent Development
R	Medical Center - Main and Prospect Streets	Future Development
S	Medical/Dental Building	Recent Development



Legend

- Town Boundaries

Category

- Future Development
- Potential Development
- Recent Development
- Under Construction

Multi-Hazard Mitigation Plan

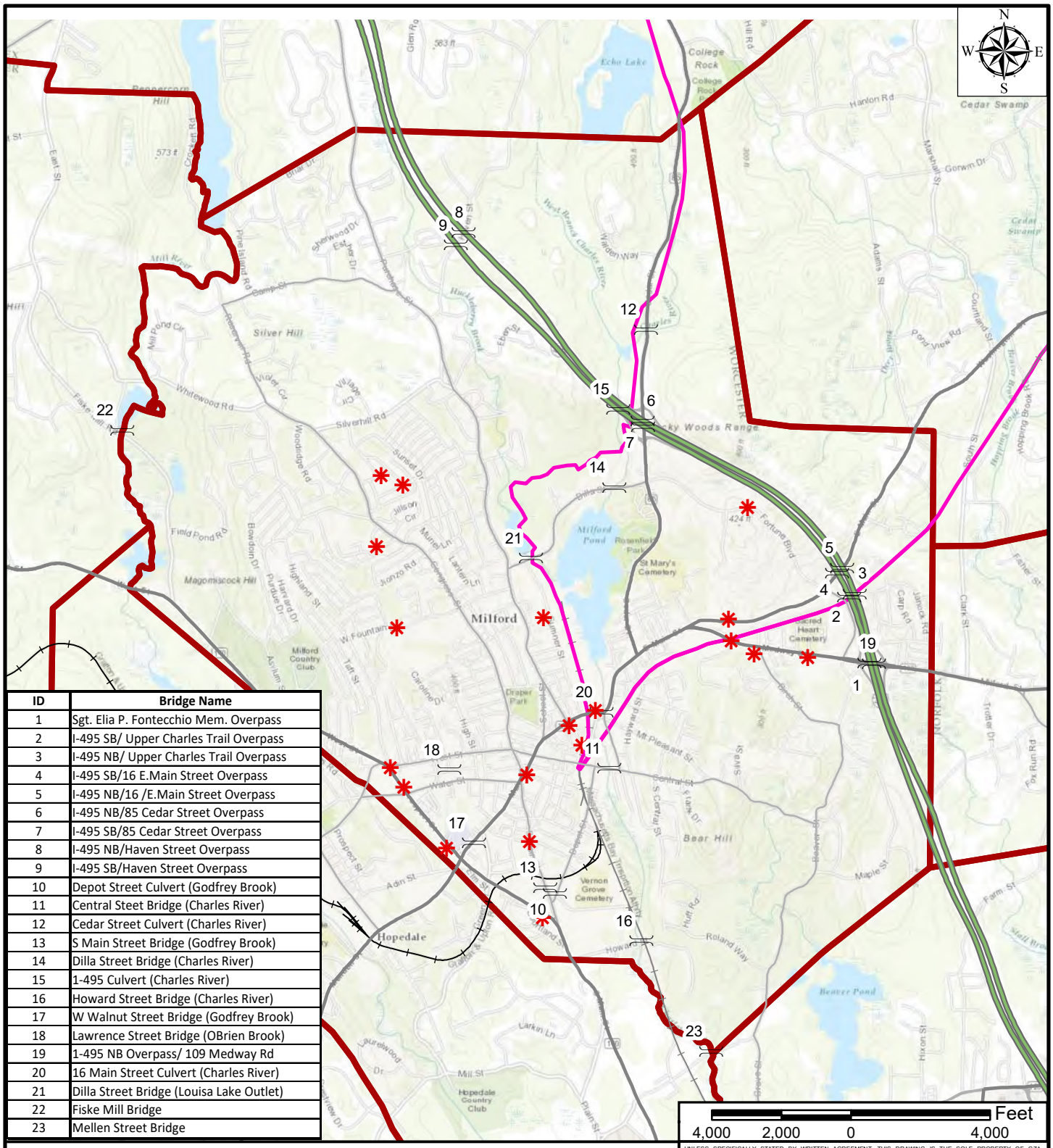
New Development

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI, LOCATIONS FROM TOWN, REMAINING DATA FROM MASSGIS (2016).

DATE:	PROJECT NO.	DRAWN BY:	CHECKED BY:	FIGURE
September 2017	15.0166551.00	JRB	TEJ	8



ID	Bridge Name
1	Sgt. Elia P. Fontecchio Mem. Overpass
2	I-495 SB/ Upper Charles Trail Overpass
3	I-495 NB/ Upper Charles Trail Overpass
4	I-495 SB/16 E.Main Street Overpass
5	I-495 NB/16 /E.Main Street Overpass
6	I-495 NB/85 Cedar Street Overpass
7	I-495 SB/85 Cedar Street Overpass
8	I-495 NB/Haven Street Overpass
9	I-495 SB/Haven Street Overpass
10	Depot Street Culvert (Godfrey Brook)
11	Central Steet Bridge (Charles River)
12	Cedar Street Culvert (Charles River)
13	S Main Street Bridge (Godfrey Brook)
14	Dilla Street Bridge (Charles River)
15	1-495 Culvert (Charles River)
16	Howard Street Bridge (Charles River)
17	W Walnut Street Bridge (Godfrey Brook)
18	Lawrence Street Bridge (OBrien Brook)
19	1-495 NB Overpass/ 109 Medway Rd
20	16 Main Street Culvert (Charles River)
21	Dilla Street Bridge (Louisa Lake Outlet)
22	Fiske Mill Bridge
23	Mellen Street Bridge

Legend

- MWRTA Bus Stops
- Major Bridges

MassDOT Major Roads
- Interstate
- U.S. Highway
- State Route
- Non-numbered Road

Bike Trail
- Upper Charles Trail

Railroads by Ownership
- CSX
- G and U

Town Boundary

Multi-Hazard Mitigation Plan

Public Infrastructure

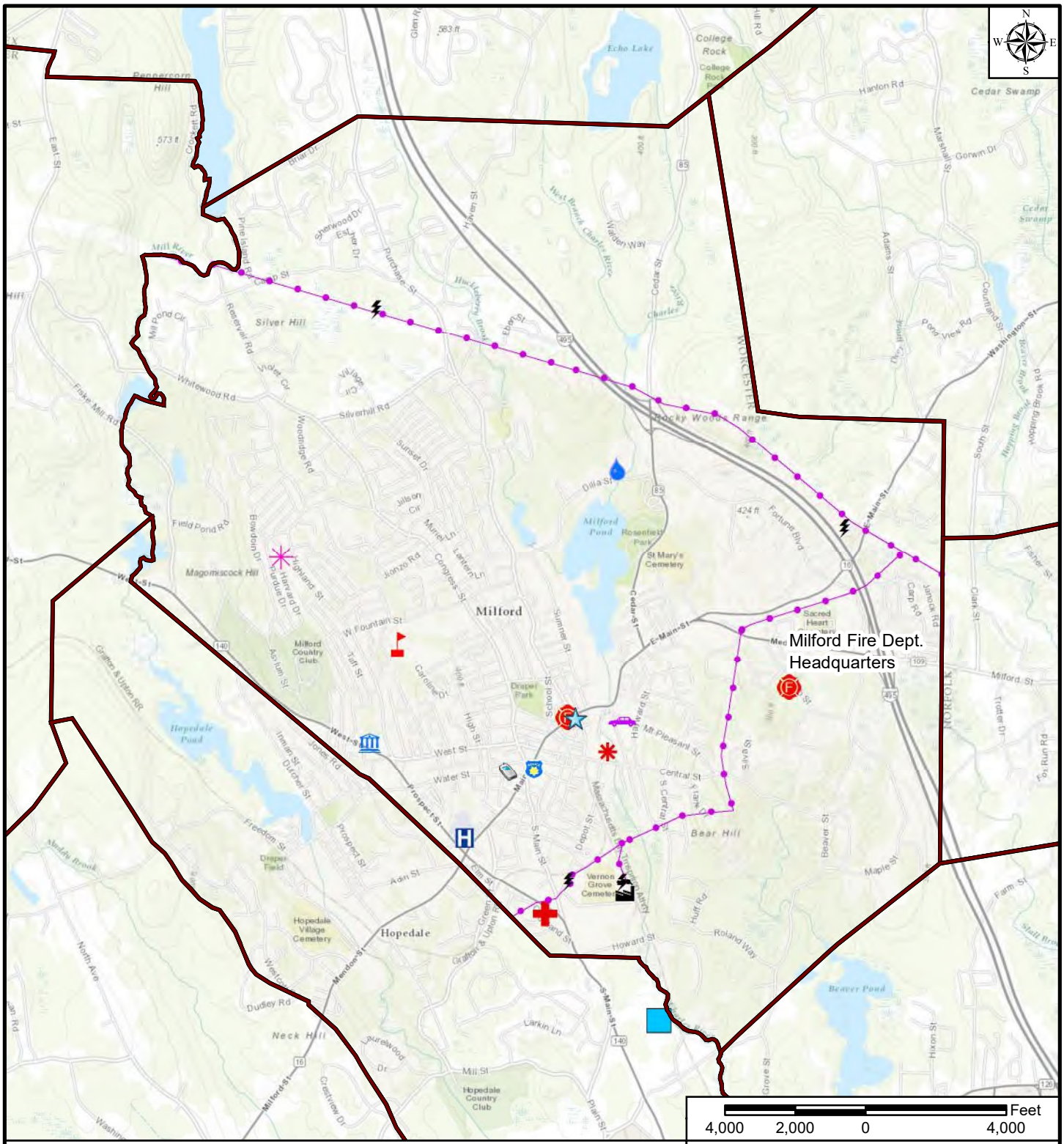
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: ESRI, MASSGIS (2016), MASSDOT, MWRTA, GOOGLE MAPS

DATE:	PROJECT NO.	DRAWN BY:	CHECKED BY:
September 2017	15.0166551.00	ARD	TEJ

FIGURE
9



Legend

- Town Boundaries
- Town Hall
- Milford Police Dept. and Emergency Op. Ctr.
- Fire Stations
- Milford Water Company
- Wastewater Treatment Plant
- Fresenius Kidney Care
- Emergency Shelter-Milford High School
- Highway Department
- Milford Power
- Electric Transmission Line
- Substation/ Generating Station
- Verizon
- Communications Tower
- Milford Regional Medical Center
- Registry of Motor Vehicles
- Milford District Court

Multi-Hazard Mitigation Plan

Essential Services

PREPARED BY:
GZA GeoEnvironmental, Inc.
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PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI, REMAINING DATA FROM MASSGIS (2016) AND TOWN OF MILFORD.

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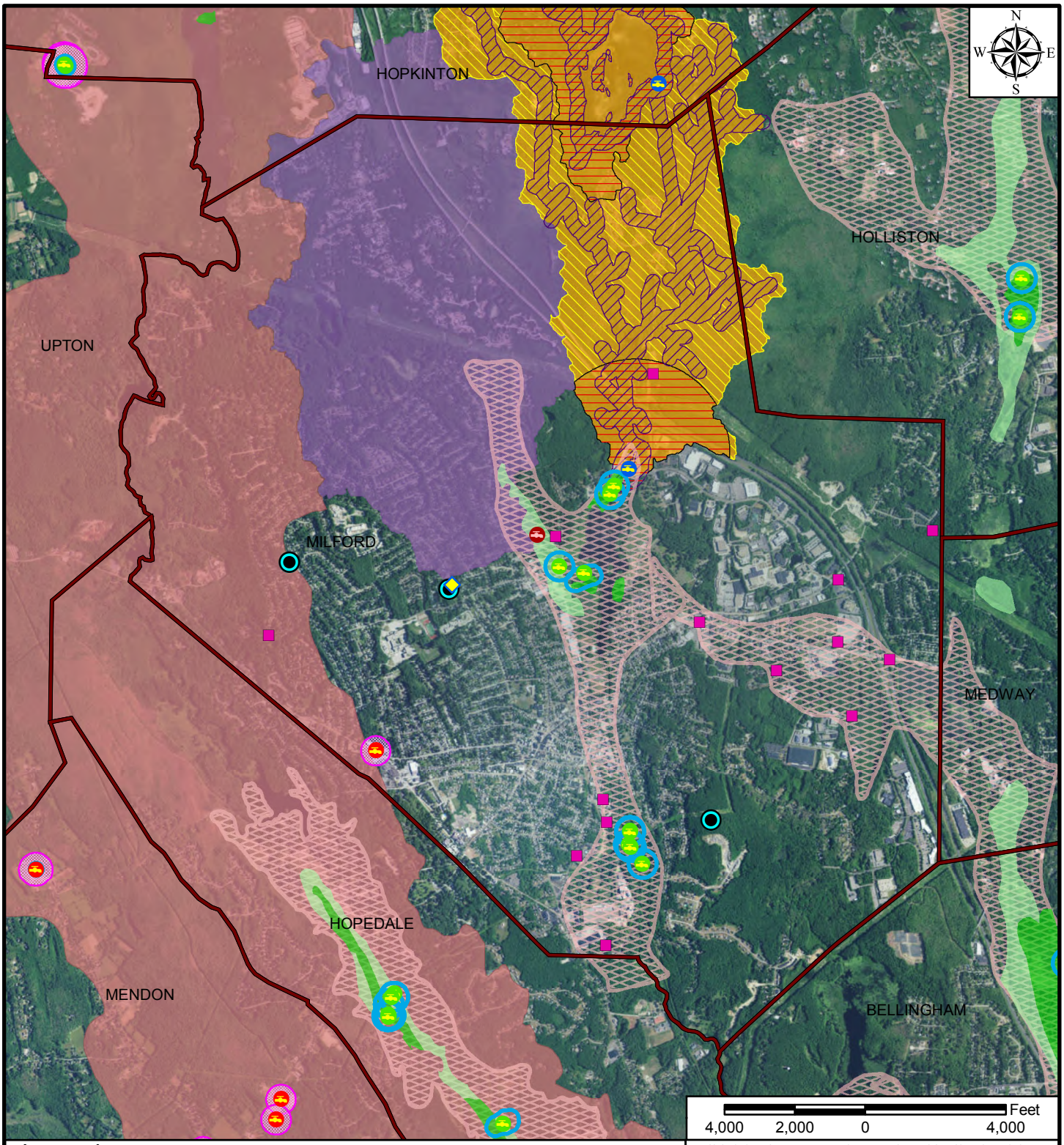
September 2017	15.0166551.00	JRB	TEJ	10



Legend

Public Water Supplies
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Emergency Surface Water

Aquifers
- High Yield
- Medium Yield

Wellhead Protection Areas
- DEP Approved Zone I
- DEP Approved Zone II
- IWPA

Surface Water Protection Areas
- ZONE A
- ZONE B
- ZONE C

Surface Water Supply Watersheds Type
- Surface Water (Active/Inactive)
- Emergency Surface Water
- Rhode Island Source

- Booster Stations
- Pump Stations
- Water Storage Towers
- Town Boundaries

Multi-Hazard Mitigation Plan

Water Supply/Wastewater

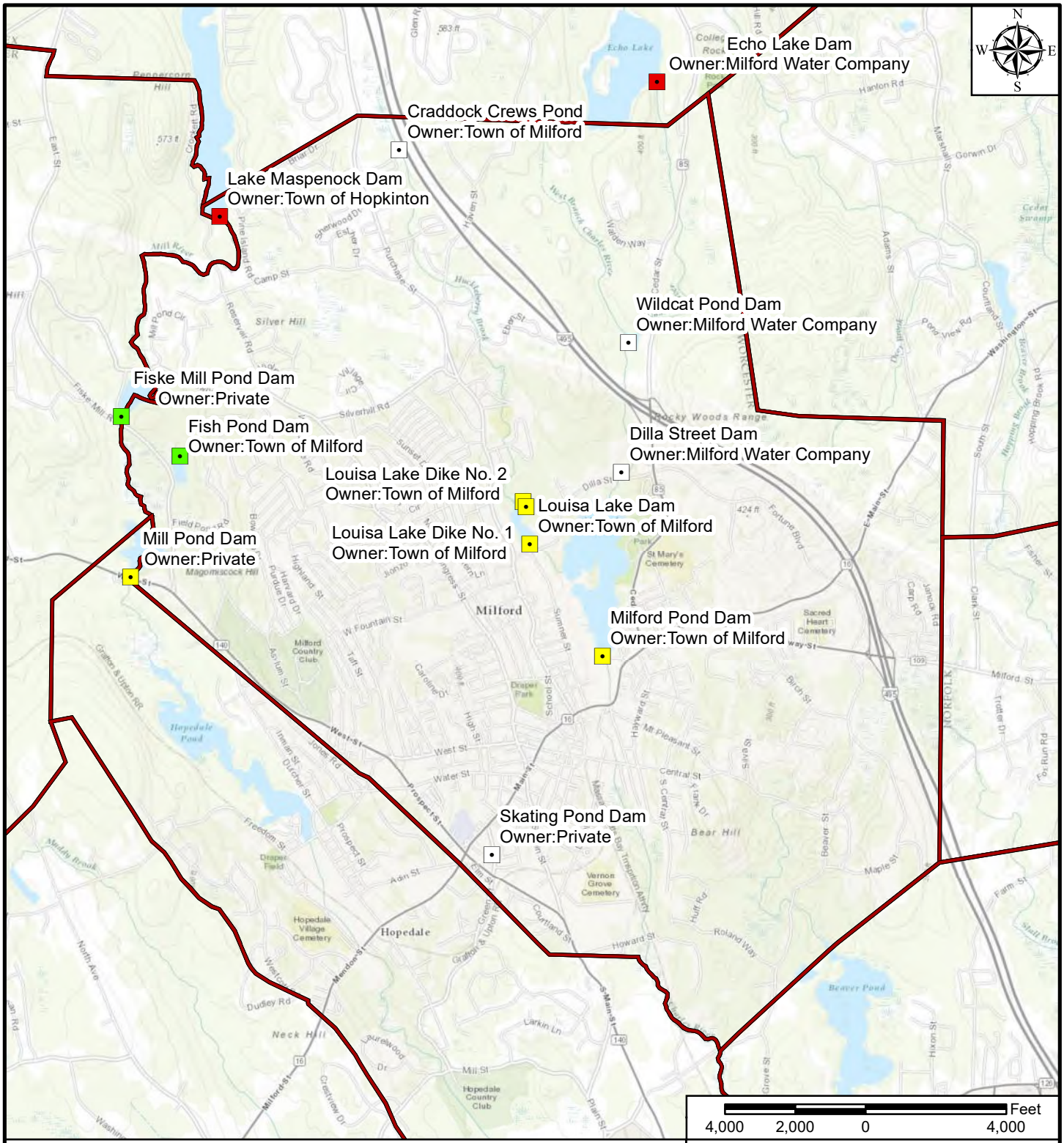
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI (2016), PUMP STATION AND WATER TOWER DATA FROM TOWN, REMAINING DATA FROM MASSGIS (2016).

DATE:	PROJECT NO.	DRAWN BY:	CHECKED BY:
November 2017	15.0166551.00	JRB	TEJ

FIGURE
11



Feet
4,000 2,000 0 4,000

Legend

Dams with Hazard Class

- High Hazard
- Significant Hazard
- Low Hazard
- N/A
- Town Boundaries

Multi-Hazard Mitigation Plan

Dams

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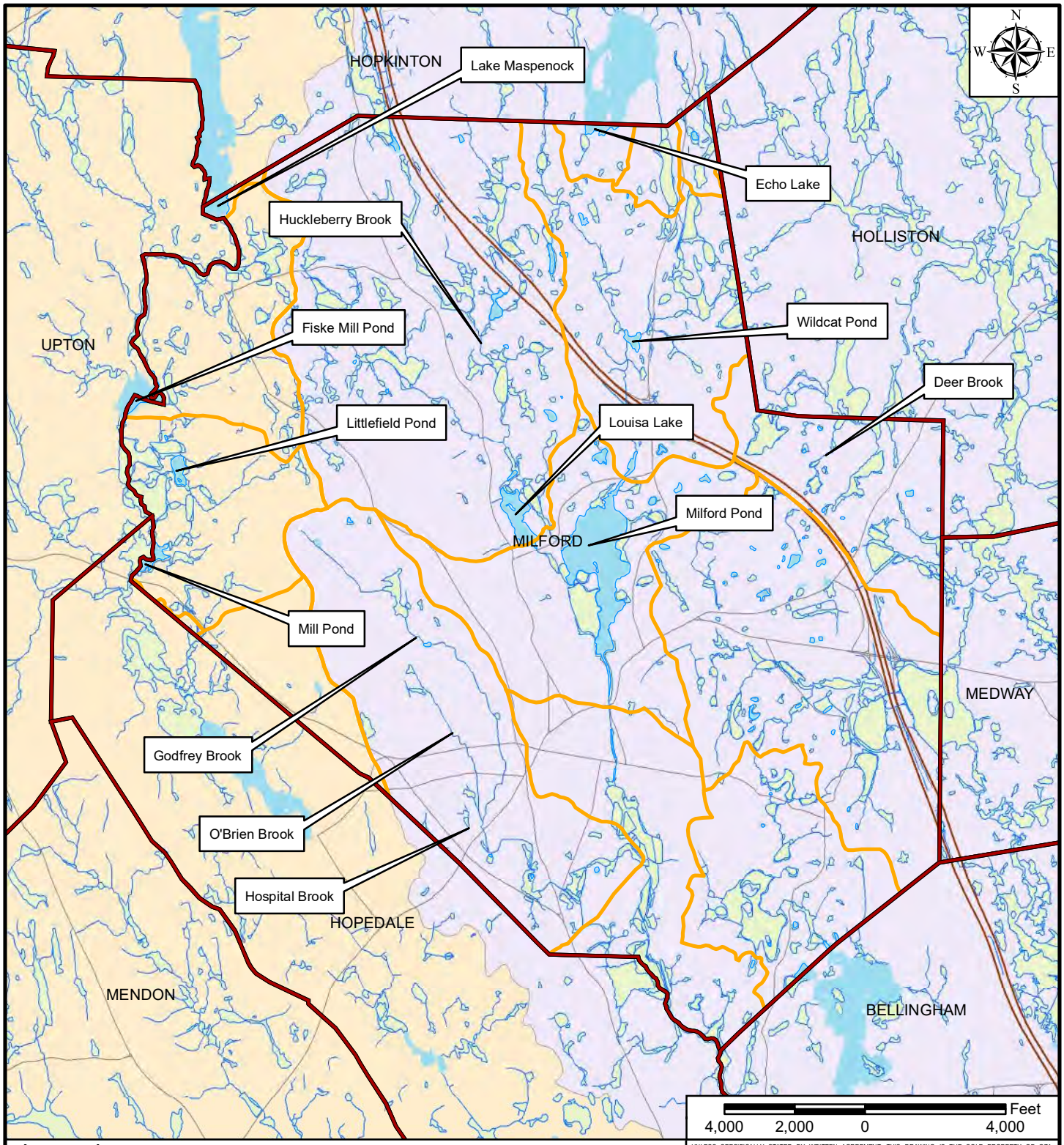
PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI, TOWN BOUNDARY AND DAMS DATA FROM MASSGIS (2016), SUPPLEMENTAL DAM INFO FROM TOWN.

DATE:	PROJECT NO.	DRAWN BY:	CHECKED BY:	FIGURE
September 2017	15.0166551.00	JRB	TEJ	12



Legend

- Hydrologic Connection
- Waterbody
- Wetland
- Sub Basins
- Major Routes
- Major Roads
- Town Boundaries
- Blackstone Watershed
- Charles River Watershed

Multi-Hazard Mitigation Plan

Water Resources

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SOURCES: MASSGIS (2016).

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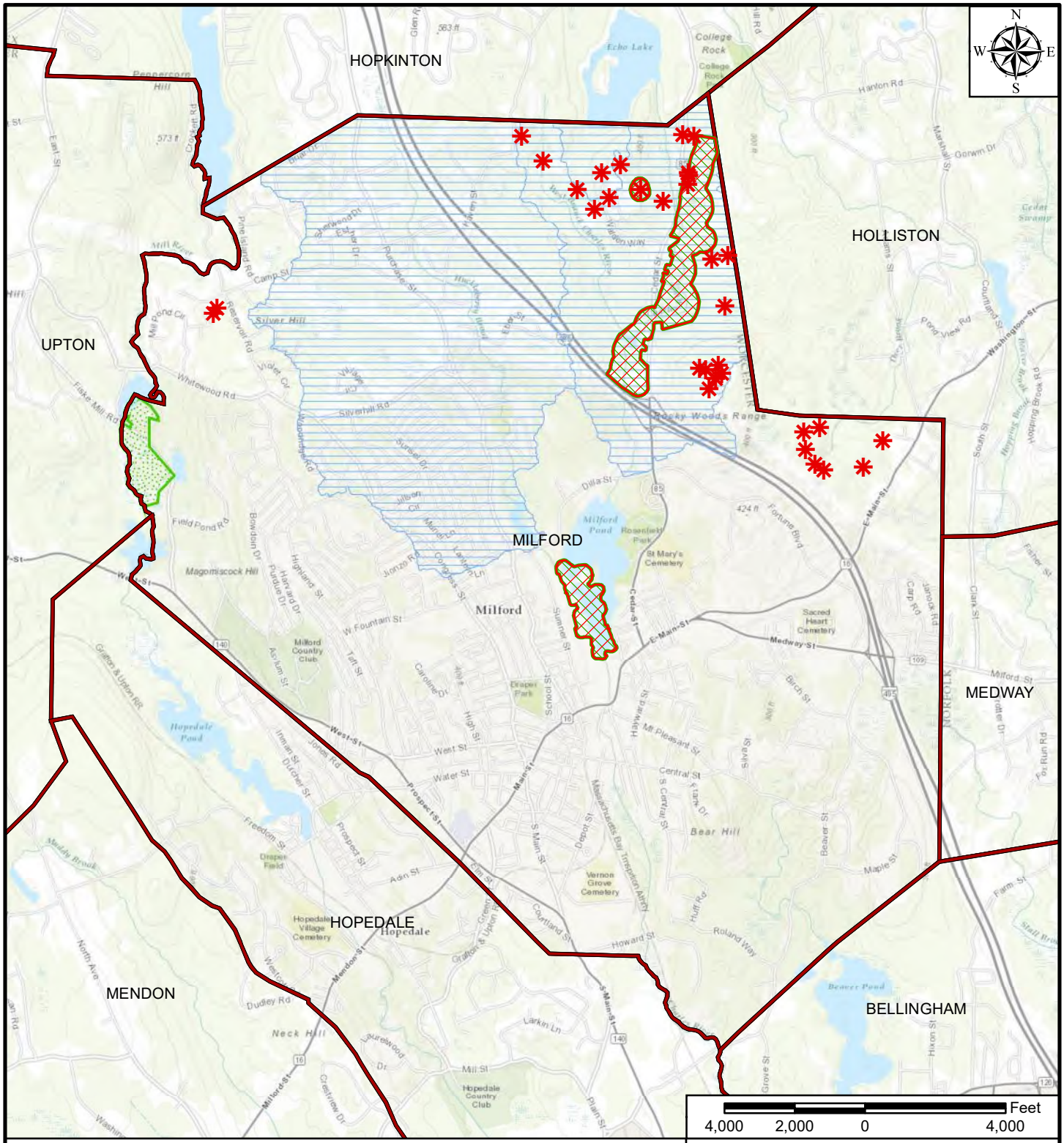
September 2017	15.0166551.00	JRB	TEJ	15



Legend

- Certified Vernal Pools
- NHESP Estimated Habitats
- NHESP Priority Habitats
- Outstanding Resource Water
  Public Water Supply Watershed
- Forest Stewardship Program
  Properties

Feet

4,000 2,000 0 4,000

Multi-Hazard Mitigation Plan

Ecological Resources

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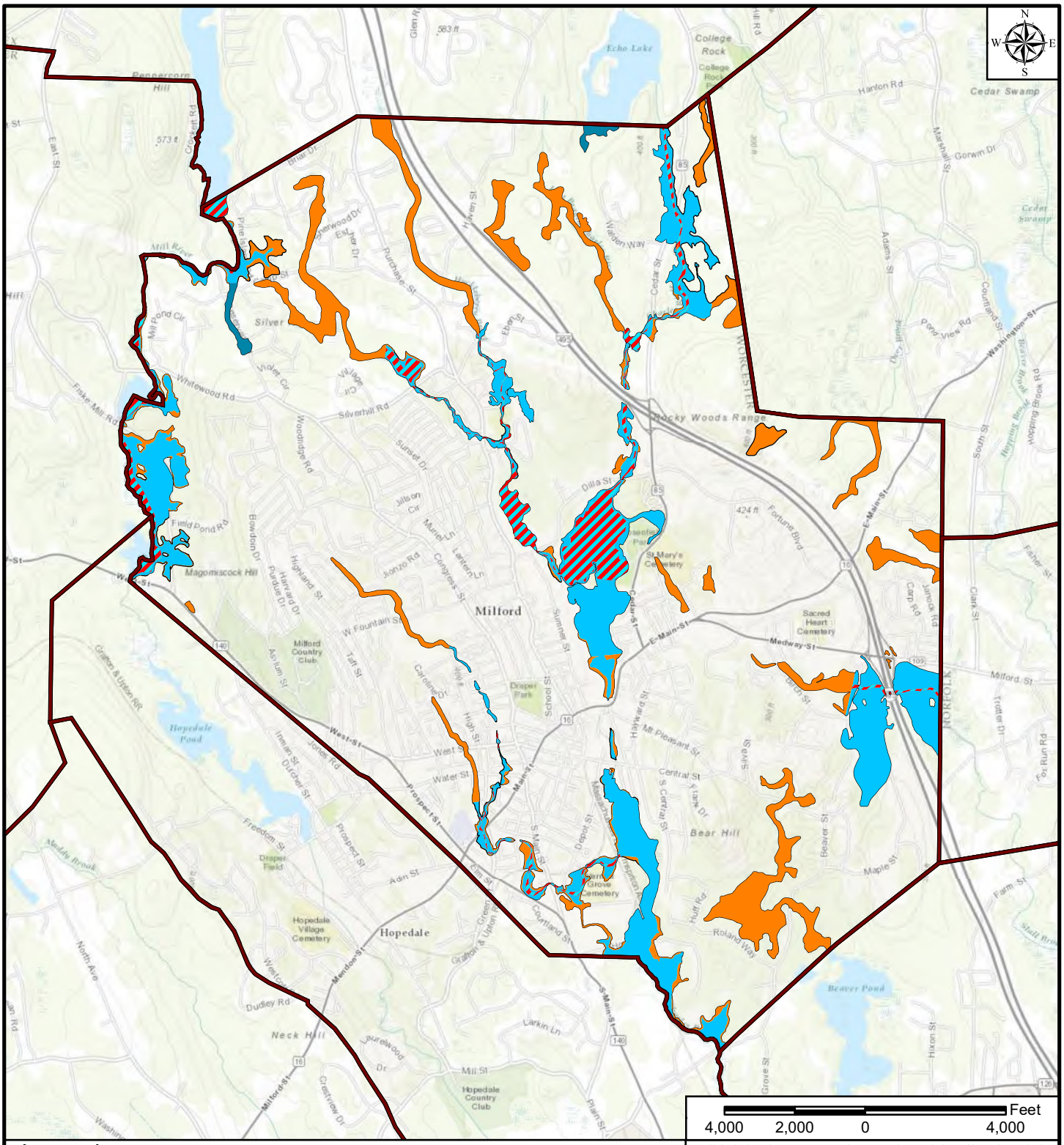
SOURCES: BASEMAP FROM ESRI, REMAINING DATA FROM MASSGIS (2017).

DATE:	PROJECT NO.	DRAWN BY:	CHECKED BY:	FIGURE
September 2017	15.0166551.00	JRB	TEJ	16



Legend

- Town Boundaries
- A, 1% Annual Chance Flood
- AE, 1% Annual Chance Flood
- AE, Regulatory Floodway
- X, 0.2% Annual Chance Flood
- X, Minimal Flood Hazard

Multi-Hazard Mitigation Plan

Flood Zones

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GZA GeoEnvironmental, Inc.
Engineers and Scientists
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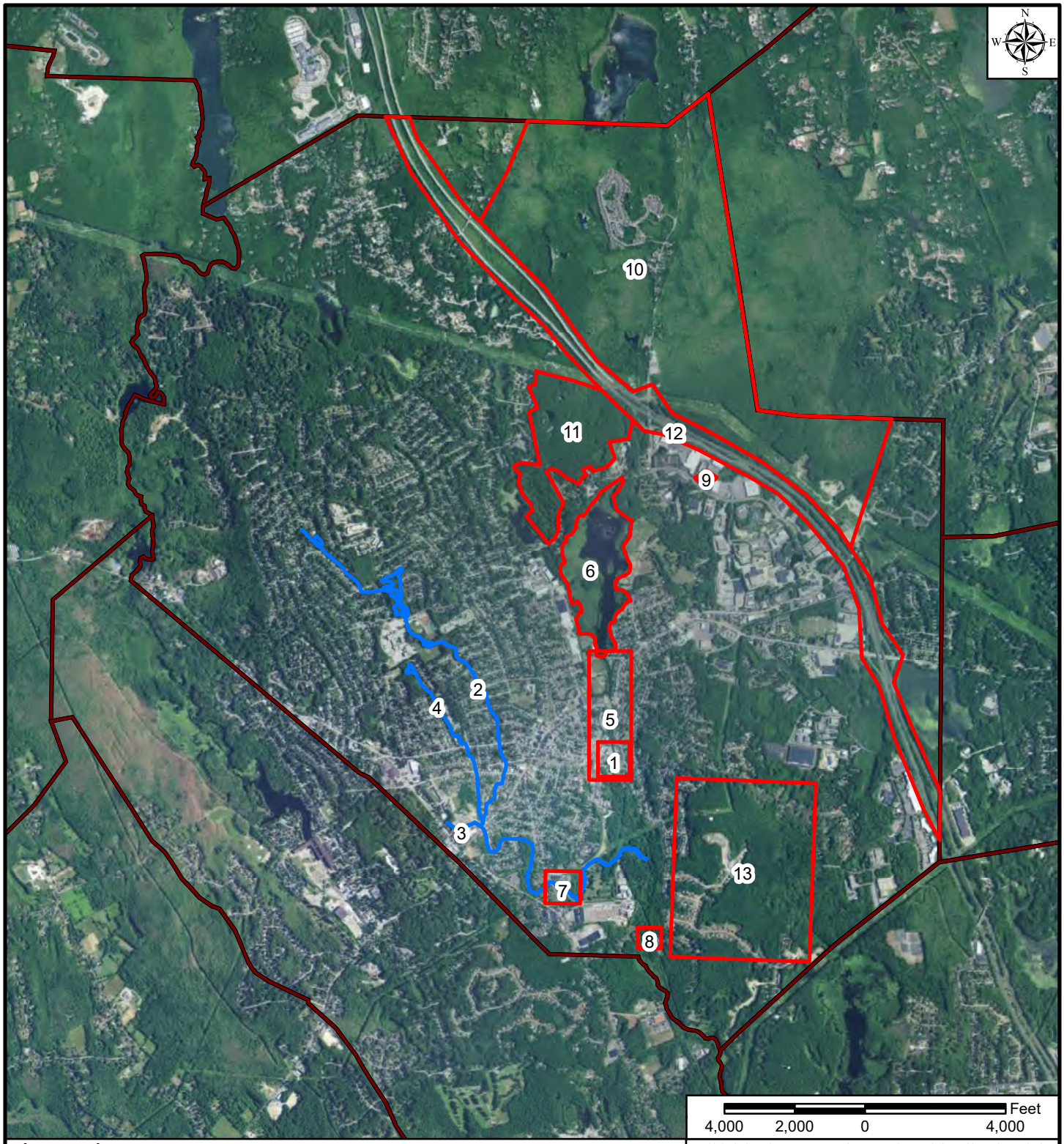
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI, FLOOD ZONE DATA FROM FEMA, REMAINING DATA FROM MASSGIS (2016).

DATE:	PROJECT NO.	DRAWN BY:	CHECKED BY:	FIGURE
September 2017	15.0166551.00	JRB	TEJ	18



4,000 2,000 0 4,000 Feet

Legend

Hazard Areas | Brooks | Town Boundaries

ID	Hazard Area	Hazard Type
1	Beach St./Central St.	Flooding
2	Godfrey Brook	Flooding
3	Hospital Brook	Flooding
4	O'Brien Brook	Flooding
5	Milford Pond Dam	Flooding
6	Milford Pond	Flooding
7	Depot St. at National St.	Flooding

ID	Hazard Area	Hazard Type
8	Charles River at Howard St.	Flooding
9	Quarry behind Lowes	Flooding
10	Cedar St. Area	Fire
11	Town Forest and Shadow Brook	Fire
12	I-495 Corridor	Fire
13	Bear Hill	Fire

Multi-Hazard Mitigation Plan

Hazard Areas

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GZA GeoEnvironmental, Inc.
Engineers and Scientists
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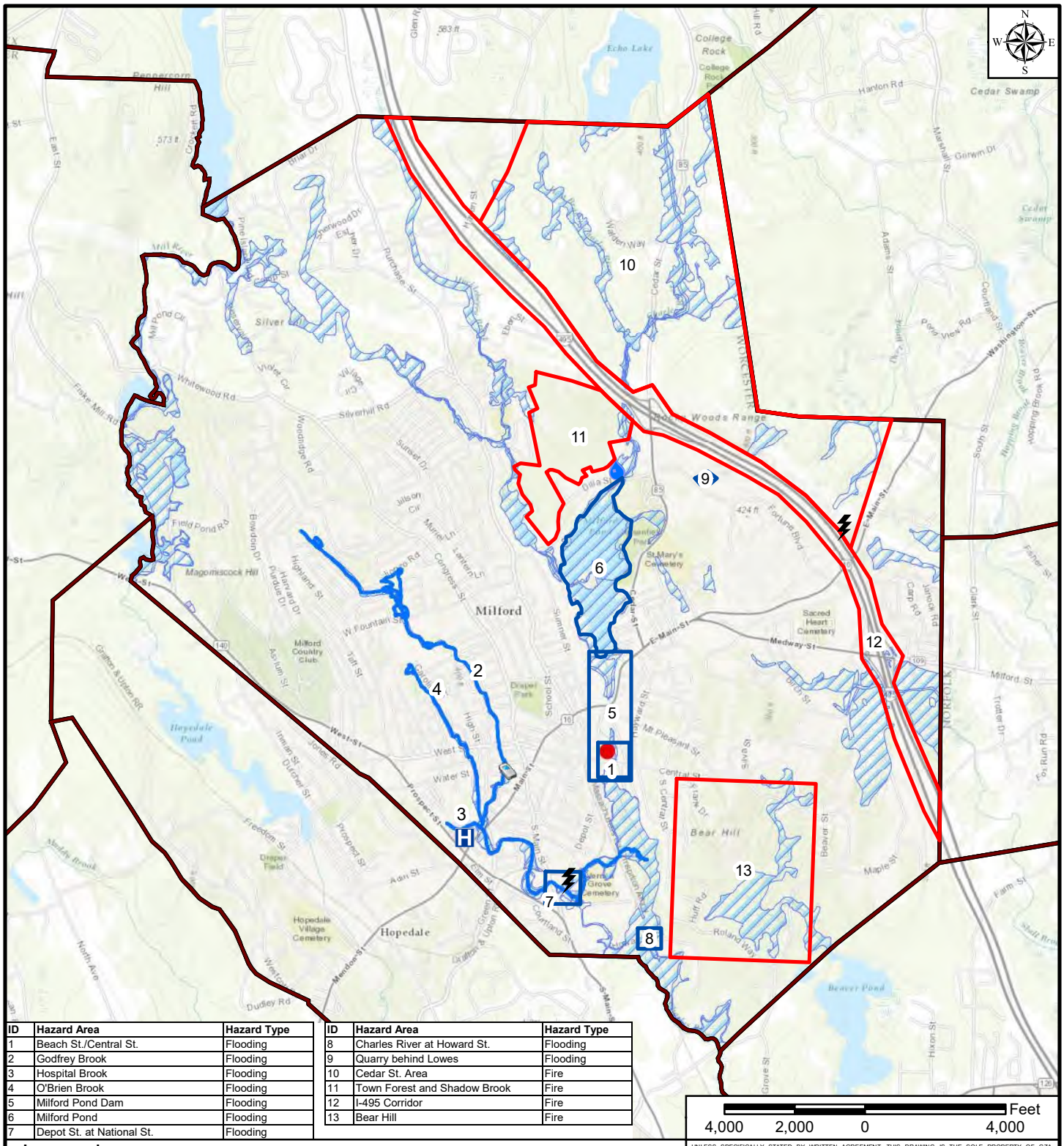
PREPARED FOR:
TOWN OF MILFORD
MASSACHUSETTS

SOURCES: BASEMAP FROM ESRI, TOWN BOUNDARY AND MHC CULTURAL RESOURCES DATA FROM MASSGIS (2016).

DATE: September 2017 | PROJECT NO. 15.0166551.00 | DRAWN BY: JRB | CHECKED BY: TEJ

FIGURE 19



ID	Hazard Area	Hazard Type
1	Beach St./Central St.	Flooding
2	Godfrey Brook	Flooding
3	Hospital Brook	Flooding
4	O'Brien Brook	Flooding
5	Milford Pond Dam	Flooding
6	Milford Pond	Flooding
7	Depot St. at National St.	Flooding

ID	Hazard Area	Hazard Type
8	Charles River at Howard St.	Flooding
9	Quarry behind Lowes	Flooding
10	Cedar St. Area	Fire
11	Town Forest and Shadow Brook	Fire
12	I-495 Corridor	Fire
13	Bear Hill	Fire

Feet
4,000 2,000 0 4,000

Legend

- Hazard Areas - Fire
- Hazard Areas - Flooding
- Town Boundaries
- Brooks with Hazard Areas
- FEMA Flood Zones
- Substations in Hazard Areas
- Milford Regional Medical Center
- Milford Water Company
- Verizon
- Highway Department

Multi-Hazard Mitigation Plan

Risk Assessment

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FIGURE
30

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