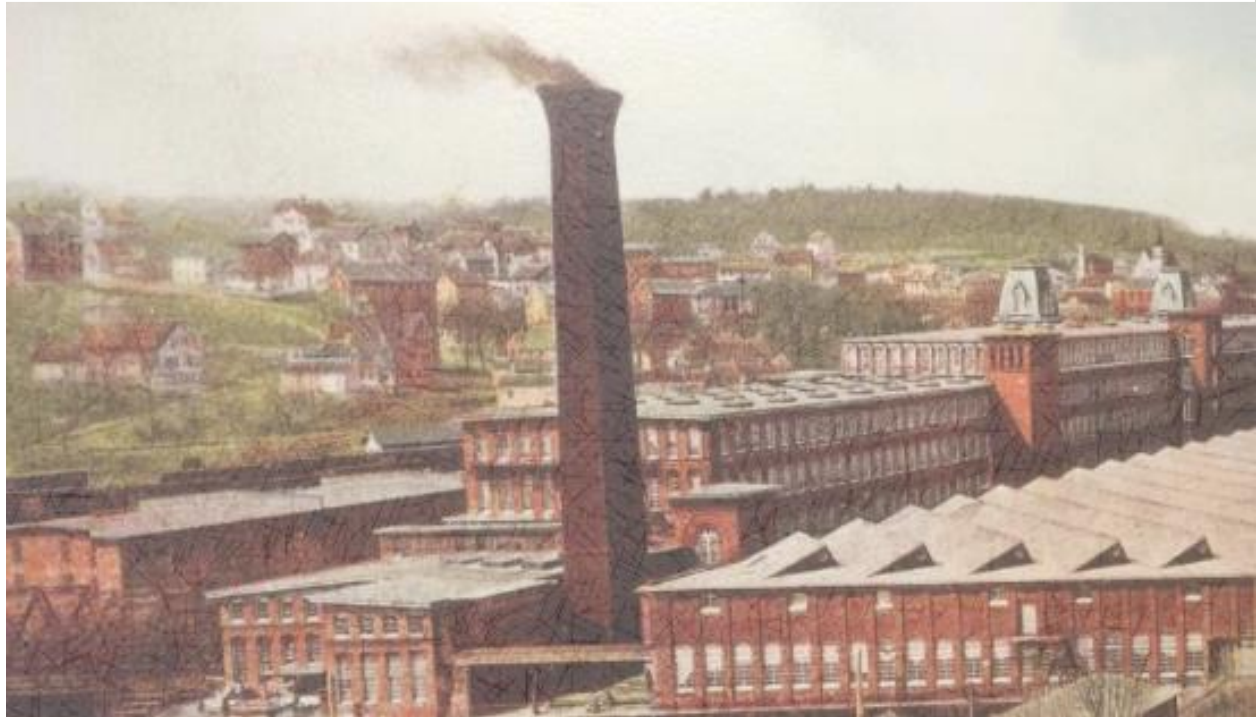




2023

Cumberland, Rhode Island Hazard Mitigation Plan



Prepared by:

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Strategy for Reducing Risks from Natural Hazards in Cumberland, Rhode Island

Acknowledgements

Daniel McKee – *Governor*

Rhode Island Emergency Management Agency

Marc R. Pappas – *Director*

State Assistance

The project has moved forward thanks to the support and resources provided by the Rhode Island Emergency Management Agency (RIEMA)

Members of the Cumberland Local Hazard Mitigation Committee

Sara Brelsford – Chief of Staff, Mayor's Office

Sarah King – Community Outreach Coordinator

Jonathan Stevens – Director, Planning and Community Development

Glenn Modica – Town Planner

Matt Benson – Police Chief

Matt Alves – Deputy Police Chief

Nick Anderson – Fire Chief

Joseph Duarte – Director, Department of Public Works

Kevin Joyce – Building Official

Michael Crawley – Director, Senior Center/Parks and Recreation Department

John Pliakas – Chief, Emergency Medical Services

Chris Collins – Pawtucket Water Supply Board

Frank Matta – Director, Cumberland Land Trust/Friends of the Blackstone

Joe Luca – Chair, Conservation Commission

Brad Dean – Dean Industries/Member at Large

Craig Pereira – Project Manager, Horsley Witten Group, Inc.

Kellie King – Planner, Horsley Witten Group, Inc.

R-24-56

Town of Cumberland

RESOLUTION: ADOPTING THE CUMBERLAND, RI HAZARD MITIGATION PLAN

BE IT RESOLVED BY THE TOWN COUNCIL OF CUMBERLAND AS FOLLOWS:

WHEREAS: A Town Hazard Mitigation Plan preserves the health, safety, and welfare of the citizens of Cumberland and their property; and

WHEREAS: The 2023 Cumberland, RI Hazard Mitigation Plan is an update to the Hazard Mitigation Plan last adopted by the Town Council in 2017; and

WHEREAS: The Town of Cumberland Local Hazard Mitigation Committee along with its contractor, the Horsley Witten Group, composed the plan and held a series of advertised and noticed public meetings from December 2022 to November 2023 on drafting the plan update; and

WHEREAS: Adoption of this plan is a federal requirement for the Town to be eligible for federal hazard mitigation grants as a result of a disaster or major mitigation planning project; and

WHEREAS: FEMA Region I has completed its review of the 2023 Cumberland, RI Hazard Mitigation Plan and approved it subject to approval by the Town Council; and

WHEREAS: Town Council approval will allow the Town to meet its local hazard mitigation planning requirements pursuant to 44C.F.R. 201.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF CUMBERLAND RHODE ISLAND AS FOLLOWS:

SECTION 1: THE TOWN COUNCIL HEREBY ACCEPTS AND APPROVES THE 2023 CUMBERLAND, RI HAZARD MITIGATION PLAN AS PRESENTED AND OUTLINED BY THE DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT.

SECTION 2: THIS RESOLUTION SHALL BECOME EFFECTIVE IMMEDIATELY UPON ITS PASSAGE BY THE CUMBERLAND TOWN COUNCIL.

DATE ADOPTED: June 5, 2024

A TRUE COPY, ATTEST


Sandra M. Giovanelli, Town Clerk

Table of Contents

<u>SECTION 1.0 - INTRODUCTION</u>	1
1.1 Overview.....	1
1.2 What Hazard Mitigation Can Do for Cumberland.....	2
1.3 Cumberland’s Mission Statement	2
1.4 Goals	2
1.5 Planning Process	3
1.6 Environmental Setting.....	17
1.7 Brief History	17
1.8 History of Disaster Declarations	18
1.9 Recent Disaster Declarations	18
1.9.1 Severe Winter Storm/Snowstorm – FEMA DR-4212	18
1.9.2 COVID-19 Pandemic – FEMA DR-4505	19
1.9.3 Severe Winter Storm/Snowstorm – FEMA DR-4653	19
<u>SECTION 2.0 - RISK ASSESSMENT</u>	20
2.1 Introduction.....	20
2.2 Hazard Identification	20
2.3 Hazard Profiles	20
2.3.1 Flood-Related Hazards	26
2.3.2 Winter-Related Hazards	54
2.3.3 Wind-Related Hazards	59
2.3.4 Geologic-Related Hazards	68
2.3.5 Drought-Related Hazards	71

2.3.6 Extreme Heat-Related Hazards	73
2.3.7 Brushfire/Wildfire-Related Hazards	76
2.3.8 Invasive Species-Related Hazards.....	78
2.4 Vulnerability	81
2.4.1 Development Trends.....	82
2.4.2 Economic Vulnerability.....	85
2.4.3 Social Vulnerability	88
2.4.4 Environmental Vulnerability	92
2.5 FEMA Disaster Grant Assistance.....	93
<u>SECTION 3.0 –CAPABILITY ASSESSMENT</u>	94
3.1 Introduction.....	94
3.2 Planning and Regulatory Capabilities	94
3.3 Administrative and Technical Capabilities.....	108
3.4 Financial Capabilities	120
3.5 National Flood Insurance Program	121
3.6 Community Rating System	122
3.7 Existing Protection Matrix	123
<u>SECTION 4.0 – MITIGATION STRATEGY</u>	131
4.1 Introduction.....	131
4.2 Mitigation Activities.....	131
4.3 Mitigation Action Plan	131
<u>SECTION 5.0 – PLAN IMPLEMENTATION AND MAINTENANCE</u>	157
5.1 Implementation, Evaluation and Revision of Plan	157

5.2 Continued Public Involvement	157
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<u>REFERENCES</u>	
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<u>APPENDICES</u>	
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Appendix A: Maps

Appendix B: Public Information/Outreach and Local Plan Adoption

Appendix C: Correspondences

LIST OF FIGURES

2-1 Archimedes Screw	31
2-2 Access Road Construction – Albion Dam	32
2-3 Wind Zones in the United States	59
2-4 NOAA’s Days with Maximum Temperature of 90° or Higher	74
2-5 NOAA’s National Weather Service Heat Index	75
2-6 RI Wildland Urban Interface Zones	77
2-7 Cumberland Manor	92
3-1 VFEAP Rail Exercise/Railbed Through Residential Area	105
3-2 MEDS Full-Scale Exercise	113
3-3 Flooding on Industrial Road	115

LIST OF TABLES

1-1 2017 Plan Report Card.....	5
1-2 Significant Federal Emergency Disaster Declarations	18
2-1 Risk Assessment Matrix 2023 Update.....	23
2-2 Hazard Index.....	24
2-3 Flood-Related Hazard Events.....	26
2-4 Inventoried Dams in Cumberland	34
2-5 Winter-Related Hazard Events	54
2-6 Wind-Related Hazard Events	60
2-7 Saffir-Simpson Hurricane Wind Scale.....	64
2-8 Enhanced Fujita Scale	66
2-9 Geologic-Related Hazard Events	68
2-10 Modified Mercalli Intensity Scale.....	69
2-11 Richter Scale	70
2-12 Drought-Related Hazard Events	72
2-13 Extreme Heat-Related Hazard Events	73
2-14 Vulnerability Matrix	81
2-15 Summary of NFIP Activity in Cumberland	86
2-16 Total Vulnerability FEMA 100-Year Flood Zones Summary.....	86
2-17 Total Vulnerability FEMA 500-Year Flood Zones Summary.....	87
3-1 Cumberland STIP Projects	118
3-2 Actions for Continued Compliance with NFIP	122

3-3 Existing Protection Matrix, Cumberland, RI.....	124
4-1 STAPLEE Review and Selection Criteria	133
4-2 STAPLEE Analysis.....	135

LIST OF MAPS

- A.1 Flood Risks and Repetitive Flood Loss Areas**
- A.2 Hurricanes**
- A.3 Critical Infrastructure and Vulnerable Populations**

Section 1 Introduction

1.1 Overview

Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by the Federal Emergency Management Agency (FEMA) as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.” The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective.

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This 2023 Update is an update from the 2017 FEMA-approved plan and documents the Town of Cumberland’s hazard mitigation planning process, identifies relevant hazards and risks, and identifies the strategy the Town will use to decrease vulnerability and increase resiliency and sustainability.

This Update was prepared pursuant to the requirements of the Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002 (44 CFR §201.6) and finalized on October 31, 2007 (hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act). While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because the Town of Cumberland is subject to many kinds of hazards, access to these programs is vital.

FEMA’s *Local Mitigation Planning Policy Guide* (April 19, 2023)¹ was used as a basic template to identify various natural hazards profiled in this 2023 Update. Information in this 2023 Update will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. The Town of Cumberland has

¹ Federal Emergency Management Agency, *Local Mitigation Planning Policy Guide*, April 19, 2023, https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf.

been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for federal funding.

1.2 What Hazard Mitigation Can Do for the Town of Cumberland

A primary benefit of hazard mitigation is that preventative measures taken now can significantly reduce the cost of post-disaster cleanup tomorrow. In addition, mitigation actions conducted before hazards occur greatly reduces the impact and costs associated with the aftermath of a hazard event. By planning ahead, Cumberland will minimize the economic and social disruption that can result from floods, snowstorms, hurricanes, and other natural disasters.

The adoption and implementation of this Plan update will assist Cumberland in remaining eligible to receive assistance from FEMA in both pre- and post-disaster assistance such as: FEMA's Community Rating System (CRS), FEMA's Building Resilient Infrastructure and Communities (BRIC), Flood Mitigation Assistance (FMA) Program, and FEMA's Post-Disaster Hazard Mitigation Grant Program (HMGP).

The Town of Cumberland currently does not participate in FEMA's CRS Program which would allow residents in the Town of Cumberland to gain credit points that would result in discounts on National Flood Insurance Program (NFIP) flood insurance policy premiums. FEMA's FMA program makes grants available for communities to implement flood mitigation planning and activities such as acquisition, relocation, and retrofitting of structures. This program is made available only to communities after a federally-declared disaster. Having an approved mitigation plan expedites the application process for pre- and post-federal mitigation funding, and ensures a funded project is eligible and feasible.

1.3 Cumberland's Mission Statement

The purpose of the Cumberland Hazard Mitigation Plan is to preserve and enhance the quality of life, property values, and resources by identifying all potential natural hazards in Cumberland and mitigating their effects to reduce the loss of life, as well as losses of economic, historical, natural, and cultural resources.

1.4 Goals

The Cumberland Local Hazard Mitigation Committee (LHMC) met to evaluate the existing goals from the 2017 Plan and determined that the goals as stated remain applicable:

1. Protect the public's health, safety and welfare.
2. Reduce property damages caused by hazard impact.
3. Minimize social distress and economic losses/business disruption.
4. Provide an ongoing forum for the education and awareness of natural hazard mitigation issues, programs, policies, and projects.

1.5 Planning Process

A hazard mitigation plan should be considered a living document that must grow and adapt, keeping pace with a community's growth and change. The DMA of 2000 places high priority on the continuation of the planning process after the initial submittal, requiring communities to seek and receive re-approval from FEMA in order to remain eligible for assistance. The evaluation, revision and update process is also a means to create an institutional awareness and involvement in hazard mitigation as part of daily activities.

The Town of Cumberland, with the assistance of the Horsley Witten Group, Inc. (HW) developed this update to the Hazard Mitigation Plan with funds provided through a Hazard Mitigation Assistance Grant from RIEMA. The Cumberland LHMC from the 2017 plan was again re-energized and expanded to provide a broad spectrum of local knowledge and experience to complete this 2023 Update through email invitations from the Planning and Community Development Department.

Members of the Cumberland LHMC include:

- Sara Brelsford – Chief of Staff, Mayor's Office
- Sarah King – Community Outreach Coordinator
- Jonathan Stevens – Director, Planning and Community Development
- Glenn Modica – Town Planner
- Matt Benson – Police Chief
- Matt Alves – Deputy Police Chief
- Nick Anderson – Fire Chief
- Joseph Duarte – Director, Department of Public Works
- Kevin Joyce – Building Official
- Michael Crawley – Director, Senior Center/Parks and Recreation Department
- John Pliakas – Chief, Emergency Medical Services
- Chris Collins – Pawtucket Water Supply Board (PWSB)
- Frank Matta – Director, Cumberland Land Trust/Friends of the Blackstone
- Joe Luca – Chair, Conservation Commission
- Brad Dean – Dean Industries/Member at Large
- Craig Pereira – Project Manager, Horsley Witten Group, Inc.
- Kellie King – Planner, Horsley Witten Group, Inc.

The Horsley Witten Group, Inc. conducted a series of meetings from December 2022 through November 2023 with the Cumberland LHMC, municipal officials, the community, and representatives of the RIEMA through emails and Teams (virtual) invitations, and /flyers/notices posted on the project webpage. All meetings were held in an open public forum and in accordance with R.I.G.L. 42-46-2(a) in complying with the requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000).

A Kickoff Meeting was conducted with Jonathan Stevens and Glenn Modica (Planning and Community Development Department), Joe Duarte (Public Works), and Chief John Pliakas (Emergency Medical Services) on December 12, 2022 to review the project scope and revised schedule, discuss project coordination (data collection, municipal

coordination and public outreach), review proposed revisions to the Update's mitigation measures layout, and identification of risks content (to include 'climate change impacts on' section for each hazard profiled). A complete set of meeting materials is included in Appendix B.

A project webpage was designed and hosted on the Town's municipal website to announce the project, inform and engage the community before, during and after plan development, and to serve as a repository of project documents, presentations, and summaries (<https://www.cumberlandri.org/197/Hazard-Mitigation>). A PDF of the Project webpage layout is included in Appendix B.

A series of interviews (in-person, virtual (via Teams), and email correspondence) with local businesses located in the Special Flood Hazard Area were conducted to identify potential mitigation projects for coordination with the Town's goals. Meeting Memorandums of the interviews are included in Appendix B.

Interviews:

- Berkeley Business Center
- Hope Global
- Stop & Shop
- Dean Industries
- Ann & Hope Mill Redevelopment (Premier Land Development)

Table 1-1
2017 Plan Report Card (2023 Update), Cumberland, Rhode Island

<i>Mitigation Measure</i>	<i>Location</i>	<i>Ownership</i>	<i>Natural Hazard</i>	<i>Primary Problem/Effect</i>	<i>Mitigation Objective</i>	<i>Risk H-Historical P- Potential</i>	<i>2023 Status</i>
PUBLIC EDUCATION AND AWARENESS							
Action 1: Distribute Informational Natural Hazards Pamphlet	Town-wide	Public	All Hazards	Uninformed public	Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities	H and P	Not completed - carry forward into 2023 update
Action 2: Develop and Emergency Management website for the Town	Town-wide	Public	All Hazards	Limited Information/Resources distribution	Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities	H and P	Completed
PROPERTY PROTECTION							
Action 3: Acquire residential properties in the flood area	Town-wide	Private	Flooding	Damages to public property/Compromised public safety	Protection of property/minimized damages/costs	H and P	Not completed - carry forward into 2023 update
Action 4: Prepare an 'After the Storm Recovery Plan' for the community	Town-wide	Public and Private	All Hazards	Damages to public and private property/Delayed recovery	Improved resiliency/ Accelerated recovery	H and P	Not completed - carry forward into 2023 update
STRUCTURAL PROJECTS							
Action 5: Replacement of Abbott St. Wastewater Pump Station	Abbott St. Wastewater Pump Station	Public	All Hazards	Potential for contamination under failure/disruption of services	Protection of property/Protection of infrastructure and improved resilience of sanitary facility	H and P	Not completed - to be completed 2023 Sewer Fund/ARPA funds

Table 1-1
2017 Plan Report Card (2023 Update), Cumberland, Rhode Island

<i>Mitigation Measure</i>	<i>Location</i>	<i>Ownership</i>	<i>Natural Hazard</i>	<i>Primary Problem/Effect</i>	<i>Mitigation Objective</i>	<i>Risk H-Historical P- Potential</i>	<i>2023 Status</i>
STRUCTURAL PROJECTS							
Action 6: Develop an implementation strategy to address Property and streets subject to flooding from poor drainage and run-off	Various locations	Public and Private	Flooding	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities/ Enhanced access/evacuation	H and P	Varies - see specific street location in plan update. Carry forward outstanding locations into 2023 update
PLANNING AND PREVENTION							
Action 7: Develop Emergency Action Plans for both high and significant hazard dams (public) within the Town of Cumberland	Diamond Hill Reservoir Dam, Arnold Mills Reservoir Dam, Happy Hollow Reservoir Dam, Robin Hollow Dam	Public	Flooding	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property/Protection of life/infrastructure	H and P	Completed: required to be updated annually, include new mitigation action for annual update
Action 8: Develop Emergency Action Plans for both high and significant hazard dams (private) within the Town of Cumberland	Miscoe Lake Dam Rawson Pond Dam	Private	Flooding	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property/Protection of life/infrastructure	H and P	Completed: required to be updated annually, include new mitigation action for annual update
Action 9: Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone	Town-wide	Public and Private	Flooding	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property/Protection of life/infrastructure	H and P	Not completed - carry forward into 2023 update

Table 1-1
2017 Plan Report Card (2023 Update), Cumberland, Rhode Island

<i>Mitigation Measure</i>	<i>Location</i>	<i>Ownership</i>	<i>Natural Hazard</i>	<i>Primary Problem/Effect</i>	<i>Mitigation Objective</i>	<i>Risk H-Historical P- Potential</i>	<i>2023 Status</i>
PLANNING AND PREVENTION							
Action 10: Evaluate new developments/projects for drainage and run-off issues	Town-wide	Public and Private	Flooding	Damages to public and private property	Protection of property	H and P	Completed
Action 11: Update Land Development and Subdivision Regulations regarding protocol for holding ponds	Town-wide	Private	Flooding	Damages to public and private property/ Damages to infrastructure	Protection of property/Protection of infrastructure	H and P	Completed
Action 12: Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Road neighborhood in the event of an emergency at the LNG site	Scott Road neighborhood	Private	Emergency Event	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property/Protection of life/infrastructure	H and P	Not completed - carry forward into 2023 update
Action 13: Identify alternative storage location and/or strategy for critical Town records/documents	Town Hall	Public and Private	All Hazards	Loss of critical Town records	Protection of critical Town records	P	Not completed - carry forward into 2023 update

The Cumberland LHMC first met on January 5, 2023, to review the project scope and revised schedule (due to 3-month delay), discuss project coordination, discuss the status of outstanding items from the kickoff meeting, review data needs, confirm the hazard index ranking, complete the 2017 Plan Report Card, and to discuss the logistics for the first public workshop (including kickoff of the online community survey). A complete set of meeting materials is included in Appendix B.

2017 Hazard Mitigation Plan – Report Card (Table 1-1)

Action #1: Distribute Informational Natural Hazards Pamphlet.

- Not completed...to be carried forward into this 2023 plan update.

Action #2: Develop an Emergency Management Agency website for the Town.

- Completed...Cumberland Fire Department and Emergency Medical Services web pages hosted on Town's website.

Action #3: Acquire residential properties in the flood area.

- Not completed...to be carried forward into this 2023 plan update.

Action #4: Prepare an "After the Storm Recovery" Plan for the Community.

- Not completed...to be carried forward into this 2023 plan update.

Action #5: Replacement of Abbott St. Wastewater Pump Station

- Not completed...to be completed in 2023 with Sewer Fund/ARPA funding.

Action #6: Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off.

Abbott Run Valley Road...completed, move to 'Monitoring'

- Specific Flooding Area: Jenna Way
- Flooding Cause: Reduced detention basin due to heavy rates of sedimentation from upstream construction sites in conjunction with catch basin blockage. Ongoing accumulation of debris in culvert which requires periodic monitoring and clean-out.
 - Improved in 2017/2018
 - Ongoing monitoring for flooding

Angell Road (State road)...completed, move to 'Monitoring'

- Specific Flooding Area: Easterly end at Diamond Hill Road
- Flooding Cause: Blocked catch basins require periodic cleaning by RIDOT.
 - Repaired by RIDOT
 - Ongoing monitoring for flooding

Theater Drive...completed, move to 'Monitoring'

- Specific Flooding Area: Scott Road culvert
- Flooding Cause: Culvert was previously blocked and subsequently cleaned. Still requires periodic monitoring and maintenance, particularly due to ice dam blockage during winter months.
 - Ongoing monitoring required

Crestwood Court...not completed, move to 'Maintenance'

- Specific Flooding Area: Culvert location
- Flooding Cause: Continual maintenance and clean-out of debris to prevent entering drainage system.

Fairview Avenue...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Select driveways
- Flooding Cause: Debris or other extraneous matter clogs slotted pipes across driveways. Pipe jetted to restore drainage capability. Requires periodic monitoring and maintenance.

Highridge Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire street
- Flooding Cause: Continual clogging and blockage of drainage catch basins due to leaves in heavily treed area. Periodic monitoring and clean-up maintenance required.

Laurel Lane...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Grandview
- Flooding Cause: Periodic clogging of slotted drain pipes during interim period of maintenance and cleaning.

Meadow Brook Drive...completed, remove

- Specific Flooding Area: End of street near rear gate to development for Chimney Hill Apartments
- Flooding Cause: Drain obstructions in the form of toys from a private property continue to accumulate in pipe requiring continual monitoring and clean-up and removal. Also, upland wooded area also periodically floods.
 - Improvements completed
 - Upland wooded area is now developed land. Stormwater is managed through stormwater management system of piping network and detention ponds.

Oakwood Drive...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Culvert location
- Flooding Cause: Catch basin and culvert blockage associated with debris and roots which have been removed periodically. Maintenance issue.

Ridgewood Drive...not completed, carry forward into 2023 plan update and move to 'Structural/Replacement'

- Specific Flooding Area: Entire street
- Flooding Cause: Blockage of drainage pipe as a result of persistent root growth during interim periods of maintenance and removal.
 - Need to replace drainage pipe to eliminate the roots entering the pipe.

Tower Hill Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Diamond Hill Road end
- Flooding Cause: Silt build-up. Requires dredging and clean-up.

Monitoring

Ann and Hope Way...not completed, move to 'Maintenance'

- Specific Flooding Area: Periodic surcharge and overflow of drains due to Blackstone River elevation during select heavy storm water events.
- Flooding Cause: Flood Plain area.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck.

Club Drive...completed, move to 'Monitoring'

- Specific Flooding Area: Lippitt Estates/Low Point of Club Drive
- Flooding Cause: No existing drainage system. Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Completed improvements

Franklin Street...not completed, move to 'Maintenance'

- Specific Flooding Area: Dead-end section near Wildwood Drive
- Flooding Cause: Flood Plain area.
 - Need to perform ongoing maintenance.

Fredrick Lane...not completed, move to 'Maintenance'

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Grundy's Way...not completed, move to 'Maintenance'

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Hannah Drive...not completed, move to 'Maintenance'

- Specific Flooding Area: Dead end/cul de sac area
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Industrial Road...not completed, carry forward into 2023 plan update and move to 'Structural/Replacement'

- Specific Flooding Area: Lower and relatively flat section of roadway near Diamond Hill Road adjacent to Okonite commercial property
- Flooding Cause: Additional catch basins installed, and drainage pipe modifications recently installed to improve drainage. New drainage modifications not in place long enough to subject to sufficient number of heavy storm events to confirm effectiveness. However, other measures will be required at upstream commercial and industrial areas where holding ponds will require maintenance and other onsite drainage improvements to mitigate probable additional flows to this area.
 - This area is under design, and it is anticipated to be corrected Summer 2024.

Kings Row...not completed, carry forward into 2023 plan update

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Mendon Road...completed, remove

- Specific Flooding Area: Westerly end of Marshall Avenue (State road) and intersection of Old Mendon Road
- Flooding Cause: Surcharging of two catch basin structures in this area due to probable blockage of state-owned drainage system within Mendon Road. State (RIDOT) has been notified and is scheduled to investigate same for remediation of same.
 - Completed by RIDOT 2019.

Wildwood Drive...not completed, move to 'Maintenance'

- Specific Flooding Area: Dead-end section
- Flooding Cause: Existing Flood Plain area
 - Downstream maintenance of culverts on Mendon Rd. is important to reduce/prevent flooding.

Broad Street (State road)...completed, remove

- Specific Flooding Area: Lusitania Avenue/Town Hall area
- Flooding Cause: No existing drainage system between Colonial Bakery area (located north of Town Hall) and the area near the Blackstone River Bridge at the Cumberland/Central Falls line. State (RIDOT) has been contacted to investigate this section of the street, which floods and inundates the sidewalks during heavy rain events, specifically at the crosswalks to Town Hall.
 - RIDOT installed a drainage system in this area, project to be finalized in 2023.

Hilltop Road...not completed, carry forward into 2023 plan update and move to 'Structural/Replacement'

- Specific Flooding Area: Allens Avenue
- Flooding Cause: Undersized drainage pipes serve this area. However, there are physical restrictions preventing construction in this area due to the existence of NGRID diffuser facilities.
 - Need to install additional shallow culverts to fit under the RI Energy's system.

Structural/Replacement

Bear Hill Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Crestwood Court
- Flooding Cause: Deteriorated and undersized drainage pipes in conjunction with periodic blockage of pipes with debris.

Hines Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Northerly section at Miller's Brook
- Flooding Cause: Undersized drainage pipes.

Martin Street...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Blackstone River and railroad area
- Flooding Cause: Existing flood plain area associated with Blackstone River.
- Supplemental: Possible collapse or deterioration of drains below railroad crossing also contributing to flooding condition.
 - Need to upgrade piping.

Old Reservoir Road...completed, move to 'Monitoring'

- Specific Flooding Area: Jason's Grant
- Flooding Cause: Drainage system in this area requires upgrading.
 - An interconnected infiltrating system was installed 2022. Ongoing monitoring will be required (during significant storms).

New York Avenue...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Miller's Brook area
- Flooding Cause: Undersized drainage pipe.

Reservoir Road...completed, remove

- Specific Flooding Area: Old Reservoir Road
- Flooding Cause: Drainage system in this area requires upgrading.
 - Completed 2019.

Jason's Grant...completed, remove

- Specific Flooding Area: N/A
- Flooding Cause: Drainage system in this area requires upgrading.
 - Completed 2019.

Seneca Street...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Culvert location

- Flooding Cause: Undersized culvert pipe is considered the probable cause.
 - To be completed 2023.

Shirley Drive...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Swale associated with CVS property.
- Flooding Cause: Deterioration of drainage pipes. Replacement required.
 - To be completed by property owner 2023.

Ronald Avenue...not completed, move to 'Monitoring'

- Specific Flooding Area: North Brook area
- Flooding Cause: Undersized culvert and drainage pipes are the probable cause at this location.
 - Dams created by beavers appears to be the cause of flooding.

Pavement Management

Canning Street...completed, remove

- Specific Flooding Area: Easterly end of street
- Flooding Cause: Street pavement deterioration causing improper drainage and ponding. Re-paving and grading correction (restoration of crown of road) is required for proper drainage.
 - Completed 2016/2017.

Dutchess Road...completed, remove

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.
 - Completed 2017.

Follett Street...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Maybury Street...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire Street (Meadowcrest subdivision)
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Sneech Pond Road (State road)...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire street
- Flooding Cause: Impeded drainage. Low points and ponding areas as a result of significantly deteriorated pavement. Requires complete rehabilitation.
 - To be completed by RIDOT 2023/2024.

Action #7: Develop Emergency Action Plans (EAP's) for both High and Significant

hazard dams owned by the PWSB within the Town of Cumberland, including Diamond Hill Reservoir Dam, Arnold Mills Reservoir Dam, Happy Hollow Reservoir Dam, and Robin Hollow Dam.

- Completed by the Town in collaboration with PWSB (funding).
- New Mitigation action to address annual update requirement.

Action #8: Develop Emergency Action Plans (EAP's) for both High and Significant hazard private dams including Miscoe Lake Dam and Rawson Pond Dam.

- Completed by the Town.
- New mitigation action to address annual update requirement.

Action #9: Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone.

- Not completed...to be carried forward into this 2023 plan update.

Action #10: Evaluate New Development/Projects for Drainage and Runoff Issues.

- Completed, remains ongoing. DPW reviews stormwater systems of every land development project.
- Move to Capability Assessment

Action #11: Update Land Development and Subdivision Regulations regarding protocol for holding ponds.

- Completed by the Town. Holding Ponds ordinance was moved from Code of Ordinances to Zoning Ordinances (Section 6-16) and changed to 'stormwater basins'. Homeowner Associations now required to maintain these stormwater basins.

Action #12: Coordinate with R.I. Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the R. I Energy LNG site.

- Not completed...to be carried forward into this 2023 plan update.

Action #13: Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents.

- Not completed...to be carried forward into this 2023 plan update.

The Town of Cumberland has taken steps to implement findings from the 2017 Plan into the following policy, programmatic areas, and plans: various Conservation Management Plans, Municipal Resilience Plan, coordination efforts with the PWSB, the Valley Falls Emergency Action Plan update, and coordination efforts with major business owners located in flood hazard areas.

The first Public Workshop was held on April 24, 2023, at the Cumberland Town Hall – Council Chambers with 15 people attending. Announcements were posted on the project webpage (<https://www.cumberlandri.org/197/Hazard-Mitigation>), emailed to Cumberland Municipal Boards, Commissions and interested citizens, and posted on the Town's Facebook page. The presentation included an overview of the project, a review of the Hazard Index for this 2023 update, and description of work completed to date. The online community survey was also kicked off at this workshop. Participants were

provided the opportunity to comment and also markup town-wide maps with specific issues at identified locations. The Workshop agenda, PowerPoint Presentation and Sign-In Sheet are included in Appendix B.

The Cumberland LHMC met for a second time (virtually via Teams invitations) on June 9, 2023, to review the mission, goals, draft updated GIS mapping, and the FEMA Flood Zone overlay analyses. A complete set of meeting materials is included in Appendix B.

The Cumberland LHMC met for a third time virtually (via Teams invitation) on October 3, 2023, to discuss the status of outstanding data needs from LHMC #2, responses from the Online Community Survey, and update actions targeted towards continued compliance with NFIP. The meeting concluded with an overview of Section 4 Mitigation Strategy to inform the LHMC what actions they would be considering for the upcoming, final LHMC meeting. A complete set of meeting materials is included in Appendix B.

The Cumberland LHMC met for a fourth time on October 19, 2023, to conduct the Benefit Cost Analysis (BCA review) via email invitations. The Project Consultant reviewed the draft 2023 Mitigation Actions (Table 4-1) which identified those actions: Ongoing – initially addressed but requires ongoing maintenance/attention, therefore, carried forward from the 2017 plan; Not addressed/partially addressed - revised from the 2017 plan; and, New - completely new action items. The Cumberland LHMC completed the BCA review to prioritize/rank the action items, assigned time frames and responsible parties, and agreed on the proposed methodology/schedule for plan maintenance and plan update (based on FEMA requirements). A complete set of meeting materials is included in Appendix B.

The second Public Workshop/Hearing was held on November 15, 2023, at Cumberland Town Hall with 23 people attending. Announcements were posted on the project webpage (<https://www.cumberlandri.org/197/Hazard-Mitigation>), and emailed to Cumberland Departments, Boards, Commissions and interested citizens. The presentation included a list of accomplishments to date, overview of mitigation actions, questions from the audience, and identification of next steps. A complete set of meeting materials is included in Appendix B.

The Cumberland Planning Board is the primary town agency responsible for regulating development in Cumberland. Feedback to the Planning Board was ensured through participation of the Director, Planning and Community Development and the Mayor's Chief of Staff on the Cumberland LHMC.

Online Survey

An online survey was developed as part of the outreach and engagement process. The survey link was pushed out through the Town's notification system (Facebook), the LHMC (at meetings and via email), announced at Public Workshop #1, and posted on the project webpage (<https://www.cumberlandri.org/197/Hazard-Mitigation>). The survey was open beginning in April 2023, closed on September 11, 2023, and included a total of 21 responses. A brief summary of responses collected is included below. The full Survey Summary is included in Appendix B.

- Most residents/businesses have experienced flood (42%), winter (89%), wind (63%), and geologic (5%) related hazard events in the past 20 years;
- More than half (71%) of residents/businesses feel they are adequately prepared to deal with a natural hazard event, with most getting their information from personal experience (84%) and/or local news/social media (68%);
- Most respondents are 'Very Concerned' with wind-related hazards (37%), followed by flood-related hazards (30%), and winter-related hazards (20%);
- 86% of respondents know for sure whether or not their property is located in/near a FEMA –designated floodplain;
- The majority of respondents (81%) of respondents are interested in making their home, business or neighborhood more resilient, with 67% willing to spend their own money to do so;
- The top three choices to reduce damage/destruction of natural hazards in Cumberland include:
 - Retrofit public infrastructure, such as elevating roadways and improving drainage systems (81%)
 - Work to improve utility resilience: electric; communications; water/wastewater facilities (76%)
 - Inform property owners of ways they can reduce the damage caused by natural hazard events (52%)/Provide better information about hazard risks and high hazard areas (52%)
- Most residents have noticed particular changes in the environment in the past 10 years related to extreme temperatures (71%), frequency and severity of rain events (52%), and seasonal shifts in weather (52%);
- The majority of respondents (62%) are unsure if the Town has done enough to prepare for the projected impacts of climate change.

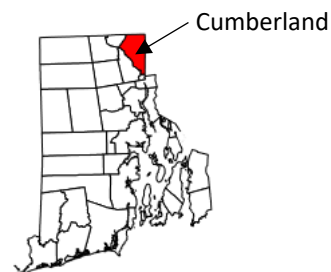
With this information, the project consultant prepared the draft Hazard Mitigation Plan, which was available for public comment from November 6, 2023, through November 17, 2023 (posted on the project webpage (<https://www.cumberlandri.org/197/Hazard-Mitigation>), emails sent to Planning Board and Town Council Members, and hard copies available at the Town Hall (see Appendix B for Notice of Availability of draft).

Notice of availability for public comment was emailed to the neighboring communities of Woonsocket, Lincoln and Central Falls in Rhode Island and Wrentham, North Attleborough, Attleboro, and Plainville in Massachusetts. Joshua Berry, Town Planner – Planning Department Town of Lincoln, Jim Vandermillen, Director - Planning and Economic Development City of Central Falls, Michael Debrouse, Director – Planning and Development City of Woonsocket, Rachel Benson, Director – Planning and Development Town of Wrentham, Gil Hilario, Town Planner Town of North Attleborough, Gary Ayrassian, Director – Planning and Development Town of Attleboro, and Chris Yarworth, Director Planning and Development Town of Plainville all received electronic notice (email) on the availability of the draft 2023 Update for comment, with no comments returned. The draft was then submitted to RIEMA for consideration. It is the intention of the Cumberland LHMC that the Hazard Mitigation Plan be an available and pertinent source of information to a wide variety of individuals and interests. The 2023 Update also has a specific and pragmatic function. By identifying and prioritizing local mitigation needs, the Plan has already served, and will continue to serve, as a basis for amendments to local policies and regulations.

State authorities will incorporate information compiled in this document into the State Hazard Mitigation Plan, to strengthen the statewide knowledge and idea-base for mitigation planning. A well-prepared and locally adopted plan can demonstrate understanding and commitment, two important variables when vying for limited, high-demand resources.

1.6 Environmental Setting

The Town of Cumberland is a diverse community located in the northeast corner of Rhode Island, approximately 28.4 square miles in area with a population of over 36,405 people according to the recent 2020 census. The Town has a mixed development pattern with urban development dominating the southern portion of the community along its border with Central Falls, Lincoln, and Massachusetts, suburban development in the central and northwest region, and rural development in the northeast. The Town has experienced rapid growth in residential development in the past decades; it is clear that this trend will continue to use up the Town's open lands and diminish its unique character if unchecked. Easy access to State highways makes Cumberland a desirable location for growth; this growth has exceeded former projections. Demand for new housing bounced back strongly after the Recession of 2007-2009, with recent growth in development proposals and building permits indicating that this trend will increase.²



1.7 Brief History

Cumberland's natural environment greatly influenced the way in which the community was developed. Hilly, wooded uplands, numerous streams and ponds, and the Blackstone River all contributed to Cumberland's pattern of development. Early settlers established small farms and agricultural settlements in the seventeenth and early eighteenth centuries. Gristmills for grinding grain grown on the farms and sawmills for processing forest timber into lumber were erected along the rivers and streams. In the eighteenth and nineteenth centuries, Cumberland evolved from its colonial beginnings as a series of scattered agricultural settlements to form established hamlets centered on a church, a mill, or a shop.

Cumberland's rich mineral deposits and readily available water power led to the establishment of early industries. Iron ore was mined and manufactured at several locations in Cumberland until the time of the American Revolution. Granite was quarried at Diamond Hill and coal was mined in Valley Falls. The industrial use of waterpower transformed the western and southern sections of Cumberland into mill villages which still retain their names today – Ashton, Berkeley, and Lonsdale.³

² *Town of Cumberland Comprehensive Plan 2016 - 2036.*

³ *Ibid.*

1.8 History of Disaster Declarations

Since 1953, FEMA Region 1 (the New England States) has endured more than 150 Federal Emergency and Disaster Declarations. The following information (Table 1-2 below) gives an overview of the most significant past Federal Emergency and Disaster Declarations for Rhode Island since 2015 (and in particular Providence County, and including Cumberland):

Table 1-2 Significant Federal Emergency and Major Disaster Declarations, Providence County

ID Number	Type	Date
DR-4212	Severe Winter Storm/Snow/Flooding	January 2015
DR-4505	COVID-19 Pandemic	March 2020
DR-4653	Severe Winter Storm/Snow	January 28, 2022

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov. Data current through September 30, 2022.

1.9 Recent Disaster Declarations

The communities of Providence County (including Cumberland) have experienced significant losses during several recent storms that have warranted FEMA to declare these storms as disasters.

The following are descriptions of each of the recent storms since 2015 that have been declared as disasters by FEMA and which have affected the Town of Cumberland.

1.9.1 Severe Winter Storm/Snowstorm – January 2015 (FEMA DR-4212)⁴

An historic winter storm brought heavy snow to southern New England with blizzard conditions to much of Rhode Island and eastern Massachusetts, beginning during the day on Monday, January 26, 2015, and lasting into the early morning hours of Tuesday, January 27th. The highest snowfall totals, averaging two to three feet, extended from extreme northeast Connecticut and northwest Rhode Island into much of central and northeast Massachusetts, including greater Boston. Much of southeast Massachusetts and the rest of Rhode Island received one to two feet of snow. Totals dropped off dramatically west of the Connecticut River Valley where totals of 4 to 8 inches were observed.

The storm was well-forecast, with Blizzard Watches and Winter Storm Watches issued 2 days before the snow began. Low pressure tracked northeast from the Carolinas and strengthened rapidly as it slowly passed southeast of Nantucket on Monday evening, January 26th. All of the precipitation fell as snow with this storm. At its peak, snowfall rates of 2 to 3 inches per hour were common. In Rhode Island, blizzard conditions were officially reported in Westerly (5 hours), Newport (4 hours), and at T.F. Green State Airport in Warwick (3 hours). In Providence, the total of 19.1 inches was the fourth highest on record (dating back to 1904), while in Boston the total of 24.6 inches was the sixth highest on record (dating back to 1872).

⁴ National Climatic Data Center, *Severe Events Database*. www.ncdc.noaa.gov.

The Blizzard of January 2015 produced very strong winds late Monday into Tuesday near the Massachusetts and Rhode Island coasts where gusts of 50 to 65 mph were common. The Governor of Rhode Island declared a statewide travel ban beginning at midnight on January 27th and continuing through 8 pm. The few cars/drivers who did not obey the travel ban became stuck. A RI Department of Transportation vehicle flipped over during the storm as well.

1.9.2 COVID-19 Pandemic – March 2020 (FEMA DR-4505)⁵

On March 28, 2020, Governor Gina M. Raimondo requested a major disaster declaration due to the Coronavirus Disease 2019 (COVID-19) pandemic beginning on January 20, 2020, and continuing. The Governor requested a declaration for all Individual Assistance programs statewide; debris removal and emergency protective measures (Categories A and B), including direct Federal assistance, under the Public Assistance program statewide; and Hazard Mitigation statewide. This event was of the severity and magnitude that the need for supplemental Federal assistance was determined to be necessary prior to the completion of joint Federal, State, and local government Preliminary Damage Assessments (PDAs). Per 44 C.F.R. § 206.33(d) and §206.36(d), the requirement for a joint PDA may be waived for those incidents of such unusual severity and magnitude that formal field damage assessments are not required to establish the need for supplemental Federal assistance under the Stafford Act.

On March 30, 2020, President Trump declared that a major disaster exists in the State of Rhode Island. This declaration made emergency protective measures (Category B) not authorized under other Federal statutes, including direct Federal assistance, under the Public Assistance program requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for all areas in the State of Rhode Island.

1.9.3 Severe Winter Storm/Snowstorm – January 2022 (FEMA DR-4653)⁶

Explosive cyclogenesis of a low-pressure center off the Mid Atlantic coast brought a strong winter storm with blizzard conditions to all of southern New England Saturday and Saturday night. The storm tracked from east of the Carolinas to the 70w/40n benchmark bringing extreme snowfall rates of 2 to 4 inches per hour and winds gusting to hurricane force along the coast and 50 to 60 mph inland. The heaviest snow, just under 30 inches, fell over southeast MA, and in RI up to 2 feet fell. Snow tapered off overnight Saturday with quiet weather to follow on Sunday.

⁵ Ibid.

⁶ Ibid.

Section 2 Risk Assessment

2.1 Introduction

Identifying potential hazards is the first step in any effort to reduce community vulnerability. The subsequent identification of the risk and vulnerability for a community are the primary factors in determining how best to allocate finite resources to address what mitigation might take place. FEMA's *Local Mitigation Planning Policy Guide* was used in developing this strategy plan as a basic template to identify the various natural hazard types. The hazard identification and analysis involves all of those hazards that potentially threaten the Town of Cumberland.

By collecting and analyzing information for each potential hazard that may affect Cumberland, several determinations have been made:

- Which hazards merit special attention
- What actions might be taken to reduce the impact(s) of those hazards
- What resources are likely to be needed

2.2 Hazard Identification

The Cumberland LHMC evaluated each of the hazard types that may affect Cumberland, with the addition of Invasive Species (new to this 2023 Update), and similarly to those identified in the 2017 Plan. For the purposes of the 2023 Update, and for consistency with the State Hazard Mitigation Plan and the 2017 plan, the LHMC maintained the natural hazard listed in order of frequency and impact, beginning at the top of the list with the most frequently occurring natural hazards:

- Flood-Related Hazards
- Winter-Related Hazards
- Wind-Related Hazards
- Extreme Heat-Related Hazards
- Geologic-Related Hazards
- Drought-Related Hazards
- Brushfire/Wildfire-Related Hazards Hazard
- Invasive Species-Related Hazards

The Horsley Witten Group, Inc. updated available town-wide Geographical Information Systems (GIS) mapping with Figure A.1 Flood Risks/Repetitive Flood Loss Areas, Figure A.2 Hurricane Tracks, and Figure A.3 Critical Facilities/Vulnerable Populations located in Appendix A.

2.3 Hazard Profiles: Location, History and Probability of Future Occurrence

In assessing the hazards to a community, both the risk and the vulnerability must be considered. A hazard is the actual event that poses a danger to the community, (e.g., the hurricane, tornado, earthquake, etc. that threatens the Town). The term "risk" refers to the predicted impact that a hazard would have on people, services, specific facilities and structures in the community. The term "vulnerability" refers to the characteristics of

the society or environment affected by the event that resulted in the costs from damages (Heinz Center Report, 1999, p. 105). The vulnerability of an area refers to its susceptibility to a hazard. The areas of the town affected by extreme natural events are identified by the hazard risk assessment. In determining the risk and vulnerability of the town, the likelihood, frequency and magnitude of damage from identified hazards are assessed.

In developing an updated Risk Assessment, Cumberland defined the risks that the town could face and followed up with an assessment of the vulnerability of the at-risk areas, and the implications of experiencing natural disasters (e.g., loss of life, damage to the natural environment, property damage, and economic losses). Risk assessment is the determination of the likelihood of adverse impacts associated with specific natural hazards, and vulnerability assessment is concerned with the qualitative or quantitative examination of the exposure of some societal component (i.e., economy, environment). The result of this process was the preparation of a Risk Assessment Matrix (Table 2.1 Risk Assessment Matrix 2023 Update) that lists the vulnerable areas and the primary effects from an event on these areas. The matrix was then used to establish mitigation benefits and develop mitigation strategies (Section 4.3).

Hazard Index

The Cumberland LHMC evaluated each of the flood, winter, wind, wildfire, geologic, and invasive species-related hazards and collectively determined the likelihood of occurrence, locations affected, and potential impacts of each. This information was used to establish a Hazard Index (HI) value (HI=1 being lowest impact and HI=10 being highest impact) for each of the types of natural hazards and is presented in Table 2-2. The highest hazard index values were assigned to those natural hazards that were deemed to have the highest level of impact to the community. These hazards include flood-related hazards such as riverine, flash flooding and inland flooding/heavy rain (HI=7 for both), winter-related hazards such as snow/nor'easter and blizzards (HI=7), and wind-related hazards such as hurricanes and high winds (HI=7).

The Hazard Index for this 2023 Update utilizes language used in the FEMA State and Local Mitigation Planning How-to-Guide Series for frequency and severity categorization:

Criteria for Frequency Categorization:

<i>Very low frequency:</i>	events that occur less frequently than once in 1,000 years (less than 0.1% per year).
<i>Low frequency:</i>	events that occur from once in 100 years to once in 1,000 years (0.1% to 1% per year).
<i>Medium frequency:</i>	events that occur from once in 10 years to once in 100 years (1% to 10% per year).
<i>High frequency:</i>	events that occur more frequently than once in 10 years (greater than 10% per year).

The criteria used for severity categorization, based on past hazard events includes:

Criteria for Severity Categorization (based on past hazard events):

<i>Minor:</i>	Limited and scattered property damage; no damage to public infrastructure; contained geographic area; essential services not interrupted; no injuries or fatalities.
<i>Serious:</i>	Scattered major property damage; some minor infrastructure damage; wider geographic area; essential services are briefly interrupted; some injuries/fatalities.
<i>Extensive:</i>	Consistent major property damage; major damage to public infrastructure; essential services are interrupted for several hours to several days; many injuries and fatalities.
<i>Catastrophic:</i>	Property and public infrastructure destroyed; essential services stopped; thousands of injuries and fatalities.

Table 2-1
2023 Risk Assessment Matrix Update, Cumberland, Rhode Island

<i>Vulnerable Area</i>	<i>Location</i>	<i>Ownership</i>	<i>Natural Hazard</i>	<i>Primary Problems/Effects</i>	<i>Mitigation Benefits</i>	<i>Risk H-Historical P- Potential</i>
Emergency Response/Evacuation	Town-wide	Public and Private	All Hazards	Uninformed public	Protection of property, protection of life/infrastructure, increased awareness of	H and P
Recovery/Resilience	Town-wide	Public and Private	All Hazards	Damages to public and private property/Delayed recovery	Improved resiliency/ Accelerated recovery	H and P
Residential Problems	Town-wide	Public and Private	Flooding	Damages to public and private property	Protection of property	H and P
Critical Town Records/Documents	Town Hall	Public and Private	All Hazards	Loss of critical Town records	Protection of critical Town records	P
Local Roads Subject to Flooding	Town-wide, various locations	Public and Private	All Hazards	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities/ Enhanced access/evacuation	H and P
Dams	Town-wide	Public and Private	Flooding	Damages to public and private property/ Damages to infrastructure/Delay in access/evacuation	Protection of property/Protection of life/infrastructure	H and P
Municipally-owned Infrastructure	Town-wide	Public	All Hazards	Potential for contamination under failure/disruption of services	Protection of property/Protection of infrastructure and improved resilience of sanitary facility	H and P

Table 2-2 Hazard Index Cumberland, Rhode Island (2023)

Natural Hazard	Frequency (i.e. Very Low, Low, Medium, High)	Location (i.e. small/local, medium/regional, large/multiple communities) ²	Severity (i.e. minor, serious, extensive, catastrophic)	Hazard Index (i.e. ranked by combining frequency and severity)
Flood-Related Hazards				
- Riverine/Flash Flooding	4	2	3	7
- Inland/Urban Flooding/Heavy Rain	4	2	3	7
- Climate Change	3	2	2	5
- Dam Failures	1	2	3	4
Winter-Related Hazards				
- Blizzards/Snow/Nor' easter	4	3	3	7
- Ice	4	2	2	6
- Extreme Cold	4	3	1	5
Wind-Related Hazards				
- Hurricanes	4	3	3	7
- Tornadoes/High Winds	4	2	3	7
- Lightning/Thunderstorms	4	1	2	6
- Hail	4	1	1	5
Geologic-Related Hazards				
- Earthquakes	4	2	1	5
Drought-Related Hazards				
- Drought	4	2	1	5
Extreme Heat-Related Hazards				
- Extreme Heat	4	2	2	6
Brushfire/Wildfire-Related Hazards				
- Brushfire/Wildfire ¹	3	1	2	5
Invasive Species-Related Hazards				
- Multiple	3	1	1	4

Notes: 1: Scored by LHMC/Fire Chief; 2: Location score not included in overall hazard ranking.

For the purposes of this 2023 Update, based on the Hazard Index, the Cumberland LHMC determined that the Town is most at risk to the following hazards (and has advanced the assessment of the vulnerability of the at-risk areas, and the implications of experiencing these natural disasters):

- ✓ Riverine/Flash Flooding
- ✓ Heavy Rain/Inland and Urban Flooding
- ✓ Climate Change
- ✓ Dam Failure
- ✓ Blizzards/Heavy Snow/Nor'easters
- ✓ Ice Storms
- ✓ Extreme Cold
- ✓ Hurricanes
- ✓ Tornadoes/High Winds
- ✓ Lightning/Thunderstorms
- ✓ Hail
- ✓ Earthquakes
- ✓ Drought
- ✓ Extreme Heat
- ✓ Brushfires/Wildfires
- ✓ Invasive Species

The Cumberland LHMC formed the consensus that: flood-related hazards such as riverine, flash flooding and inland flooding/heavy rain; winter-related hazards such as snow/nor'easter and blizzards; and wind-related hazards such as hurricanes and high winds, are the major causes of risk to the community.

It should be noted that the above hazards are not a complete listing of hazards that may impact Cumberland. The Cumberland LHMC agreed that this listing accurately represents those hazards that impact the Town most frequently and have the potential to cause fatalities, injuries, property and infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss. The following hazards will not be addressed in this 2023 Update:

- Sea Level Rise
- Avalanche
- Expansive Soils
- Land Subsidence
- Landslides
- Volcanoes
- Tsunamis

These hazards were considered and discussed during LHMC meetings, where it was determined these hazards would not be considered for the following reasons:

- Lack of frequency in which they occur;
- The minimal probability of their occurrence; and/or
- The lack of resources to devote any amount of time to further research the likelihood or potential occurrence or impact.

The hazard-specific tables that follow after each section represent the various significant natural hazard events that have occurred in and around the Town of Cumberland, utilizing National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information (NCEI) (<http://www.ncdc.noaa.gov/>). All events are county wide (Providence County), unless otherwise noted.

2.3.1 Flood-Related Hazards

Flooding is the accumulation of water within a water body and the overflow of excess water onto adjacent floodplain lands (FEMA, Multi Hazard Identification and Risk Assessment, 1997). A floodplain is the land adjoining the river/stream channel, ocean or other watercourse or water body that is susceptible to flooding.

Flooding results from: large-scale weather systems generating prolonged rainfall; on-shore winds; locally intense thunderstorms; dam failures; or significant snow melt. Floods are capable of undermining buildings and bridges, eroding shorelines and stream banks, uprooting trees, washing out access roads, and causing loss of life and injuries. Also, flash floods (characterized by rapid onset and high velocity waters) carry large amounts of debris that further exacerbate conditions.

Under the NFIP, FEMA is required to develop flood risk data for use in both insurance rating and floodplain management. FEMA develops this data through Flood Insurance Studies (FIS). Detailed analyses are used to generate flood risk data only for developed or developing areas of communities. For undeveloped areas FEMA uses approximate analyses to generate flood risk data. Flood hazard areas are identified in the FEMA FIRMs. Flood hazard areas are divided into zones (V, X, AO, etc.) depending on the severity and type of flood threat. These zones are those areas subject to inundation (shallow or deep) by a flood (and/or velocity wave action) that has a 1 percent chance of occurring during any given year.

Floodplains in Cumberland include 'AE' and 'X' Zones, Figure A.1 (Appendix A). 'AE' Zones are areas that would be inundated by the 100-year flood. The 100-year flood is a regulatory standard used by federal agencies and most states to administer floodplain management programs and is also used by the NFIP as the basis for insurance requirements nationwide. "X' Zones (limited) are areas that would be inundated by the 500-year flood.

Table 2-3 below represents the various significant flood-related hazard events that have occurred in and around the Town of Cumberland over time, utilizing NOAA's National Centers for Environmental Information (NCEI) (<http://www.ncdc.noaa.gov/>). All events are county wide (Providence County), unless otherwise noted.

Table 2-3 Significant Flood-Related Events, Providence County

Hazard Type	Date	Level/Description	Damages
<i>Riverine Flooding</i>			
	1/28/1996	1 to 2"; 50-60 mph winds; Blackstone River crested at 9.5'	Scattered power outages

	12/21/1996	80 mph winds; Blackstone crested at 9.3'	
	3/10/1998	3.3" in Cumberland; 40-50 mph winds; Blackstone crested at 10.3'	
	6/15/1998	7 to 8"; Blackstone crested at 9.13'	
	3/22/2001	Blackstone crested at 11.65'	1,400 homes/37 businesses affected; \$3 M
	3/31/2001	3 to 4"; Blackstone crested at 10.21'	
	4/14/2004	2 to 4"; Blackstone crested at 9.25'	Roads closed in low-lying areas
	10/15/2005	2.5 to 4.5"	500 evacuations across region; \$340 K
	6/7/2006	2 to 4"	\$20 K
	3/2/2007	2 to 3"	significant urban/small stream flooding; roads closed, and cars stranded
	3/30/2010	5.71"	Blackstone River crested at 14.4 feet
	9/8/2011	4 to 6"	
Flash Flooding			
	1/12/1996		
	7/28/2012	2 to 3" per hour	\$30 K
	8/10/2012		
Heavy Rain/Inland and Urban Flooding			
	7/13/1996		
	9/18/1996		
	10/20/1996		
	11/1/1997	2 to 3"	Scattered power outages
	2/23/1998	3 to 5"; 40-50 mph winds; (nor'easter)	
	3/8/1998	2 to 4"; Blackstone crested at 10.3'	Residential/commercial flooding
	5/9/1998	2 to 5"; 3-day nor'easter	Several roads closed
	6/13/1998	6 to 8"; Blackstone rested at 9.17'	Several roads closed
	9/10/1999	6 to 7"	
	3/29/2003	2 to 3"	
	4/14/2004	2 to 4"	Blackstone River minor flooding/roadways closed

	10/15/2005	2.5 to 4.5"	Roadways closed/approx. 500 evacuations along Blackstone River communities/\$50K in damages
	6/7/2006	2 to 4"	Roadways closed/approx. 500 evacuations along Blackstone River communities/\$50K in damages
	3/2/2007	2 to 3"	Roadways closed/\$25 K in damages
	9/8/2011	2 to 8"	Route 146 NB/SB lanes closed temporarily
	7/28/2012	2 to 3"	Abbott St. closed/Basements flooded? \$15 K in damages
	7/6/2018	1.25"	Industrial Rd. flooded/People stranded in vehicles
	8/23/2022	4 to 6"	Abbott St. flooded and impassable

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov.

Data current through September 30, 2022.

Riverine/Flash Flooding

Riverine or inland flooding often occurs after heavy rain, particularly in areas of the state with high water tables. These areas are also particularly susceptible to flash flooding caused by rapid runoff occurring after heavy precipitation events, and in combination with spring snowmelt. Frozen ground conditions can also contribute to low rainfall infiltration and high runoff events that sometimes result in river flooding.

The Blackstone River flows south along the western border of Cumberland, and eventually into Narragansett Bay. Several smaller streams and brooks that run through the Town are also susceptible to flooding during periods of heavy rain and threaten both residential and industrial properties.

Flood magnitude increases with increasing recurrence interval. The Town of Cumberland can be uniformly affected by riverine flooding events, dependent upon the location (amount of impervious surfaces within the area), existing/incoming weather conditions, and time of year (frozen ground conditions exacerbate flooding). Based on the increased frequency and severity of riverine and flash flooding events, as reported by the National Centers for Environmental Information and indicated in Table 2-3, the Town is considered at high risk for future riverine/flash flooding events.

Climate Change Impacts on Riverine/Flash Flooding

Riverine flooding will likely be exacerbated by increased storm intensity, as well as by increased precipitation. The Intergovernmental Panel on Climate Change (IPCC) identifies inland flooding in some urban regions as a “key risk” in North America, which may disrupt people’s livelihood and result in severe health risks. It is also important to note that riverine flooding and coastal flooding due to SLR can have a coupling effect. Rising seas can set a new flood stage in riverine systems, thus increasing flood risk in inland areas adjacent to rivers.

Heavy Rain/Inland and Urban Flooding

Heavy rains that cause inland and urban flooding are often exacerbated by stormwater-related issues. Thunderstorms, winter storms, coastal storms and nor’easters, and

hurricanes all contribute to interior flood related hazards due to the large amounts of precipitation associated with them. Development often compounds the magnitude and frequency of urban flooding by increasing impervious surfaces, also increasing the rate of drainage collection, reducing the carrying capacity of the land, and often overwhelming sewer system infrastructure.

The State of Rhode Island experienced torrential rainfall that affected the entire state between March 12, 2010, and March 31, 2010. The Pawtuxet River crested at 14.98 feet setting a record which had previously been 14.5 feet in 1982. The Blackstone River crested at 14.4 feet, 2.4 feet above its moderate flood stage (12.4 feet) and 5.4 feet above its minor stage (9 feet). In Cumberland, approximately 200 residents of the One Mendon Road senior housing complex were evacuated after flood waters from the Blackstone River threatened to isolate the building. The Town's Mayor (at that time), Daniel J. McKee, announced a mandatory evacuation of the high-rise and residents were evacuated while vehicles could still access the building. Mendon Road was closed to through traffic from Broad Street to the Lincoln Town line due to advancing water from the Blackstone. Flood waters collapsed a section of Nate Whipple Highway near the North Cumberland Middle School, a section of road that had just been rebuilt with \$3 million in federal stimulus money. The flooding also caused \$1 million in damage at the Hope Global industrial site which employs about 300 people. Approximately 228 residents and businesses submitted damage reimbursement claims for just over \$2.6 million.

The Town of Cumberland (and state overall) continues to experience significant increases in the frequency and intensity of heavy rain/precipitation events as experienced throughout 2023. One significant rain event passed through Cumberland on September 11, 2023, with the heaviest rainfall concentrated south of Route 295 to the Cumberland/Central Falls border. Rainfall totals ranged from four inches near Route 295 to six inches at the border with Central Falls, lasting approximately five hours. Several roads remained impassable for many hours following the storm (Curran Rd., Rawson Rd., Abbott St., Industrial Rd., England St., and Scott Rd.).

Based on the high frequency and extensive severity of heavy rain and inland/urban flooding events since the last plan as reported by the National Centers for Environmental Information as indicated in Table 2-3 and confirmed by the LHMC, the Town is considered at high risk for future heavy rain/inland and urban flooding events.

Climate Change Impacts on Heavy Rain/Inland and Urban Flooding

Heavy precipitation events are becoming more frequent and intense. Whether a hurricane, tropical storm, or extra-tropical storm (e.g., a nor'easter), there has been a global increase in both the frequency and the intensity of heavy precipitation events. This trend is consistent with physical responses to a warming climate, such as an increased amount of moisture in the atmosphere. New England is experiencing heavier rainfall events due to climate change; this trend is modelled to increase.

Dam Failure

A dam is any artificial barrier with the ability to impound water, wastewater, or any liquid-borne material for the purpose of storage or water control. Dam failure can be a catastrophic type of failure characterized by the sudden, immediate, and uncontrolled

release of impounded water, or the likelihood of such an uncontrolled release with secondary impacts to downstream structures within the inundation zone

A dam failure event includes the potential for a range of impacts on both residents and the built environment, including injury and loss of life, short- and long-term displacement, financial needs, and emotional/psychological trauma. A dam failure event can also impact a community's critical facilities/infrastructure including structural and equipment damage at municipal buildings, disruptions to normal/daily operations (water supply, sewer conveyance/treatment, and communications), and transportation disruptions. Dam failure events can also impact the environment/ecosystems by way of displacing wildlife, carrying pollution/hazardous materials into natural habitats, and disrupting natural ecological processes.

It is important to note that extreme natural hazard events are often interconnected and can have cascading impacts on dams. Often, wildfires are the result of periods of drought and record high temperatures. In turn, charred landscapes are more vulnerable to flooding and landslides due to compromised soil integrity. The onset of heavy precipitation from severe storm events can exacerbate these resultant conditions, causing a chain of adverse impacts on dams that may affect upstream and downstream flooding potential.

The RIDEM, Office of Compliance and Inspection is responsible for monitoring the condition of the state's dams. There are 22 inventoried dams located within the Town of Cumberland, four of which are a shared responsibility with the Town of Lincoln on the Blackstone River (Manville Dam, Albion Dam, Ashton Dam, and Pratt Dam), and the Valley Falls Pond Dam is a shared responsibility with the City of Central Falls, also on the Blackstone River (Table 2-4).

Inventoried jurisdictional dams are classified by the hazard, which relates to the probable consequences of failure or mis-operation of the dam; it does not relate to the current condition or the likelihood of failure of the dam. A three-tiered hazard classification rates each dam based upon the probable consequences of failure or miss operation of the dam. This system includes:

- **High Hazard** – means a dam where failure or miss operation will result in a probable loss of human life.
- **Significant Hazard** – means a dam where failure or miss operation results in no probable loss of human life but can cause major economic loss, disruption of lifeline facilities, or impact other concerns detrimental to the public's health, safety, or welfare. Examples of major economic loss include but are not limited to washout of a state or federal highway, washout of two or more municipal roads, loss of vehicular access to residences (e.g., a dead-end road whereby emergency personnel could no longer access residences beyond the washout area), or damage to a few structures.
- **Low Hazard** – means a dam where failure or miss operation results in no probable loss of human life and low economic losses.

In accordance with Rhode Island General Laws, Chapters 46 - 18 and 46 - 19, and two amendments to Chapter 46-19: Section 4 was amended to authorize the RIDEM, in an

emergency, to take necessary action to mitigate an unsafe condition at a dam and to assess the costs of those actions against the dam owner. Section 9 was amended to require a city or town where a high or significant hazard dam is located to complete by July 1, 2008, an Emergency Action Plan (EAP) for the dam. An EAP defines responsibilities and provides procedures designed to identify unusual and unlikely conditions which may endanger a structure in order to safeguard the lives of citizens living, working, schooling, recreating, and property within the inundation area. EAPs are required to have annual updates to remain in compliance.

Hydropower Construction Project – Albion and Ashton Dams⁷

The New England Hydropower Company (NEHC) officially broke ground May 10, 2021, on its second new hydro project in the northeastern U.S. This new project revitalizes the 19th century historical Albion Dam on the Blackstone River using the Archimedes Screw. Nearly two thousand years ago, Archimedes and his screw pumped water up from lakes and rivers into the famed Roman aqueducts. Now, the NEHC team is calling Archimedes out of retirement: NEHC installs the screw at existing non-powered dams to convert previously wasted flow into carbon-free electricity.

The screw is a 50-ton piece of steel with three grooves spiraling down a central shaft (Figure 2-1). The weight of the water flowing into the grooves forces the screw to turn, which is then converted into electricity through a system of gears, motors, and other state-of-the-art electrical equipment.

Figure 2-1 Archimedes Screw



Source: <https://www.hydro.org/powerhouse/article/new-hydropower-under-construction-in-rhode-island/>

Standing a proud 9 feet tall, the Albion Dam on the Blackstone River spills as much as 800 cubic feet per second. But soon enough, most of this flow will be redirected through two Archimedes Screws with a capacity of 420-kW of carbon-free electricity.

In May 2021, NEHC finished building a road which will be used to construct the powerhouse, drop in the two screws, and allow R.I. Energy to build new poles and wires for interconnection (Figure 2-2).

⁷ <https://www.hydro.org/powerhouse/article/new-hydropower-under-construction-in-rhode-island/>

Figure 2-2 Access Road Construction – Albion Dam



Source: <https://www.hydro.org/powerhouse/article/new-hydropower-under-construction-in-rhode-island/>

Next up for NEHC is the Ashton Mills Dam, just downstream from Albion. This project will boast the second Voith Stream Diver in the United States. The Steam Diver features a powerhouse built within the turbine itself, reducing the costs associated with building a conventional powerhouse above the 100-year flood line, a necessity at Ashton Mills given the existing infrastructure and topography.

Hydropower Construction Project – Manville Dam⁸

The Federal Energy Regulatory Commission (FERC) has issued a preliminary permit to One Drop Hydro LLC to study the feasibility of the 250-kW Manville Dam Project in Providence County, Rhode Island.

The proposed Manville Dam project, on the Blackstone River, would consist of the existing 246-foot-long, 18-foot-high stone masonry, arch-gravity Manville Dam, with a crest elevation of 105.72 feet North American Vertical Datum of 1988 (NAVD88); an existing impoundment with a surface area of 2.83 acres and a total storage capacity of 45.45 acre-feet at a surface elevation of 106.22 feet NAVD88; two 125-kW siphon Kaplan turbine-generator units; a new transformer and 528-foot-long, 13-kV transmission line connecting the turbine-generator units to the regional grid; and (5) appurtenant facilities. The estimated annual generation of the project would be 1,839 MWh.

One Drop Hydro filed the application in November 2020. The preliminary permit is effective May 1, 2021, and lasts for 48 months. The purpose of a preliminary permit is to preserve the right of the permit holder to have the first priority in applying for a license for the project that is being studied.

⁸ <https://www.hydroreview.com/regulation-and-policy/ferc-issues-preliminary-permit-for-250-kw-manville-dam-project/>.

River/Dam Cleanup – Pratt Dam⁹ (Shorey, 2019)

Last year's heavy rains caused such high waters along the Blackstone River that volunteers were unable to get in the water at the Pratt Dam to remove the accumulated debris. That delay meant another year of dead trees and other debris would accumulate at the dam, which carries the Blackstone River Bikeway across the river behind Stop & Shop on Mendon Road in Cumberland. River advocates, who have been doing this labor of love for the past 18 years, staged an elaborate removal operation last Saturday, July 6, 2019, complete with safety ropes, chainsaws and a boat. Cyclists on the bike path stopped to take pictures of this impressive operation, a few dropping dollars into a collection bucket to help fund the ongoing efforts of the Blackstone River Watershed Council/Friends of the Blackstone.

Suzanne Matta, secretary of the BRWC/FOB, told The Breeze that Hope Global, a company further up the river where flooding has been a recurring issue, contributed money to the cleaning of the dam. "This will prevent upstream flooding of homes and businesses," she said. Two years of debris buildup meant a much more formidable job than ever before, said John Marsland, founder and president of the group and one of the "Valley Boys" who have cared for the Blackstone River like it's their own backyard. A project such as this takes immense resources, Matta said, including worker time, safety equipment, and chainsaws. In just a few minutes, three chainsaws had already broken-down last Saturday.

Frank Matta, Suzanne's husband and past president of the organization, was in the water last Saturday as logs were chopped up and thrown through the Pratt Dam, also known locally as "The Tubes." The entire Blackstone River is forced through these five tubes, and the Friends of the Blackstone has been clearing these tubes once each year for nearly two decades.

Though less flooding is one benefit of the work, the initiative is mainly designed to promote river safety, said Matta. After two fatalities at this location involving novice paddlers in the past few years, the group installed buoys upstream and members maintain that added safety feature. To guard against a potential tragedy during last Saturday's cleanout, those working the chainsaws had someone behind them holding onto their safety belt just in case. Pieces of the blockage were pulled out carefully, each wood chunk removed from the edges of the pile as water began flowing again at each of the tubes.

Judy Hadley, a director with the BRWC/FOB and photographer at group events, said there is no entity or organization anywhere that commits the kind of volunteer resources this group does to maintaining public resources such as the river. "Nobody would do this, nobody in their right mind," she said. "These guys are amazing. The guts and nerve it must take to do that is beyond me." It took 10 to 12 men in the water nearly four hours to clear a wall of debris reaching 20 feet high, she said.

⁹ https://www.valleybreeze.com/news/double-trouble-volunteers-clear-pratt-dam/article_4e2f9c9c-54c6-5a5b-bb8c-425bccf88fd6.html#.XSdsqOhKiUk.

Table 2-4 Inventoried Dams in Cumberland, RI

Dam Name	RI DEM/NID #	Body of Water	Ownership	Hazard
<i>Dams</i>				
Albion Dam	RI 060/RI 0080	Blackstone River	RIDEM	Low
Arnold Mill Pond Dam	RI 297/RI 04095	Abbott Run	Private	Low
Arnold Mills (Pawtucket) Reservoir Dam	RI 078/RI 00803	Abbott Run	PWSB	High
Ashton Dam	RI 061/RI 00807	Blackstone River	RIDEM	Low
Carl's Pond Dam	RI 616/RI 04409	Bungay Brook	Private	Low
Catamint Dam	RI 756/RI 04547	Catamint Brook	Private	Low
Diamond Hill Reservoir Dam	RI 077/RI 00802	Burnt Swamp Brook	PWSB	High
Duhallow Pond Dam	RI 350/RI 04096	Burnt Swamp Brook	Private	Low
Happy Hollow Pond Dam	RI 082/RI 00806	Abbott Run	PWSB	Significant
Howard Pond Dam	RI 080/RI 04094	Abbott Run	Private	Low
Ker-Anna Pond Dam	RI 076/RI 04099	Burnt Swamp Brook	Private	Low
Louise Posse CMU	RI 618/RI 04411	Blackstone River	Private	Low
Manville Dam	RI 059/RI 00809	Blackstone River	Private	Low
Miscoe Lake Dam/Grant's Mill Pond Dam	RI 074/RI 00801	Miscoe Brook	Private	High
Pratt Dam	RI 062/RI 01705	Blackstone River	Town of Cumberland	Low
Rawson Pond Dam	RI 079/RI 00803	Abbott Run	Town of Cumberland	Significant
Resurrection Cemetery Dam	RI 620/RI 04413	Bungay Brook	Private	Low
Robin Hollow Pond Dam	RI 081/RI 00806	Abbott Run	PWSB	Significant
Scott Lower Dam	RI 617/RI 04410	Scott Brook	Private	Low
Scott Upper Dam	RI 619/RI 04412	Scott Brook	Private	Low
Thornley Farm Pond Dm	RI 427/RI 04098	Abbott Run	Private	Low
Valley Falls Pond Dam	RI 063/RI 00401	Blackstone River	Private	Low

Source: RIDEM Inventory of Dams, RIDEM Office of Compliance and Inspection/Dam Safety Program
<https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/compinsp/pdf/damlist.pdf>.

Since the last update of this HMP (2017), and in accordance with Rhode Island General Laws, Chapter 46-19: Section 9 requiring high or significant hazard dams to have EAPs, the PWSB (participating member of the Cumberland LHMC) worked with the Town to fund and develop EAPs for the four dams they have jurisdiction over (Arnold Mills Reservoir Dam, Diamond Hill Reservoir Dam, Happy Hollow Pond Dam, and Robin Hollow Pond Dam) in 2019. The PWSB also completed recent (2020) Phase 1 Inspection Reports for the same four dam structures.

The PWSB has an active Operations and Maintenance Manual for the Happy Hollow Pond Dam, with additional Manuals in development for the remaining three dams. Independently, the Town also completed two additional EAPs for Rawson Pond Dam and Miscoe Lake Dam utilizing an intern and working in coordination with RIEMA.

The six EAPs completed since the 2017 Plan are now out of compliance (required to be updated annually). Phase 1 Inspection Reports (high hazard: required every 2 years,

significant hazard: required every 5 years) for several dams (Arnold Mills/Pawtucket Reservoir Dam, Diamond Hill Reservoir Dam, Miscoe Lake Dam, and Rawson Pond Dam) are now out of compliance. Correspondence from former Mayor William Murray (February 27, 2017) to the Town Council regarding the Rawson Pond Purchase agreement states that ‘the Cumberland Water District will need to create an Operations and Maintenance Manual for the Rawson Pond Dam.’ Mitigation actions have been added to Section 4 to address these deficiencies.

Albion Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: RIDEM
RI ID #: 060
NID ID #: RI 0080
Type: Unknown
Tributary: Blackstone River
Height: 9 feet
Storage Capacity: 800 ac/ft
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Arnold Mill Pond Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 297
NID ID #: RI 04095
Type: Unknown
Tributary: Abbott Run
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Arnold Mills (Pawtucket) Reservoir Dam¹⁰

The Arnold Mills (Pawtucket) Reservoir Dam was constructed in 1928 and is for water supply purposes by the PWSB. The PWSB operates the reservoir in tandem with Diamond Hill Reservoir, located immediately upstream.

¹⁰ *Arnold Mills (Pawtucket) Reservoir Dam Phase 1 Inspection Report*, PARE Corporation, September 14, 2020.

More than two dozen homes and several commercial structures appear they would be affected by a major flood caused by a sudden breach of Pawtucket Reservoir Dam. There are also several dams located downstream on Abbott Run and the Blackstone River that would be impacted (overtopped) by a failure at the Pawtucket Reservoir Dam: Arnold Mills Pond Dam; and Rawson Pond Dam. The Nate Whipple Highway bridge and Route 120 are about 1,000 feet downstream of the dam.

Owner: PWSB
RI ID #: 078
NID ID #: RI 00803
Type: Earthen Embankment
Tributary: Abbott Run
Height: 33 feet
Storage Capacity: 5,125 ac/ft
Last Inspection: September 14, 2020
Hazard Classification: High Hazard
EAP: August 2019
O & M: No

The PWSB an inspection and evaluation done September 14, 2020. The inspection rated the overall physical condition of the dam as fair, meaning a component requires maintenance.

The consultants (PARE Corporation) who performed the inspection identified deficiencies and made several recommendations, including:

1. Seal cracks within the asphalt and develop a program to monitor further and expanded crack development.
2. Fill areas of erosion along the upstream/downstream shoulder transitions with the crest.
3. Restore operability to the upper-level and mid-level outlet gates.
4. Remove trees, rotting stumps and the associated root systems from the dike embankment and within 15-feet of abutment contact points.
5. Clear all unwanted vegetation from rip rap slopes at both the dam and the dike.
6. Formalize a monitoring program and evaluation to further assess the observed wet and soft areas near the discharge structure to the low-level outlet.
7. During subsequent inspections, complete a video and underwater inspection of the low-level outlet pipe and internal components including the venturi meter to evaluate the current condition of the system, and the condition and location of the intake and trash rack.
8. Trap and remove burrowing animals.
9. Clear the upstream areas of the Main Dam (right of the spillway) and the noted left and right sides of the Dike of trees, brush, weeds, and ground cover.
10. Stumps need to be removed, the root systems grubbed from the embankment and the resulting holes promptly filled with suitable compacted material.
11. Grouted riprapped areas along the upstream slopes of the Mian Dam and the Dike should have existing gaps filled with appropriate sized rip rap to provide better protection against wave action and slope stabilization.

12. Fill the eroded paths along the downstream slope and gullies formed by stormwater runoff at the primary spillway.
13. Earthen areas that have been cleared of vegetation, filled, or regraded should be seeded to allow grass to grow.
14. Complete repairs of the Primary Spillway including finishing the removal of the vegetation within joints, repairing and sealing cracks at the ogee face and training walls, repairing the spalled areas within the stilling basin, and continue to clear vegetation from the approach and discharge areas.
15. A formalized Operations and Maintenance Manual should be developed for this structure.
16. Complete detailed hydrologic and hydraulic (H&H) analyses to evaluate the capacity of the structure to accommodate various storm events that would be typical for the watershed.
17. Implement a program of regular inspection and monitoring of the dam (every two years).

Ashton Dam

The dam was constructed in 1885. The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: RIDEM

RI ID #: 061

NID ID #: RI 00807

Type: Stone Masonry

Tributary: Blackstone River

Height: 20 feet

Storage Capacity: 200 ac/ft

Last Condition Assessment: October 3, 2017

Hazard Classification: Low Hazard

EAP: Not required

O & M: Unknown

Carl's Pond Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private

RI ID #: 616

NID ID #: RI 04409

Type: Unknown

Tributary: Bungay Brook

Height: Unknown

Storage Capacity: Unknown

Last Inspection: Unknown

Hazard Classification: Low Hazard

EAP: Not required

O & M: Unknown

Catamint Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private

RI ID #: 756

NID ID #: RI 04547

Type: Unknown

Tributary: Catamint Brook

Height: Unknown

Storage Capacity: Unknown

Last Inspection: Unknown

Hazard Classification: Low Hazard

EAP: Not required

O & M: Unknown

Diamond Hill Reservoir Dam¹¹

The original dam was constructed in 1885 across Burnt Swamp Brook, it consisted of an earthen embankment with a concrete core wall, masonry spillway, and gatehouse. The gatehouse shared an outlet leading to Pawtucket (Arnold Mills) Reservoir. In 1926 a new stone revetment was added to the dam's downstream toe of the embankment. In 1962 the dam was raised a level with a newly constructed spillway with a crest elevation of 188.0. The modern standing Diamond Hill Reservoir was constructed in 1971 and was raised a second level to its current crest elevation of 198.0 feet. The dam retains the Abbott Run waterway which acts as several municipalities' drinking water.

More than two dozen homes and several commercial structures appear they would be by a major flood caused by a sudden breach of Diamond Hill Reservoir Dam. There are also several dams downstream of Diamond Hill Reservoir Dam on Abbott Run and the Blackstone River that would be impacted (overtopped) by a failure at the Diamond Hill Reservoir Dam: Pawtucket (Arnold Mills) Reservoir Dam; Arnold Mills Pond Dam; Rawson Pond Dam; Robin Hollow Pond Dam; Happy Hollow Pond Dam; Happy Hollow Pond Dam; Central Falls Dam; Pawtucket Upper Dam; and Pawtucket Lower Dam. There are also several bridges downstream of Diamond Hill Reservoir spanning Abbott Run, including Nate Whipple Highway (Route 120) bridge about 1,000 feet downstream of the dam. There is also a bridge on Reservoir Road that spans over the discharge channel from the Diamond Hill Reservoir.

Owner: PWSB

RI ID #: 077

NID ID #: RI 00802

Type: Earthen Embankment

Tributary: Burnt Swamp Brook

Height: 76 feet

Storage Capacity: 15,680 ac/ft

Last Inspection: September 8, 2020

Hazard Classification: High Hazard

¹¹ *Diamond Hill Reservoir Dam Phase 1 Inspection Report*, PARE Corporation, September 8, 2020.

EAP: August 2019
O & M: No

The PWSB an inspection and evaluation done September 8, 2020. The inspection rated the overall physical condition of the dam as fair, meaning a component requires maintenance.

The consultants (PARE Corporation) who performed the inspection identified deficiencies and made several recommendations, including:

1. Review available LiDAR imagery to determine the limits of the dam/dikes/causeways and assess potential flooding (at the causeways) and dam breach (at the east dike) structures.
2. Complete regular topographic survey at the dam, dikes and causeways to provide baseline elevations to which future elevation measurements and slope irregularities can be compared. Alternatively, complete drone-based survey, using LiDAR or photometric modeling to create surfaces of the dam that can be overlaid and compared.
3. Develop and implement a monitoring program and evaluation to further assess the observed wet, soft, and stained areas along the downstream slope of the Main Dam left of the primary spillway channel and beyond the downstream toe of the East Dike near its left side.
4. Based on the results of the monitoring program and evaluation, install drainage systems to control the observed seepage along the downstream slope of the Main Dam left of the primary spillway, including the installation of a designed blanket and toe drain to collect and convey seepage waters from along the slope towards the spillway discharge channel.
5. Complete a video and underwater inspection of the upstream side of the primary spillway, the low-level outlet pipe (s), and the equalization culverts at the causeways to evaluate the current condition of the concrete at the primary spillway and the condition of the low-level outlet pipes and trash racks and assess sediment accumulation at the approach to the structures.
6. Locate and mark the alignments and structures associated with the toe and blanket drains at the dam and dike structures. After drains and outfalls have been located, complete a video inspection to assess the condition of the infrastructure. Clean or repair elements as needed.
7. Restore operability of the apparent instrumentation or properly abandon and re-install.
8. Clear and grub areas of unwanted vegetation from the Dam and Dike embankments, abutments, and upstream/downstream areas.
9. Trap and remove burrowing animals from all structures and fill the resulting holes with compacted structural fill.
10. Fill areas of potential soil loss along the upstream/downstream earthen slope transitions with riprapped slope sections.
11. Use riprap and or trap rock to continue to fill the gaps and regrade the irregular areas along the riprapped sections of upstream/downstream slopes of all structures as they develop. Monitor the slopes for horizontal and vertical movement using survey measurements performed at selected time intervals.

12. Given that the two causeways are not designed as impounding structures, the clearing of the remaining trees and brush is not required; however, the vegetation should be regularly trimmed to allow for proper access and inspection of the ground surface and to maintain the overall integrity of the embankment supporting Reservoir Road.
13. Earthen areas that have been cleared of vegetation and/or have exposed bare soils should be loamed and seeded to allow for the development of a healthy stand of grass.
14. Repair the erosion/sloughing observed along downstream slope right of the primary spillway discharge channel, including adding a designed rip rap section consisting of bedding and armor stone layers underlain with a geotextile fabric.
15. Make necessary repairs to the deteriorating gatehouse ceiling to maintain a safe working conditions for those who make routine checks and/or must operate the low-level outlet and to protect the gate controls from the elements.
16. Repair and seal the cracks and spills observed within the downstream face of the primary spillway and along the right training wall.
17. Evaluate and monitor potential head cutting at the toe of the primary spillway bedrock face, given the observed rock jointing and 20-foot vertical face.
18. A formalized Operations and Maintenance Manual should be developed for this structure.
19. Implement a program of regular inspection and monitoring of the dam (every two years).

Duhallow Pond Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 350
NID ID #: RI 04096
Type: Unknown
Tributary: Burnt Swamp Brook
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: August 2019
O & M: Unknown

Happy Hollow Pond Dam¹²

The dam was constructed in 1885 and serves as the primary source of water supply for the PWSB. It is located adjacent to the PWSB water treatment facility in a developed area in Cumberland.

Owner: PWSB
RI ID #: 082

¹² *Happy Hollow Dam Phase 1 Inspection Report*, PARE Corporation, September 14, 2020.

NID ID #: RI 00806
Type: Earthen Embankment
Tributary: Abbott Run
Height: 19 feet
Storage Capacity: 208 ac/ft
Last Inspection: September 14, 2020
Hazard Classification: Significant Hazard
EAP: August 2019
O & M: August 2013

The PWSB an inspection and evaluation done September 14, 2020. The inspection rated the overall physical condition of the dam as fair, meaning a component requires maintenance.

The consultants (PARE Corporation) who performed the inspection identified deficiencies and made several recommendations, including:

1. Repair the leak in the hydraulic line controlling the bascule gate operation.
2. Develop and implement a monitoring program and evaluation to further assess the observed leakage at the base of the right downstream wall and to determine the source and quantity of flow from the base of the left downstream wall.
3. Based on the results of the monitoring program and evaluation, implement repairs to cut off the observed leakage.
4. Complete an underwater inspection of the upstream and downstream sides of the primary spillway including areas near the base of the walls.
5. Remove vegetation and repoint the training walls for the spillway including areas near the base of the walls.
6. Monitor abrasion along the concrete portions of left and right training walls.
7. A formalized Operations and Maintenance Manual should be developed for this structure.
8. Perform a dam break analysis for the structure to determine the extents of downstream inundation in the event of mis-operation or failure of the dam embankment or appurtenant structures.
9. Implement a program of regular inspection and monitoring of the dam (every five years).
10. Evaluate means to provide low-level outlet discharge capacity.

Howard Pond Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 0780
NID ID #: RI 04094
Type: Unknown
Tributary: Abbott Run
Height: Unknown

Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Ker-Anna Pond Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 076
NID ID #: RI 04099
Type: Unknown
Tributary: Burnt Swamp Brook
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Louise Posse CMU Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 618
NID ID #: 04411
Type: Unknown
Tributary: Blackstone River
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Manville Dam¹³

The dam is currently being evaluated as a hydropower project.

Owner: Private
RI ID #: 059
NID ID #: RI 00809
Type: Stone Masonry
Tributary: Blackstone River
Height: 18 feet

¹³ <https://www.hydroreview.com/regulation-and-policy/ferc-issues-preliminary-permit-for-250-kw-manville-dam-project/>

Storage Capacity: 45.45 ac/ft
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

*Miscoe Lake Dam/Grant's Mills Pond Dam*¹⁴

The dam was constructed in 1937, historically used to generate power for a former manufacturing mill, Grant's Mill. It is located along Miscoe Brook on Grant's Mill Road.

More than a dozen homes, several commercial buildings along with several of the Town of Cumberland structures appear to be affected by a hypothetical major flood caused by a sudden breach of Miscoe Lake Dam. An Inundation study performed by GZA in 2007 indicates that a hypothetical failure of Miscoe Lake Dam would result in the flooding of 2ft of depth beyond the overbanks of the stream channel. This flooding may in turn impact more than a dozen homes along with secondary residential roads such as Mountview Dr., Ledge View Dr. and Thomas Leighton Blvd. GZA also determined that it was likely the downstream roadways of Routes 121 and 114 would likely overtop and washout. The hypothetical flood wave would dissipate within the Pawtucket Reservoir. There are several bridges downstream of Diamond Hill Reservoir spanning Abbott Run. These include but aren't limited to; Route 121 located 350 feet downstream, Route 114 located around .8 miles downstream. The Sylvys is conveyed via a box culvert under Route 121. The Sylvys runs under Route 114 via a span bridge. The GZA report from 2007 estimated that neither the culvert under 121 or the bridge over Route 114 have sufficient capacity to convey the flow released by a hypothetical dam break. Roads will likely be overtopped by the hypothetical dam break while many smaller and secondary road crossings are likely to overtop due to a dam break flood wave.

Owner: Private
RI ID #: 074
NID ID #: RI 00801
Type: Stone Masonry
Tributary: Miscoe Brook
Height: 12 feet
Storage Capacity: 226 ac/ft
Last Inspection: August 20, 2014
Hazard Classification: High Hazard
EAP: August 2019
O & M: Unknown

*Pratt Dam*¹⁵

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Town of Cumberland
RI ID #: 062
NID ID #: RI 01705

¹⁴ Miscoe Lake Dam No. 074 Emergency Action Plan, RIDEM/RIEMA, 2019.

¹⁵ <https://data.statesmanjournal.com/dam/rhode-island/providence-county/pratt/ri01705/>.

Type: Unknown
Tributary: Blackstone River
Height: 12 feet
Storage Capacity: 236 ac/ft
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Rawson Pond Dam¹⁶

The dam was constructed in 1885 and flows through the Town of Cumberland and the City of Central Falls. It currently impounds water for passive recreational purposes.

Owner: Town of Cumberland
RI ID #: 079
NID ID #: RI 00804
Type: Stone Masonry
Tributary: Abbott Run
Height: 9 feet
Storage Capacity: 128 ac/ft
Last Inspection: July 13, 2012
Hazard Classification: Significant Hazard
EAP: August 2019
O & M: No

Resurrection Cemetery Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 620
NID ID #: RI 04413
Type: Unknown
Tributary: Bungay Brook
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Robin Hollow Pond Dam¹⁷

The dam was constructed in 1937 and its primary purpose is to impound water for the PWSB.

Owner: PWSB

¹⁶ *Rawson Pond Dam No. 074 Emergency Action Plan*, RIDEM/RIEMA, 2019..

¹⁷ *Robin Hollow Pond Dam Phase 1 Inspection Report*, PARE Corporation, September 8, 2020.

RI ID #: 081
NID ID #: RI 00805
Type: Earthen Embankment
Tributary: Abbott Run
Height: 13 feet
Storage Capacity: 208 ac/ft
Last Inspection: September 8, 2020
Hazard Classification: Significant Hazard
EAP: August 2019
O & M: No

The PWSB an inspection and evaluation done September 8, 2020. The inspection rated the overall physical condition of the dam as fair, meaning a component requires maintenance.

The consultants (PARE Corporation) who performed the inspection identified deficiencies and made several recommendations, including:

1. Based on the observed pooling of water within the stability concrete units within 10-feet of the left wall, evidence of flow from the weep holes near the bottom of the left channel wall and observed buildup of iron flocculent within the toe drain pipe, there is the potential that the toe perforations are clogged in close proximity to the left channel wall. The toe drain should be thoroughly cleaned of any debris and inspected for additional deficiencies via remote camera.
2. Repair eroded areas along the downstream slope near the right abutment.
3. Provide additional loam and seed throughout the downstream slopes to promote the growth of a healthy stand of grass.
4. Repoint the stone joints where areas of missing mortar are present along the upstream wall along the right abutment.
5. Restore communication/operability of the sonic water level sensor to be able to remotely measure the water elevation within the impoundment.
6. A formalized Operations and Maintenance Manual should be developed for this structure.
7. Repair damaged security fence sections at the right abutment and extend the fence at the left abutment into the impoundment to discourage pedestrian access.
8. Continue regular maintenance of the dam structure.
9. Implement a program of regular inspection and monitoring of the dam (every five years).

Scott Lower Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 617
NID ID #: RI 04410

Type: Unknown
Tributary: Scott Brook
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Scott Upper Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 619
NID ID #: RI 04412
Type: Unknown
Tributary: Scott Brook
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Thornley Farm Pond Dam

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 427
NID ID #: RI 04098
Type: Unknown
Tributary: Abbott Run
Height: Unknown
Storage Capacity: Unknown
Last Inspection: Unknown
Hazard Classification: Low Hazard
EAP: Not required
O & M: Unknown

Valley Falls Pond Dam¹⁸

The RIDEM Office of Safety and Compliance – Dam Safety Program does not maintain any information on private, low-hazard dams.

Owner: Private
RI ID #: 063

¹⁸ <https://data.shreveporttimes.com/dam/rhode-island/providence-county/valley-falls/ri00401/>

NID ID #: RI 00401
Type: Masonry
Tributary: Blackstone River
Height: 31 feet
Storage Capacity: 80 ac/ft
Last Inspection: July 10, 2018
Hazard Classification: Low Hazard
EAP: December 28, 2020
O & M: Unknown

Based on the very low frequency and extensive severity of dam failures since the last plan as scored by the LHMC as indicated in Table 2-3, the Town is considered at moderate risk for future dam failures.

Property at Risk from Flood-Related Hazards in Cumberland

Flooding in Cumberland is primarily associated with areas along the Blackstone River and inland areas due to stormwater collection deficiencies. Also, in addition to various parcels, critical facilities, and vulnerable populations, a number of streets subject to repetitive flooding, recently updated by the Director of Public Works and Highway Superintendent, are included below.

Critical Facilities and Vulnerable Populations

Critical facilities are those public or private facilities that possess added value to the community and deserve additional consideration when determining mitigation strategies to protect these resources from natural hazard risks. Vulnerable populations are those public or private facilities that are host to vulnerable residents – children in day care or schools, seniors living in congregate care settings, or disabled residents living independently in the community.

A list of critical facilities and vulnerable populations provided by the Town were reviewed, updated and approved with minor modifications by the Cumberland LHMC and are presented in Figure A.3 and Tables A-1 and A-2 (Appendix A). A limited number of the Town's critical facilities are located in high hazard areas, including two drinking water wells/pump stations and numerous dams throughout the Town.

Streets/Properties Subject to Flooding

Ann and Hope Way

- Specific Flooding Area: Periodic surcharge and overflow of drains due to Blackstone River elevation during select heavy storm water events.
- Flooding Cause: Flood Plain area.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck.

Bear Hill Road

- Specific Flooding Area: Crestwood Court.
- Flooding Cause: Deteriorated and undersized drainage pipes in conjunction with periodic blockage of pipes with debris.

Crestwood Court

- Specific Flooding Area: Culvert location.
- Flooding Cause: Continual maintenance and clean-out of debris to prevent entering drainage system.

England Road

- Specific Flooding Area: near 371 England Road.
- Flooding Cause: Need to upgrade with additional catch basins and upgrade drainage pipe from 12" to 18".

England Rd.

- Specific Flooding Area: near 295 England Road.
- Flooding Cause: Regular maintenance of catch basins, add additional infiltration galleys

Fairview Avenue

- Specific Flooding Area: Select driveways.
- Flooding Cause: Debris or other extraneous matter clogs slotted pipes across driveways. Pipe jetted to restore drainage capability. Requires periodic monitoring and maintenance.

Follett Street

- Specific Flooding Area: Entire street.
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Franklin Street

- Specific Flooding Area: Dead-end section near Wildwood Drive.
- Flooding Cause: Flood Plain area.
 - Need to perform ongoing maintenance.

Fredrick Lane

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Grundy's Way

- Specific Flooding Area: N/A.
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Hannah Drive

- Specific Flooding Area: Dead end/cul de sac area.
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Highridge Road

- Specific Flooding Area: Entire street.
- Flooding Cause: Continual clogging and blockage of drainage catch basins due to leaves in heavily-treed area. Periodic monitoring and clean-up maintenance required.

Hilltop Road

- Specific Flooding Area: Allens Avenue.
- Flooding Cause: Undersized drainage pipes serve this area. However, there are physical restrictions preventing construction in this area due to the existence of Nation Grid diffuser facilities.

Hines Road

- Specific Flooding Area: Northerly section at Miller's Brook.
- Flooding Cause: Undersized drainage pipes.

Industrial Road

- Specific Flooding Area: Lower and relatively flat section of roadway near Diamond Hill Road adjacent to Okonite commercial property.
- Flooding Cause: Additional catch basins installed, and drainage pipe modifications recently installed to improve drainage. New drainage modifications not in place long enough to subject to sufficient number of heavy storm events to confirm effectiveness. However, other measures will be required at upstream commercial and industrial areas where holding ponds will require maintenance and other onsite drainage improvements to mitigate probable additional flows to this area.

Kings Row

- Specific Flooding Area: N/A.
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Laurel Lane

- Specific Flooding Area: Grandview.
- Flooding Cause: Periodic clogging of slotted drain pipes during interim period of maintenance and cleaning.

Martin Street

- Specific Flooding Area: Blackstone River and railroad area.
- Flooding Cause: Existing flood plain area associated with Blackstone River.
- Supplemental: Possible collapse or deterioration of drains below railroad crossing also contributing to flooding condition.

Maybury Street

- Specific Flooding Area: Entire Street (Meadowcrest subdivision).

- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

New York Avenue

- Specific Flooding Area: Miller's Brook area.
- Flooding Cause: Undersized drainage pipe.

Oakwood Drive

- Specific Flooding Area: Culvert location.
- Flooding Cause: Catch basin and culvert blockage associated with debris and roots which have been removed periodically. Maintenance issue.

Old Reservoir Road

- Specific Flooding Area: Jason's Grant.
- Flooding Cause: Drainage system in this area requires upgrading.

Ridgewood Drive

- Specific Flooding Area: Entire street.
- Flooding Cause: Blockage of drainage pipe as a result of persistent root growth during interim periods of maintenance and removal.
 - Need to replace drainage pipe to eliminate the roots entering the pipe.

Ronald Avenue

- Specific Flooding Area: North Brook area.
- Flooding Cause: Undersized culvert and drainage pipes are the probable cause at this location.

Seneca Street

- Specific Flooding Area: Culvert location.
- Flooding Cause: Undersized culvert pipe is considered the probable cause.

Shirley Drive

- Specific Flooding Area: Swale associated with CVS property.
- Flooding Cause: Deterioration of drainage pipes. Replacement required.

Sneech Pond Road (State road)

- Specific Flooding Area: Entire street.
- Flooding Cause: Impeded drainage. Low points and ponding areas as a result of significantly deteriorated pavement. Requires complete rehabilitation.

Tower Hill Road

- Specific Flooding Area: Diamond Hill Road end.
- Flooding Cause: Silt build-up. Requires dredging and clean-up.

Wildwood Drive

- Specific Flooding Area: Dead-end section.
- Flooding Cause: Existing Flood Plain area.

Windsong Road

- Specific Flooding Area: Entire street.
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Flood Hazard Areas

FEMA Flood Zones

Inland flooding caused by major rainstorms combined with stormwater related issues and increasing development and impervious surfaces has been determined as one of the highest risks of natural disaster to the community. HW performed a Vulnerability Analysis that considered those areas in Town impacted by the various flood zones according to land use type, critical facilities and vulnerable populations, and critical infrastructure. A full Economic Analysis of the impacts based on FEMA's 1% Annual Chance/100-year flood zone follows later in this section (Table 2-17).

AE/100-Year Flood Zone

The AE zone or 100-year flood zone (has a 1% chance of flooding occurring each year) is a regulatory standard used by federal agencies and most states to administer floodplain management programs and is also used by the NFIP as the basis for insurance requirements nationwide. Below is a breakdown of the number of parcels (by land use type), critical facilities and vulnerable populations, and critical infrastructure susceptible to inundation in the AE flood zone:

Parcels affected: (825 Parcels Total)

- Mixed Use: 10
- Vacant: 94 (includes Residential, Commercial and Industrial Vacant Land)
- Commercial: 29 (includes Small and Large Business)
- Residential: 501 (includes Single-, Two-, Three-, Four-, Five-, Six-Family, Condominiums and Residential Apartments)
- Industrial: 13 (includes Industrial and Utility and Railroad)
- Municipal: 66 (includes Municipal Land/Commercial Sites/Residential Sites, Fire, Police, Library and Schools)
- State: 9 (includes State Land/Commercial Sites/Residential Sites)
- Farm/Forest/Open Space: 17
- Cemetery: 3
- Religious: 2
- Tax Sales: 12
- Vote of Town: 4
- Charitable Land: 1

Critical Facilities affected:

- Dams
 - Albion Dam
 - Ashton Dam
 - Diamond Hill Reservoir Dam
 - Pratt Dam
 - Happy Hollow Pond Dam
 - Howard Pond Dam

- Manville Dam
- Rawson Pond Dam
- Robin Hollow Pond Dam
- Duhallow Pond Dam
- Ker-Anna Pond Dam
- Cranberry Bog Dam
- Miscoe Lake Dam
- Valley Falls Pond Dam
- Carl's Pond Dam
- Catamint Dam
- Drinking Water
 - Manville 1 Well/Pump Station
 - Manville 2 Well/Pump Station

Critical Infrastructure affected:

- Silva Street
 - Rear of residential lots adjacent to flood zone
- Ann & Hope Way
 - Commercial businesses along east side of roadway
 - P & W Rail Yard/Rail Crossing
- Mendon Road/Ann & Hope Way intersection
 - Cumberland Manor senior housing
 - Stop & Shop/Commercial Plaza
- Wildwood Street/Franklin Street/Lenox Street/Dixon Street
- River Bank Lane
 - Rear of residential lots adjacent to flood zone
- Martin Street
 - Industrial businesses fronting along the Blackstone River
- Front Street
 - Residential development at Ashton Mill complex
- Blackstone River Bikeway – intermittent sections
- P & W Railroad – intermittent sections
- Albion Road/School Street intersection
- Manville Hill Road (at bridge)
- Monastery grounds – wooded portions
- Salvas Court
- Scott Road
 - Residences along Scott Brook
- Bruce Caldwell Drive
 - Cumberland High School Athletic complex along West Sneeck Brook
- Cozy Lane
 - Rear of residential lots adjacent to flood zone
- Highland Avenue/Morris Street/Williams Street/Amherst Street/Hilltop Road
 - Residential development
- Mill Street (at Happy Hollow Pond Dam)
- Dexter Street (at Robin Hollow Pond dam)

- Curran Road (at Millers River)
- Bonnie Brook Drive/Anna Mack Drive
 - Residences along Long Brook
- Sneece Pond Road/Nate Whipple Highway (at Ash Swamp Brook)
- Pine Swamp Road
- West Wrentham Road/Deer Brook Way
- Summer Brown Road/Burnt Swamp Road/Reservoir Road (at Diamond Hill Reservoir)
- Rawson Road (at Abbot Run/Rawson Pond)

X/500-Year Flood Zone

The X zone or 500-year flood zone (has a 0.2% chance of flooding occurring each year) is a regulatory standard used by federal agencies and most states to administer and inform floodplain management programs. Importantly, properties within the 500-year flood zone, also referred to as an area of moderate flood hazard, are not required to meet the NFIP's insurance requirements. Below is a breakdown of the number of parcels (by land use type), critical facilities and vulnerable populations, and critical infrastructure susceptible to inundation in the X flood zone:

Parcels affected: (292 Parcels Total)

- Mixed Use: 5
- Vacant: 15 (includes Residential, Commercial and Industrial Vacant Land)
- Commercial: 38 (includes Small and Large Businesses)
- Residential: 175 (includes Single-, Two-, Three-, Four-, Five-, Six-Family, Condominiums and Residential Apartments)
- Industrial: 23 (includes Industrial, Utility, and Railroad)
- Municipal: 9 (includes Municipal Land/Commercial Sites/Residential Sites, Fire, Police, Library and Schools)
- State: 3 (includes State Land/Commercial Sites/Residential Sites)
- Tax Sales: 2
- Vote of Town: 4
- Unclassified: 13
- Utility and Railroad: 7

Vulnerable Populations affected:

- Cumberland Manor

Critical Infrastructure affected:

- P & W Railroad – intermittent sections
- Albion Road west of Cumberland Plaza
- Route 116 (George Washington Highway) and P & W Railroad crossing
- Front Street
 - Residential development at Ashton Mill complex
- Martin Street and P & W Railroad crossing
 - Commercial developments along P & W Railroad
- Riverview Drive
 - Rear of residential lots adjacent to flood zone
- Lenox Street

- Residences
- Mendon Road at P & W Railroad crossing
- Ann and Hope Way at P & W Railroad crossing
- Stop & Shop Plaza at Mendon Road
- Meeting Street
 - Rear of commercial parcels along Blackstone River
- Meeting Street/Broad Street intersection

Probability of Future Occurrence of Flood-Related Hazards in Cumberland

As new development and urbanization continues, with the increase of impervious surfaces increasing the rate of drainage collection and reducing the carrying capacity of the land, it is likely interior flooding and stormwater runoff events will also increase on a more frequent basis with even lower storm events. Until the Town permanently addresses the number of streets and properties subject to repetitive flooding identified earlier, the Town will continue to address these areas as needed in the short-term. The presence of the Blackstone River with existing development directly adjacent to its banks, the continuing increase in frequency and severity of events and compounded by stormwater collection deficiencies in inland areas, the Town will continue to be at high risk for flood-related events (Table 2-2 Hazard Index).

2.3.2 Winter-Related Hazards

Winter weather events can include heavy snow, ice, and extreme cold and can affect the entire Town of Cumberland. Heavy snow can bring the community to a standstill by inhibiting mobility (transportation networks, pedestrian travel), knocking down trees and utility lines, and cause structural collapses in older buildings. Ice buildup can down utility lines and communication towers. The impacts of both events can cause indirect issues such as freezing/rupturing pipes from lack of heat, while also changing the ground's frost level, creating problems for underground infrastructure.

Table 2-5 below represents the various significant winter-related hazard events that have occurred in and around the Town of Cumberland over time, utilizing NOAA's National Centers for Environmental Information (<http://www.ncdc.noaa.gov/>). All events are county wide (Providence County), unless otherwise noted.

Table 2-5 Significant Winter-Related Events, Providence County

Hazard Type	Date	Level/Description	Damages
<i>Snow</i>			
	1/2/1996	12"	School/Business closings
	1/7/1996	1' to 2' (Blizzard of 96)	School and commercial closings; transportation interruption
	2/3/1996	6 to 8"	Transportation disrupted
	2/16/1996	6 to 8"	Transportation disrupted
	3/2/1996	6 to 11"	Numerous automobile accidents
	3/7/1996	7.5"	
	4/7/1996	up to 7"	Downed trees/lines; power outages
	4/9/1996	up to 7"	Downed trees/lines; power outages

	12/6/1996	up to 7"	Downed trees/lines; power outages
	1/11/1997	4 to 7"	Numerous automobile accidents
	12/23/1997	6 to 11"	Numerous automobile accidents
	2/25/1999	12"	Schools closed; transportation disrupted
	3/15/1999	7 to 12"	Transportation disrupted; school/commercial closings
	1/13/2000	4 to 7"	Numerous automobile accidents
	1/25/2000	6 to 8"	Transportation disrupted
	2/18/2000	3 to 5"	Treacherous driving
	12/30/2001	7"	
	1/20/2001	up to 8"	Minor accidents; scattered power outages
	2/5/2001	7' to 15"	Scattered power outages; transportation disrupted
	3/5/2001	12"	Schools closed (3 days), transportation disrupted; \$10 M
	3/9/2001	6 to 8"	\$.5 M
	1/25/2002	4 to 7"	Trees/power lines down: \$10 K
	11/27/2002	6 to 8"	Scattered power outages; transportation disrupted
	1/3/2003	5"	
	2/7/2003	12"	
	2/17/2003	22"	
	3/6/2003	9"	\$50 K
	12/5/2003	15"	Transportation disrupted; 2 deaths
	3/16/2004	6"	
	11/12/2004	4 to 8"	
	1/5/2005	5 to 7"	
	1/22/2005	20"	Transportation disrupted
	2/24/2005	5"	
	3/1/2005	4 to 8"	
	3/12/2005	7"	
	3/23/2005	4 to 8"	
	2/12/2006	9 to 14" (nor'easter)	\$10 K
	2/14/2007	2"	
	3/16/2007	4 to 7"	
	12/13/2007	12"	Major transportation disruption
	11/14/2008		Trees/power lines down; \$30 K
	12/19/2008	12"21"	
	12/31/2008	4 to 10"	
	1/18/2009	6 to 7"	
	3/2/2009	7 to 12"	
	12/19/2009	18 to 20"	School closed; transportation disrupted
	12/26/2010	8 to 15"	

	1/12/2011	up to 2'	Roof collapses; transportation disrupted
	1/18/2011	2 to 4"	
	1/21/2011	6 to 9"	
	1/26/2011	12 to 18"	
	2/1/2011	6 to 9"	
	12/29/2012	8 to 13"	
	2/8/2013	2 to 2.5'	Blizzard of 2013
	3/7/2013	1 to 2'	
	12/14/2013	4 - 8"	
	1/2/2014	6 to 9"	
	1/21/2014	10 to 12"	
	2/5/2014	6"	
	2/13/2014	6 to 8"	
	1/24/2015	4 to 7"	
	1/26/2015	1.5 to 3'	Blizzard of 2015
	2/2/2015	4 to 12"	
	2/8/2015	1.5'	
	2/14/2015	8 to 13"	\$50 K
	1/23/2016	5 to 8"	\$50 K
	2/5/2016	5 to 12"	Trees/power lines down/\$50 K damages
	2/8/2016	6 to 9"	Blizzard conditions
	3/21/2016	1 to 6"	
	4/3/2016	3 to 7"	
	4/4/2016	4 to 7"	
	12/17/2016	3 to 5"	
	1/7/2017	8 to 11"	
	1/23/2017		Trees/power lines down
	2/9/2017	10 to 15"	
	3/14/2017	9"	
	12/9/2017	4 to 6"	
	1/4/2018	8 to 14"	Blizzard conditions
	1/30/2018	5 to 7"	
	2/14/2018		Scattered road closures
	2/17/2018	5 to 6"	
	3/7/2018	6 to 13"	
	3/13/2018	13 to 25"	
	11/15/2018	7.5"	
	1/19/2019	3 to 5"	
	3/3/2019	10 to 15"	
	4/18/2020	5 to 6"	
	10/30/2020	5.5"	Trees/power lines down
	12/16/2020	8 to 14"	
	2/1/2021	3"	
	2/7/2021	6 to 11"	

	1/7/2021	10 to 14"	
	1/28/2022	13 to 19"	Blizzard conditions
Blizzard			
	2/8/2013	2 to 2.5 feet	Blizzard conditions
	1/28/2015	1.5 to 2 feet	Blizzard conditions
Ice			
	3/3/1996	40-50 mph winds	Snow squalls
	1/31/1997	freezing rain	Numerous automobile accidents
	1/26/2000	freezing rain	Numerous automobile accidents
	1/30/2001	freezing rain	Numerous automobile accidents
	2/25/2001	freezing rain	Numerous automobile accidents
	2/1/2008	freezing rain/sleet	Numerous automobile accidents; 1 death
	10/29/2011	3 to 6" (nor'easter)	Trees/power lines down
	1/19/2012	2 to 5"	
	1/21/2012	3 to 5"	
	2/29/2012	3 to 6"	
	11/7/2012	2 to 5"	
	2/17/2013	3 to 4"	
	3/18/2013	2 to 5"	
	2/9/2014	ice/freezing rain	
	2/5/2015	2 to 4"	
	2/21/2015	1 to 5"	
	3/1/2015	3 to 5"	
Extreme Cold			
	2/16/2015	wind chill as low as 30 below	
	2/14/2016	wind chill as low as 30 below	

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov.
Data current through September 30, 2022.

Blizzards/Heavy Snow/Nor'easters

Winter storms often include natural hazards such as extreme winds, coastal erosion and flooding. Utility and power lines can break from the weight of snow or ice coupled with strong winds. This could put residents at risk of losing heat, electricity, and water (if using well water). Snow melting poses problems as well such as road flooding in low lying areas. The Town has experienced heavy snow and winter storms which have become more frequent over the past several years.

Heavy snow affects the entire State, but the highest amounts typically occur in the northern and northwestern areas of the State. Usually, the impact and vulnerability of winter weather is measured in terms of the financial costs associated with preparing for, responding to, and recovering from the event. The Town uniformly continues to experience heavy snow and winter storms with greater frequency and severity, as reported by the National Centers for Environmental Information and indicated in Table

2-5 and confirmed by the LHMC. The Town is considered at high risk for snow/blizzards/winter storms/nor'easters.

Climate Change Impacts on Heavy Snow Events

Climate change will result in increased average global temperatures. These impacts are already being felt in New England, as average winter temperatures in the region have risen 3.8°F in the last 30 years. Although at first glance this would appear to make winters less severe the Northeast has experienced the largest increase in extreme precipitation events in the country, which often fall as heavy wet snow in the winter.

Ice/Ice Storms

Ice storms result from the accumulation of freezing rain, or rain that becomes super-cooled and freezes upon impact with cold surfaces. Most commonly, freezing rain occurs in a narrow band within a winter storm that is also producing heavy amounts of snow and sleet in other locations. The Town of Cumberland is uniformly susceptible to the impacts of ice storms. Infrastructure (utility lines/power outages, roads, and bridges) are at great risk from ice storms. Based on the increased frequency and severity of ice storm events over time, as reported by the National Centers for Environmental Information and indicated in Table 2-5, Cumberland is considered to be at moderate risk of any future ice storm events.

Climate Change Impacts on Ice/Ice Storms

Climate change will result in increased average global temperatures, which will likely decrease the number of extreme cold days and in turn, the number of ice/ice storm events.

Extreme Cold

Extreme cold events often accompany winter storms, may be left in their wake, or occur without any associated storm activity, and can lead to hypothermia and frostbite. Extreme cold temperatures vary dependent on the normal climate of the region however, Cumberland can expect to be uniformly affected. For Rhode Island, extreme cold typically means temperatures below zero degrees Fahrenheit. Extreme cold can adversely affect people - some more than others, infants and residents 65 years of age or more are especially vulnerable. Based on the medium frequency and severity of extreme cold events over time, as reported by the National Centers for Environmental Information and indicated in Table 2-5, Cumberland is considered at moderate risk to extreme cold.

Climate Change Impacts on Extreme Cold Temperatures

Climate change will result in increased average global temperatures, which will likely decrease the number of extreme cold days. This decrease in extreme cold days has already been documented and is expected to continue.

Property at Risk from Winter-Related Hazards in Cumberland

New England experiences winter storms in more extreme ways than most of the rest of the country. The Town of Cumberland receives between 36 inches to 72 inches of snow per year (high frequency). The most dangerous hazard associated with winter storms, as it concerns Cumberland, is the possibility of citizens losing power due to downed trees and utility lines (loss of heat, electricity, water, and communications). Other minor

hazards include flooding during snow melt and treacherous roadways due to ice (medium frequency) and snow.

Probability of Future Occurrence of Winter-Related Events in Cumberland

According to past history and climatic conditions, and the inability to predict extreme snow and temperature events, the Town will continue to be at moderate/high risk for winter-related events (Table 2-2 Hazard Index).

2.3.3 Wind-Related Hazards

Wind is the movement of air caused by a difference in pressure from one place to another. Local wind systems are created by the immediate geographic features in a given area, such as mountains, valleys, or large bodies of water. Wind effects can include blowing debris, interruptions in elevated power and communications utilities, and intensification of the effects of other hazards related to winter weather and severe storms.

Rhode Island is susceptible to high wind from several types of weather events: before and after frontal systems, hurricanes and tropical storms, severe thunderstorms and tornadoes, and nor'easters. Based on historical tornado and hurricane data, FEMA has produced a map that depicts maximum wind speeds for design of safe rooms. Rhode Island is located within Wind Zone II, with wind speeds up to 180 mph (Figure 2-3). Rhode Island is also within the Hurricane - Susceptible Region. Rhode Island wind events can produce damage often associated with thunderstorms or tornadoes.

Figure 2-3 Wind Zones in the United States



Source: FEMA

Table 2-6 below represents the various significant wind-related hazard events that have occurred in and around the Town of Cumberland over time, utilizing NOAA's National

Centers for Environmental Information (<http://www.ncdc.noaa.gov/>). All events are county wide (Providence County), unless otherwise noted.

Table 2-6 Significant Wind-Related Events, Providence County

Hazard Type	Date	Level/Description	Damages
Hurricanes			
	9/21/1938	95 mph	\$100 M; 262 deaths
	9/14/1944	82 mph	\$2 M
	8/31/1954	Carol; 110 mph	\$90 M; 19 deaths
	9/11/1954	Edna; 40 mph	\$100 K
	8/19/1955	Diane; 75 mph	\$170 M
	12/12/1960	Donna; 75 mph:	\$2.4 M
	9/27/1985	Gloria; 81 mph	\$19.8 M; 1 death
	8/19/1991	Bob; 63 mph	\$115 M
	8/28/2011	Irene; 60 mph	\$75 K
	10/29/2012	Sandy; 60 mph	\$10 K; trees/power lines down
Tornadoes			
	8/7/1986	F1; .5 miles in length/100 yds. In width	Homes damaged; unfinished condo project suffered extensive loss of plywood; trees/power lines down; \$250 K; 20 injured
	9/23/2011	F0;. 2 miles long/40 yds. wide	\$250 K; 3 injured
Strong Winds			
	1/19/1996	61 mph	Scattered power outages
	1/27/1996	57 mph	
	2/25/1996	67 mph	Trees/power lines down
	7/13/1996	64 mph; (tropical storm Bertha)	Trees/power lines down
	3/6/1997	50 to 60 mph	Trees/power lines down
	3/31/1997		Trees/power lines down
	11/27/1997	40 to 50 mph	
	12/2/1997	40 to 50 mph	
	12/14/1997	40 to 50 mph	
	2/24/1998	40 to 50 mph; (nor" easter)	
	3/9/1998	Blackstone crested at 10.3'	Parking lots flooded with 3' water; scattered power outages
	3/12/1998		
	11/11/1998	52 mph	
	1/3/1999	2.85" in Cumberland	
	1/15/1999	55 mph	
	1/18/1999	55 mph; scattered power outages	

	3/4/1999	50 mph; trees/power lines down	
	3/22/1999	55 mph; scattered power outages	
	9/16/1999	Tropical storm Floyd	Trees/power lines down
	10/14/1999	50 mph	Trees/power lines down
	12/11/1999	50 mph	Trees/power lines down
	11/2/1999	60 mph	Trees/power lines down
	1/16/2000	50 mph	
	2/14/2000	50 mph	
	4/8/2000	50 mph	
	10/28/2000		\$8 K
	12/12/2000	57 mph	Trees/power lines down
	12/17/2000	57 mph	Trees/power lines down
	2/10/2001	50 mph	
	2/17/2001	50 mph	
	12/27/2001	54 mph	\$15 K
	9/11/2002	50 mph; (Hurricane Gustav)	Trees/power lines down; \$15 K
	11/13/2003	57 mph	Trees/power lines down; \$20 K
	11/5/2004	57 mph	Trees/power lines down; \$50 K
	12/1/2004	67 mph	Trees/power lines down; \$20 K
	12/23/2004	67 mph	Trees/power lines down; \$25 K
	3/8/2005	57 mph	Trees/power lines down; \$50 K
	4/2/2005	57 mph	Trees/power lines down; \$35K
	5/7/2005	57 mph	Trees/power lines down; \$15K
	9/29/2005	52 mph	Downed Trees; \$5,000 in damages
	10/16/2005	57 mph	Trees/power lines down; \$25K
	10/25/2005	57 mph; (nor'easter)	Trees/power lines down; \$5K
	1/18/2006	57 mph	\$40 K; tree on house on Cathedral St. in Cumberland
	1/21/2006	57 mph	\$50 K; drive through roof onto car in Cumberland; 2 injured
	10/29/2006	57 mph	Trees/power lines down; School St. closed temporarily; \$10K
	12/1/2006	57 mph	Trees/power lines down; \$10K; 1 injured
	2/10/2008	66 mph	Trees/power lines down; \$5K
	3/8/2008	59 mph	
	1/25/2010	60 mph	Tress/power lines down; Nate Whipple Highway closed temporarily; \$10 K

	12/8/2011	63 mph	
	1/20/2013	46 mph	\$5 K
	11/27/2013	46 mph	\$3 K
	1/31/2013	64 mph; (tropical storm Bertha)	Trees/power lines down; \$25K
	4/4/2015	47 mph	\$25K
	10/29/2015		\$2 K/Tree down
	2/16/2016	60 mph	\$25 K
	3/17/2016		\$15 K/Trees and power lines down
	3/31/2016		\$10 K/Trees and power lines down
	4/1/2016		\$10 K/Trees and power lines down
	9/5/2016		\$10 K
	10/23/2016	42 mph	\$300
	11/21/2016	45 to 50 mph	\$600/Tree down on car Manville Hill Rd.
	1/24/2017		\$11 K/Power outages Cumberland Hill
	10/24/2017	45 to 50 mph	\$3 K
	10/29/2017		Trees down
	4/16/2018		\$1 K
	10/15/2018	55 mph	\$1 K
	11/3/2018	40 to 60 mph	
	1/30/2019	60 to 70 mph	\$1.5 K/Trees down Thompson Hill R.
	10/16/2019	45 to 55 mph	
	11/1/2019	50 to 80 mph	\$1.5 k/Trees and power lines down
	2/7/2020	50 to 60 mph	Widespread power outages
	2/27/2020		
	4/13/2020	45 to 50 mph	Trees/power lines down
	5/9/2020		
	10/7/2020		\$4 K
	11/30/2020		Trees down Pennsylvania Ave. and Reservoir Rd.
	8/4/2020		\$2.8 K/Trees down Abbott Run Valley Rd. (Tropical storm)
	10/10/2020	45 to 50 mph	\$800
	12/5/2020	45 to 45 mph	\$2 K/Tree down on Farm Drive
	12/25/2020	40 to 60 mph	\$1.6 K/Trees and power lines down Tower Hill Rd.
	3/1/2021		Tree down of home Cedar Way
	3/29/2021	50 to 60 mph	\$1 K/Tree down Elm St.
	4/30/2021		\$1 K
	8/22/2021	40 to 50 mph	\$80 K/Trees down (Tropical storm Henri)
	10/27/2021	60 to 90 mph	
	12/11/2021		\$1.8 K/Trees and power lines down
	1/17/2022		\$1 K

<i>Thunderstorms</i>			
	16 events 6/19/57 through 4/4/95		
	7/15/1995	63 mph	
	7/19/1999	57 mph	Trees/power lines down
	4/9/2000	57 mph	Trees/power lines down
	8/5/2005	57 mph	Trees/power lines down; \$5 K; Trees down on Interstate 295 near exit 10 in Cumberland
	8/6/2011	57 mph	\$5 K; trees down on Wrentham Rd. in Cumberland
	7/23/2016		\$.5 K/Trees down Wrentham Rd.
	8/6/2016		\$5 K/Trees down of car Mendon Rd.
	10/7/2020	61 mph	Trees./power lines down
	7/27/2021		\$.5 K/Tree blocking intersection Diamond Hill Rd./Nate Whipple Highway
<i>Hail</i>			
	5/17/1965	1.25" in diameter	
	5/29/2009	1.0" in diameter	
	5/11/1973	0.75" in diameter	
	6/27/1992	0.75" in diameter	
	8/10/2002	1.75" in diameter	
	6/20/2006	0.75" in diameter	
	7/2/2008	0.88" in diameter	
	7/18/2012	2.0" in diameter	
	7/17/2021	0.75" in diameter	
	9/28/2021	0.75" in diameter	

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov.
Data current through September 30, 2022.

Hurricanes

Hurricanes are defined as a large circulating windstorm covering hundreds of miles that forms over warm ocean water. To be officially classified as a hurricane, the wind speeds must exceed 74 miles per hour. In the northern hemisphere winds circulate in a counter clockwise direction. A great dome of water as much as fifty miles in diameter (called the “storm surge”) is pushed ahead of the storm by its winds. In some coastal locations, this can result in tides 20 feet higher than usual. Occasionally, storm surge is responsible for damage to property and potential deaths.

The winds that accompany hurricanes have the potential to cause serious damage. Downed power lines leave residents without electricity and can impede business for days. Fallen trees can damage buildings and block roadways. Unsecured building components including gutters, screened enclosures, roof coverings, shingles, car ports, porch coverings, overhangs, siding, decking, windows, walls, gables can be blown off

structures and carried by the wind to cause damage in other places. Wind driven rain often causes water damage in roof and wall envelopes.

Measuring the Intensity of a Hurricane

Hurricane damages come from wind, rain, tornadoes, floods/storm surge, and the effects of very low air pressure. The Saffir-Simpson Hurricane Wind Scale (SSHWS) intensity category system was developed in the 1970's to characterize a hurricane's destructive potential by indicating wind speeds and range of damage, see Table 2-7 below. The SSHWS category system measures sustained wind speed, central pressure, storm surge height, and coastal damage potential within five intensity categories.

Table 2-7 Saffir-Simpson Hurricane Wind Scale

Scale No. (Category)	Wind (mph)	Potential Damage
1	74 - 95	Minimal: Damage is primarily to shrubbery and trees, mobile homes, and some signs. No real damage is done to structures.
2	96 – 110	Moderate: Some trees topple, some roof coverings are damaged, and major damage is done to mobile homes.
3	111 – 130	Extensive: large trees topple, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.
4	131 – 155	Extreme: Extensive damage is done to roofs, windows and doors; roof systems on small buildings completely fail; and some curtain walls fail.
5	> 155	Catastrophic: Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures, and entire buildings could fail.
Additional Classifications		
Tropical Storm 39 – 73		
Tropical Depression < 38		

Source: NOAA.

The National Weather Service (NWS) will issue a hurricane warning when sustained winds of 74 mph or higher are reached and expected within a coastal area within 24 hours. On average, there are approximately 10 named tropical storms along the east coast of the U.S. each year, six of which are likely to develop into hurricanes, with only two or three likely to reach category 3 on the SSHWS. The SSHWS completed a minor modification in 2012 in order to resolve awkwardness associated with conversions among the various units used for wind speed in advisory products. The change broadens the Category 4 wind speed range by one mile per hour (mph) at each end of the range, yielding a new range of 130-156 mph. Figure A.2 Hurricanes (Appendix A) shows historic tracks of hurricane events over time, as confirmed by the LHMC.

Although Rhode Island has not been hit by intense hurricanes (Category 4 or 5) as seen in other parts of the East Coast, the state has had its share of major hurricanes that have caused extensive damage. In the sixteen-year period from 1938 to 1954, Rhode Island experienced three major hurricanes that caused a tremendous amount of damage and resulted in almost 300 deaths. The great unnamed hurricane of 1938 devastated Rhode Island and caused \$100 million dollars in property damage and claimed 262 lives. Hurricane Carol in August of 1954 caused similar damage dollar

wise, but fortunately resulted in the loss of only 19 lives. Even though Rhode Island has not had significant hurricanes as severe as these in the last 50 years, the state has had several that have resulted in several million dollars in property damage. The wind and rain that precede a hurricane can cause severe damage even to communities that are further inland, such as Cumberland. Therefore, the threat of a hurricane to this community and the resulting wind and rain damage needs to be considered.

Based on the medium frequency and extensive severity of hurricane events over time, as reported by the National Centers for Environmental Information and indicated in Table 2-6 and confirmed by the LHMC, Cumberland is considered at high risk to future hurricanes.

Climate Change Impacts on Hurricanes

Climate change is expected to result in the increased frequency and intensification of hurricanes and tropical storms worldwide. Rising sea levels, coupled with potentially higher hurricane wind speeds, rainfall intensity, and storm surges will combine to create more intense hurricanes, resulting in increased impacts to communities. Research predicts a global increase in the intensity of such storms on average, by 2% to 11%, based on the IPCC mid-range emission scenario projections, as well as a poleward expansion in the latitude at which storms will reach their highest intensity. Some experts have noted that the three massive storms from the 2017 hurricane season (Harvey, Irma, and Maria) are consistent with this expected intensification.

Hurricanes and tropical storms are expected to result in more rainfall. This increase has been observed and is expected both globally (IPCC 2014) and for the Atlantic basin, including the U.S. east coast. Based on a synthesis of current science, NOAA predicts that Atlantic hurricanes and tropical storms in the coming century will have higher rainfall rates than present storms, especially near the center of the storm. Hurricane Harvey, which resulted in a record 51.9 inches of rainfall at one station west of Houston, Texas, is one recent example of this trend.

Tornadoes/High Winds

Tornadoes are violently rotating columns of air in contact with and extending between a cloud and the surface of the earth. Generally, winds in most tornadoes are 100 mph or less, but can exceed 250 mph in the most violent and least frequent tornadoes. Several conditions are required for the development of tornadoes and associated thunderstorm clouds, including abundant low-level moisture to contribute to the development of a thunderstorm, along with a trigger/cold front to lift the moist air. Tornadoes usually form in areas where strong winds are turning in a clockwise direction and can be in the traditional funnel shape, or in a slender rope-like form. They typically begin in a supercell (severe thunderstorm), primarily in the month of May.

Wind is the motion of air past a given point caused by a difference in pressure from one place to another. Severe wind poses a threat to Rhode Island in many forms, including that produced by severe thunderstorms and tropical weather systems. The effects can include blowing debris, interruptions in elevated power and communications utilities and intensified effects of winter weather. Harm to people and animals as well as damage to property and infrastructure may be the result. Two basic types of damaging wind events other than tropical systems affect Rhode Island: synoptic-scale winds and thunderstorm

winds. Synoptic-scale winds are high winds that occur typically with cold frontal passages or Nor'easters. When thunderstorm winds exceed 58 MPH, the thunderstorm is considered severe, and a warning is issued. "Downbursts" cause the high winds in a thunderstorm. Downburst winds result from the sudden descent of cool or cold air toward the ground. As the air hits the ground, it spreads outward, creating high winds. Unlike tornadoes, downburst winds move in a straight line, without rotation. The term "microburst" refers to a small downburst with damaging winds up to 168 MPH and less than 2.5 miles in length. The term "macroburst" refers to a large downburst that can extend greater than 2.5 miles with winds up to 134 MPH and can last five (5) to 30 minutes.

Measuring the Intensity of a Tornado

Typically, tornadoes are categorized by frequency values from historic data and area impacted based on the length and width of the damage path. Tornado damage severity is measured by the Fujita Tornado Scale, where wind speed is estimated from the amount of damage. As of February 1, 2007, the National Weather Service began rating tornadoes using the Enhanced Fujita-scale (Table 2-8). The Enhanced Fujita scale is more complicated than the original F-scale, allowing for more precise assessments of tornado severity.

Table 2-8 Enhanced Fujita Scale

Fujita Scale			Derived		Operational EF Scale	
F Number	Fastest ¼ mile (mph)	3-second gust (mph)	EF Number	3-second gust (mph)	EF Number	3-second gust (mph)
0	40 - 72	45 - 78	0	65 - 85	0	65 - 85
1	73 - 112	79 - 117	1	86 - 109	1	86 - 110
2	113 - 157	118 - 161	2	110 - 137	2	111 - 135
3	158 - 207	162 - 209	3	138 - 167	3	136 - 165
4	208 - 260	210 - 261	4	168 - 199	4	166 - 200
5	261 - 318	262 - 317	5	200 - 234	5	Over 200

Source: NOAA.

Tornadoes are a rare occurrence in Rhode Island and there is no known tornado history in Cumberland. Based on the very low frequency of tornadoes over time, the Town of Cumberland is considered at low risk of future tornadoes. Based on the medium frequency and extensive severity of high winds over time as reported by the National Centers for Environmental Information and indicated in Table 2-6 and confirmed by the Cumberland LHMC, the Town of Cumberland is considered at high risk to future high wind events.

Lightning/Thunderstorms

Thunderstorms are formed when the right atmospheric conditions combine to provide moisture, lift, and warm unstable air that can rise rapidly. Thunderstorms occur any time of the day and in all months of the year but are most common during summer afternoons and evenings and in conjunction with frontal boundaries. Thunderstorms

affect a smaller area compared with winter storms or hurricanes, but they can be dangerous and destructive for a number of reasons. Storms can form in less than 30 minutes, giving very little warning; they have the potential to produce lightning, hail, tornadoes, powerful straight-line winds, and heavy rains that produce flash flooding.

All thunderstorms produce lightning, and therefore all thunderstorms are dangerous. Lightning often strikes outside of areas where it is raining and may occur as far as 10 miles away from rainfall. It can strike from any part of the storm and may even strike after the storm has seemed to pass. The Town of Cumberland can be uniformly affected by lightning and thunderstorms, dependent upon the time of day, existing/incoming weather conditions, and time of year.

Building construction, location, and nearby trees or other tall structures will have a large impact on how vulnerable an individual facility is to a lightning strike. A rough estimate of a structure's likelihood of being struck by lightning can be calculated using the structure's ground surface area, height, and striking distance between the downward-moving tip of the stepped leader (negatively charged channel jumping from cloud to earth) and the object. In general, buildings are more likely to be struck by lightning if they are located on high ground or if they have tall protrusions such as steeples or poles which the stepped leader can jump to. Electrical and communications utilities are also vulnerable to direct lightning strikes. Damage to these lines has the potential to cause power and communications outages for businesses, residences, and critical facilities. Based on the medium frequency of lightning/thunderstorm events over time, as reported by the National Centers for Environmental Information indicated in Table 2-6 and confirmed by the Cumberland LHMC, the risk of lightning/thunderstorms is considered moderate in Cumberland.

Hail

Hail is formed in towering cumulonimbus clouds (thunderheads) when strong updrafts carry water droplets to a height at which they freeze. Eventually, these ice particles become too heavy for the updraft to hold up, and they fall to the ground at speeds of up to 120 MPH. Hail falls along paths called swaths, which can vary from a few square acres to up to 10 miles wide and 100 miles long. The Town of Cumberland can be uniformly affected by hail, dependent upon the existing/incoming weather conditions, and time of year.

Structure vulnerability to hail is determined mainly by construction and exposure. Metal siding and roofing is better able to stand up to the damages of a hailstorm than many other materials, although it may also be damaged by denting. Exposed windows and vehicles are also susceptible to damage. Crops are extremely susceptible to hailstorm damage, as even the smallest hail stones can rip apart unsheltered vegetation. Based on the medium frequency of hail events over time, as reported by the National Centers for Environmental Information indicated in Table 2-6 and confirmed by the Cumberland LHMC, the risk of hail is considered moderate in Cumberland.

Property at Risk from Wind-Related Events in Cumberland

Wind events are quite normal in New England and happen regularly each year. In the winter months, the Town of Cumberland is susceptible to high winds from nor'easters and winter storms. Spring and summer seasons usually bring a number of severe

thunderstorms to the region. During the late summer and fall seasons, the area is at risk from a hurricane or tropical event.

Probability of Future Occurrence of Wind-Related Hazards in Cumberland

As previously stated, wind events are quite normal in New England, as evidenced throughout the year. Given the increase in frequency and severity of high wind events realized over the last several years, the Town will continue to be at high risk for serious damages at a medium/regional level for wind-related events (Table 2-2 Hazard Index).

2.3.4 Geologic-Related Hazards

Earthquakes

An earthquake is the sudden release of strain energy in the Earth's crust, resulting in energy waves that radiate outward from the earthquake source. The point on the Earth's surface directly above the focus is called the earthquake epicenter. The severity of earthquake effects is dependent upon magnitude of energy released; proximity to the epicenter; depth to the epicenter; duration; geologic characteristics; and type of ground motion.

When earthquakes occur, much of the damage is a result of structures falling under the stress created by the ground movement. Another significant effect is damage to the public and private infrastructure (i.e., water service, communication lines, drainage system). Because earthquakes are highly localized it is difficult to assign regional boundaries that share the same relative degree of risk.

For this 2023 Update, geologic-related events include earthquakes. Table 2-9 below represents the various significant geologic-related hazard events that have occurred outside of Providence County and Cumberland more specifically but have resulted in secondary effects (rumbling and vibrations) felt in Providence County, utilizing NOAA's National Climatic Data Center (<http://www.ncdc.noaa.gov/>).

Table 2-9 Significant Geologic-Related Events, Providence County

Hazard Type	Date	Point of Origin	Magnitude/Impact on Rhode Island
<i>Earthquakes</i>			
	2/28/1925	St. Lawrence River region	Intensity V effects felt on Block Island and in Providence, Intensity IV effects felt in Charlestown.
	11/19/1929	Grand Banks of Newfoundland	Moderate vibrations felt on Block Island and on Chepachet, Newport, Providence and Westerly.
	11/1/1935	Quebec, Canada	A magnitude of 6.25 with intensity IV felt on Block Island and in Providence and Woonsocket.
	12/20/1940	Lake Ossipee, NH	Intensity V affects knocked pictures off walls in Newport. Intensity IV effects were felt at Central Falls, Pascoag, Providence and Woonsocket. Intensity I-III effects were felt at Kingston, New Shoreham and Wakefield.
	9/4/1944	Massena, NY	Intensity I-III was reported in Kingston, Lonsdale, Providence, Wakefield and Woonsocket.

	10/16/1963	Coast of Massachusetts	A magnitude 4.5 quake caused Intensity V to be felt in Chepachet with reports of some cracked plaster. There were also reports of rattling windows and dishes and rumbling earth sounds. Other Northern RI locations felt the tremor but with less intensity.
	12/7/1965	Unknown	Windows and doors shook in Warwick and furniture and small objects moved in Cumberland.
	2/3/1973	Unknown	Explosion like or sonic boom noises were heard throughout RI and houses and windows shook, but nothing was reported by seismographs.
	6/14/1973	Western Maine	Intensity IV effects felt at Charlestown and Intensity I-III felt at Cumberland, E. Providence, Harmony and Providence.
	3/11/1976	Newport, RI	Intensity VI, magnitude 3.5
	10/6/2003	West Warwick	A magnitude of 1.8 caused minor shaking in the Community, no damage reported.

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov.
Data current through September 30, 2022.

Measuring the Intensity of an Earthquake

An earthquake's severity can be expressed in terms of intensity and magnitude. Intensity is defined by the observed effects of ground shaking on people, buildings, and the natural environment, which varies depending upon the location of the observer with respect to the epicenter. Currently in the U.S., the Modified Mercalli (MMI) Intensity Scale is used to evaluate the effects of earthquakes – specifically, it describes how strongly an earthquake was felt at a particular location, Table 2-10 below. Magnitude is defined by the amount of seismic energy released at the hypocenter of the earthquake, based on the amplitude of the earthquake waves recorded on seismographs (using the Richter Magnitude Scale, Table 2-11). Another measure of the relative strength of an earthquake is the expanse of area the shaking is noticed.

Table 2-10 Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Felt by very few people, barely noticeable.
II	Felt by few people, especially on upper floors.
III	Noticeable indoors, especially on upper floors, but may not be recognized as an earthquake.
IV	Felt by many indoors, few outdoors. May feel like passing truck.
V	Felt by almost everyone, people have trouble standing. Small objects move, trees and poles may shake.
VI	Felt by everyone, people have trouble standing. Heavy furniture can move, plaster can fall off walls. Chimneys may be slightly damaged.
VII	People have difficulty standing. Drivers feel cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings.

VIII	Buildings suffer slight damage if well-built; severe damage if poorly built. Some walls collapse.
IX	Considerable damage to specially built structures; buildings shift off their foundations. The ground cracks. Landslides may occur.
X	Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas.
XI	Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed.
XII	Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move.

Source: USGS, 2012.

Table 2-11 Richter Magnitude Scale

Richter Magnitude	Earthquake Effects
2.5 or less	Not felt or felt mildly near the epicenter, but can be recorded by seismographs
2.5 to 5.4	Often felt, but only causes minor damage
5.5 to 6.0	Slight damage to buildings and other structures
6.1 to 6.9	May cause a lot of damage in very populated areas
7.0 to 7.9	Major earthquake; serious damage
8.0 or greater	Great earthquake; can totally destroy communities near the epicenter

Source: USGS, 2012.

Rhode Island has a 2% chance that an earthquake with a peak horizontal acceleration of 50 km above magnitude will occur within the next 50 years. A 'G' is the average acceleration produced by gravity at the earth's surface (9.80665 meters per second squared). This measurement describes ground shake during earthquakes. The impact of an earthquake on the Town would be devastating.

There is no known earthquake history/activity for Cumberland. Based on the medium frequency of earthquake events over time included in Table 2-9 and confirmed by the Cumberland LHMC, the risk of future earthquakes is considered moderate in Cumberland.

Property at Risk from Geologic-Related Hazards in Cumberland

All structures in Cumberland are potentially vulnerable to seismic ground shaking. The most vulnerable are historic buildings constructed of unreinforced masonry. Other critical facilities or infrastructure at risk are unknown; their construction determines their ability to withstand seismic shaking. As reported in Table 2-9, the Town has experienced secondary effects from both regional events and longer-distance events emanating from the northeast in general. However, since building codes do not require seismic proofing, the impact would be expected to be severe if an earthquake were to hit the Town of Cumberland.

Probability of Future Occurrence of Geologic-Related Hazards in Cumberland

New England is not considered to be a hot spot for earthquakes, especially when compared to the western United States. Given the historic pattern of earthquakes, or more specifically the secondary impacts of earthquakes felt across the region (which has been the historic pattern), the Town will continue to be at moderate risk for future geologic-related events (Table 2-2 Hazard Index).

2.3.5 Drought-Related Hazards

Drought is a temporary irregularity characterized by long durations of below normal precipitation. Drought occurs in virtually all climatic zones yet varies significantly from one region to another, due to its relationship to normal precipitation in that specific region. Drought can affect agriculture, water supply, aquatic ecology, wildlife, and plant life.

Drought can be defined or grouped by the following:

- Meteorological drought is a measure of departure of precipitation from normal, defined solely on the degree of dryness.
- Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts with a focus on precipitation shortages, differences between actual and potential evapo-transpiration, soil water deficits, reduced groundwater or reservoir levels, etc.
- Hydrological drought is associated with the effects of precipitation (including snowfall) shortfalls on surface or subsurface water supply and when water supplies are below normal.
- Socioeconomic drought is associated with the supply and demand of some economic goods with elements of meteorological, hydrological, and agricultural drought.

The U.S. Drought Monitor includes five classifications for drought, including:

- DO: Abnormally Dry...short-term dryness slowing plant/crop progress
- D1: Moderate Drought...some damage to crops, voluntary water-use restrictions requested
- D2: Severe Drought...Crop/pasture losses likely, water restrictions imposed
- D3: Extreme Drought...Major crop/pasture losses, widespread water restrictions
- D4: Exceptional Drought...Widespread crop/pasture losses, water shortages creating emergencies

The Town of Cumberland can expect to be uniformly affected by drought conditions. Table 2-12 below represents the significant drought-related hazard events that have occurred in and around the Town of Cumberland over time, utilizing NOAA's National Centers for Environmental Information (<http://www.ncdc.noaa.gov/>) and Drought.gov website (<https://www.drought.gov/location/Cumberland,%20RI,%20USA>). All events are county wide (Providence County), unless otherwise noted.

Table 2-12 Significant Drought-Related Events, Providence County

Hazard Type	Date	Level/Description	Damages
<i>Drought</i>			
	4/12/2012	Half the normal precipitation reported Jan. 2012 to April 2012	
	8/2/2016	Below normal precipitation reported March to August	
	9/1/2016	Severe drought (D2) thru September	
	10/1/2016	Severe drought (D2) through October 25th	
	11/1/2016	Moderate drought (D1) through the end of the month	
	8/15/2020	Severe (D2)/Extreme (D3)/Severe (D2) drought mid-August through early November	
	7/15/2022	Severe (D2)/ Extreme (D3)/Severe (D2) drought mid-July through mid-September	

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov, Drought.gov, <https://www.drought.gov/location/Cumberland,%20RI,%20USA>.

Data current through September 30, 2022.

Based on the medium frequency of drought events as reported by the National Centers for Environmental Information and Drought.gov, as indicated in Table 2-12 and confirmed by the Cumberland LHMC, the risk of drought is considered moderate in Cumberland.

Climate Change Impacts on Drought-Related Hazards

Climate change will result in increased average global temperatures, which will likely decrease the number of extreme cold days.

Property at Risk from Drought-Related Hazards in Cumberland

Past drought events in RI have affected the entire state. Summer dry spells, during which crops and lawns may require irrigation, are fairly common. Farmers can lose livestock or crops or pay substantially more to produce a year's crop. Water suppliers may lose income if they impose restrictions or face increased costs for developing alternate water supplies. In addition, Rhode Island relies heavily on tourism. Use restrictions/limitations can significantly decrease revenues realized from tourism. Cumberland can be uniformly affected by drought-related hazard events. Of most concern are residents living without air-conditioning units, or the means to stay hydrated and cool, making them vulnerable to dehydration, injury or even death.

Probability of Future Occurrence of Drought-Related Hazards in Cumberland

Two notable, multi-month drought events have impacted Providence County since the 2017 Plan (2020 and 2022). For this update, Cumberland is considered at moderate risk for future drought-related events (Table 2-2 Hazard Index).

2.3.6 Extreme Heat – Related Hazards

Extreme heat occurs when a system of high atmospheric pressure moves into an area. In such a high-pressure system, air from upper levels of our atmosphere is pulled toward the ground, where it becomes compressed and increases temperatures. This high concentration of pressure makes it difficult for other weather systems to move into the area, which is why periods of extreme heat can last for several days, or even weeks. The longer the system stays in an area, the hotter temperatures become. The high pressure inhibits winds, making them faint to almost non-existent. Because the high-pressure system also prevents clouds from entering a region, sunlight can become punishing, increasing temperatures even more. The combination of all these factors come together to create what is known as a heat wave. Typically, a heat wave can last two or more days with significant impacts on human health and/or infrastructure.

Table 2-13 below represents the various significant Extreme Heat-related hazard events that have occurred in and around the Town of Cumberland over time, utilizing NOAA's National Centers for Environmental Information (<http://www.ncdc.noaa.gov/>). All events are county wide (Providence County), unless otherwise noted.

Table 2-13 Significant Extreme Heat-Related Events, Providence County

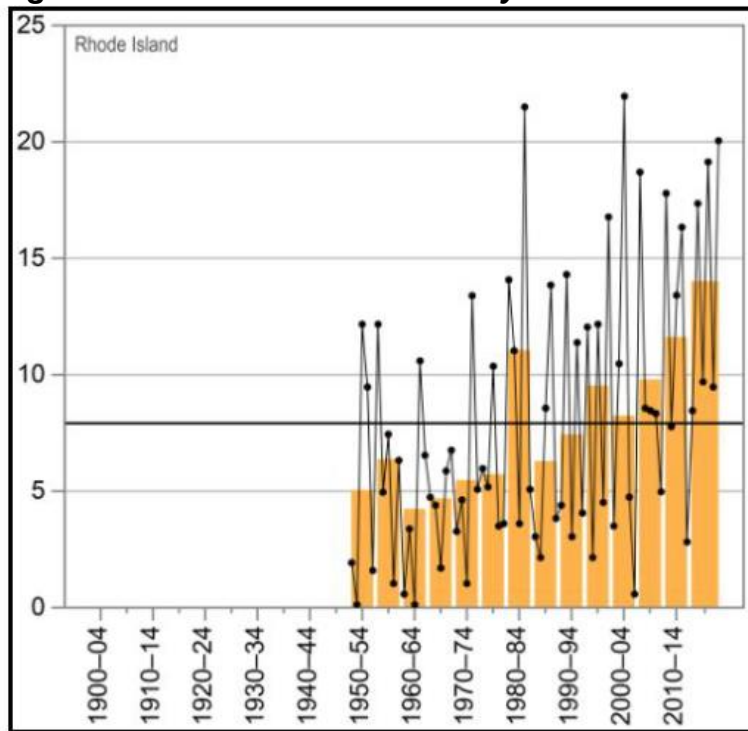
Hazard Type	Date	Level/Description	Damages
<i>Extreme Heat</i>			
	7/6/2010	Heat Index at 100 - 104 degrees for several days	
	7/22/2011	Temperature at/above 105 degrees for several hours	

Source: NOAA National Centers for Environmental Information, www.ncdc.noaa.gov.
Data is current through September 30, 2022.

Figure 2-4 details the annual number of hot days (maximum temperature of 90° F or higher) for Rhode Island from 1950 – 2020. Dots show annual values, bars show averages over 5-year periods, and the horizontal black line shows the long-term (entire period) average of 7.9 days. The number of hot days has been above average since the mid-1990s, with the highest number hot days occurring in the most recent 6-year period (2015 – 2020), with an average of 14 hot days occurring each year.¹⁹

¹⁹ NOAA National Centers for Environmental Information, *State Climate Summaries 2022*, <https://statesummaries.ncics.org/chapter/ri/>.

Figure 2-4 NOAA's Number of Days with Maximum Temperature of 90° F or Higher

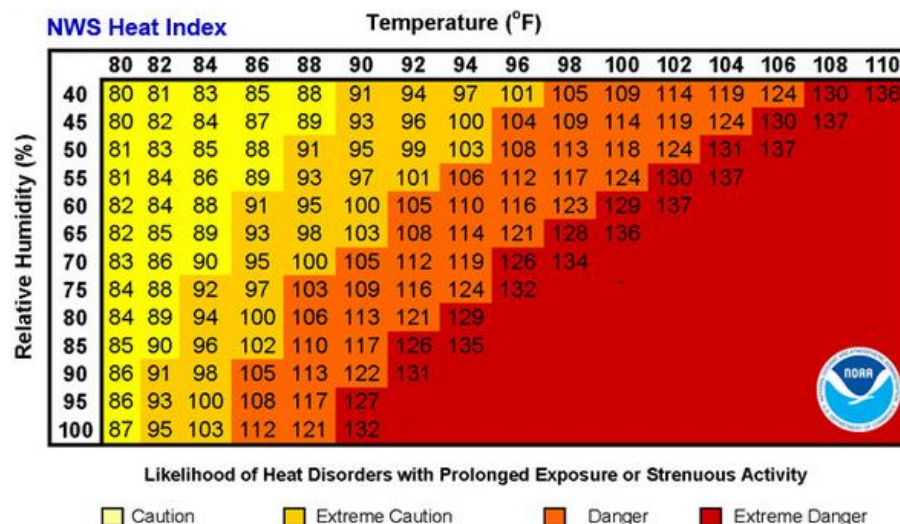


Source: NOAA National Centers for Environmental Information, *State Climate Summaries 2022*, <https://statesummaries.ncics.org/chapter/ri/>.

NOAA's NWS maintains a Heat Index (Figure 2-5), which is a measure of how hot it really feels when relative humidity is also factored in with actual air temperatures. As an example, if the air temperature is 96°F and the relative humidity is 65%, the heat index, how hot it feels, is 121°F. The NWS also initiates alert procedures when the Heat Index is expected to exceed 105°-110°F (depending on local climate) for at least two consecutive days:

- Caution – fatigue possible,
- Extreme Caution – sunstroke, muscle cramps, and/or heat exhaustion possible,
- Danger – sunstroke, muscle cramps, and/or heat exhaustion likely, and
- Extreme Danger – heat stroke or sunstroke highly likely.

Figure 2-5 NOAA's National Weather Service Heat Index



Source: <https://www.weather.gov/phi/heatcond>

Based on the medium frequency of extreme heat events as reported by the National Centers for Environmental Information and indicated in Table 2-13, also confirmed by the Cumberland LHMC, the risk of extreme heat events is considered moderate in Cumberland.

Climate Change Impacts on Extreme Heat

More intense and prolonged heat waves are predicted with climate change. The frequency of days with high temperatures at or above 90°F has already increased (Vallee and Giuliano, 2014). The average number of days expected to be above 90°F from 1970 – 2000 is sixty, while projections for the end of the century (2090s) is projected to be seventy.

Extreme heat events (i.e., heat waves) will increase, endangering those who work outdoors, the elderly, the homeless, those with chronic health conditions, and people who cannot afford air conditioning.

Property/People at Risk from Extreme Heat-Related Hazards

Extreme heat-related conditions can have both short- and long-term impacts on a community, including:

Social Impacts

Increased demand on emergency, health, and social services and support:

- Impacts to vulnerable populations (elderly, homeless, special needs, and those with chronic health conditions) will be exacerbated (potential for cardiovascular and respiratory complications).
- Can endanger those who work outdoors.
- Increased demand for comfort/cooling stations (emergency services).
- Stressors (mental health) on those who do not have/can't afford air conditioning.
- Increased demands on emergency personnel and medical facilities.

Infrastructure Impacts

Disruptions to critical infrastructure with cascading effects:

- Increased electricity demand for cooling which can lower the ability of transmission lines to carry power.
- Impacts on transportation systems:
 - Higher temperatures can cause pavement to soften and expand causing rutting/potholes, stress bridge joints, and limit construction activities outdoors.
- Disruptions to water distribution systems:
 - Limited supply of water sources and quality of water sources.

Environmental/Built Environment Impacts

Compromised environmental conditions:

- Particularly damaging to agriculture (crops/livestock) stressing water supply sources (economic impacts and food security).
- Excessively dry ground conditions can be susceptible to subsidence and exacerbate stormwater runoff.
- Compromised air quality conditions can result in increased hospital admissions for heat-related illness.
- Potential for drought (s) to exacerbate conditions for wildfires.

Probability of Future Occurrence of Extreme Heat-Related Hazards

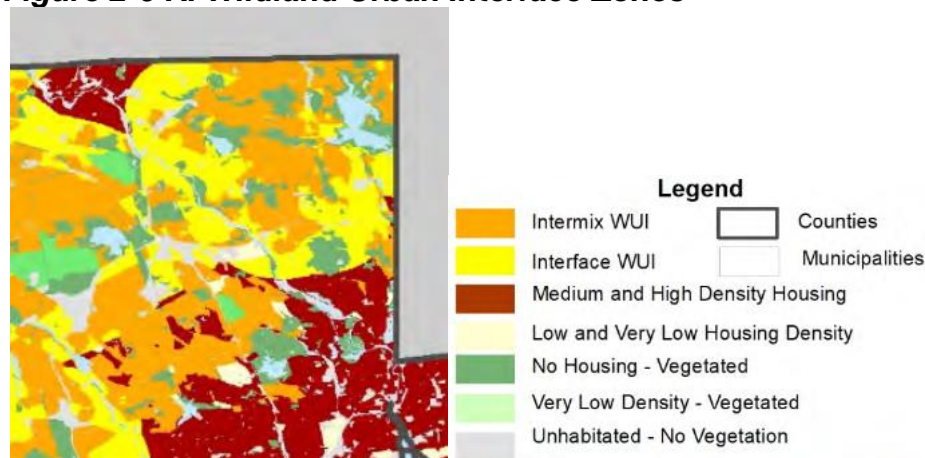
As more intense and prolonged heat waves are predicted with climate change, so is the frequency of days with high temperatures at or above 90°.

2.3.7 Brushfire/Wildfire - Related Hazards

Brushfires/Wildfires are defined as any non-structure fire that occurs in the vegetative wildland, including grass, shrub, leaf litter/debris, and forested tree fuels. Most susceptible to the hazard are pitch pine, scrub oak, and oak forests – the most flammable vegetative fuels. Small brushfires/wildfires are common throughout the State, especially when drought or near-drought conditions warrant, the potential for spreading wildfires is real. The State's Wildland Urban Interface (WUI) – the area where structures and human development meet and intermingle with undeveloped wildland, creates an environment in which fire can move readily between structural and vegetative fuels. The State's WUI includes the Intermix WUI – areas where housing and vegetation intermingle²⁰, mapped in red as shown below (Figure 2-6 as part of the State's Hazard Mitigation Plan. Intermix WUI areas identified in Cumberland include woodland portions of the Town, particularly, the northern portion at Diamond Hill State Park and the woods surrounding the Pawtucket Reservoir, and the large open space parcels, most of which abut residential neighborhoods, particularly adjacent to the Monastery grounds.

²⁰ Radeloff, V.C., R.B. Hammer, S.I. Stewart, J.S. Fried, S.S. Holcomb, and J.F. McKeefry. 2005. *The Wildland Urban Interface in the United States*. Ecological Applications 15:799-805.

Figure 2-6 RI Wildland Urban Interface Zones



Source: State of Rhode Island State Hazard Mitigation Plan Update, December 2018.

The impact and vulnerability to brushfire/wildfire is influenced by a variety of factors, such as land cover conditions, weather and the effectiveness of land management techniques. Suburban neighborhoods located at the WUI are very vulnerable to brushfire/wildfire. Individual buildings may be more or less vulnerable to damage from wildfire based on factors such as the clear distance around the structure, and the structure's construction materials. A fire in any of these areas would quickly overwhelm local resources and could possibly threaten homes nearby.

Since the 2018, there has been a steady increase in brushfires/wildfires in the Town of Cumberland (includes natural vegetation fires, forest/woods/wildland fires, brush or brush/grass fires, and cultivated vegetation/crop fires):

- 2017: 14
- 2018: 11
- 2019: 20
- 2020: 30
- 2022: 31
- 2023: 41 (through September 2023)

Climate Change Impacts on Brushfire/Wildfire

Climate change can alter the weather and fuel factors of brushfires/wildfires. Hot dry spells can increase the risk of fire due to decreased soil moisture and increased evaporation/evapotranspiration. Climate change can also increase winds that spread fires.

Property at Risk from Brushfire/Wildfire-Related Hazards in Cumberland

Although Cumberland is considered to be at moderate risk for brushfires/wildfires, wooded areas such as Diamond Hill Park and the wooded areas surrounding the Pawtucket Reservoir (approximately 350 acres) should be monitored as the area is most susceptible to spreading fires due to lightning, compounded by limited vehicular access.

Probability of Future Occurrence of Brushfire/Wildfire Hazard in Cumberland

For this update, Cumberland is considered at moderate risk to future brushfires/wildfires (Table 2-2 *Hazard Index*).

2.3.8 Invasive Species-Related Hazards

For this update, invasive species (existing and early detection/emergent) for Cumberland have been incorporated as a hazard impacting the community. Invasive species are non-native species that can impact the environment, the economy or human health. Typically, they have the potential to cause or contribute to the following:

- Habitat loss/degradation
- Loss of native fish, wildlife, and tree species
- Loss of recreational opportunities and income
- Crop damage/diseases in humans

The Town of Cumberland relies on the Rhode Island Wild Plant Society's list of potential invasives standing to negatively impact the community as a baseline (<https://riwps.org/invasives-plants/>):

- Tree of Heaven (*Ailanthus altissima*)
Produce an overly abundant number of seeds, reproduction through roots and a chemical that can prevent or kill other plants near it has made it a species that have many states concerned. This invasive tree threatens to overwhelm our natural areas, agricultural fields and roadsides.
- Autumn Olive (*Elaeagnus umbellata*)
Rapidly spreads across forest edges, roadsides, meadows and grassland and outcompetes and displaces native vegetation, often changing the chemistry of the soil around it and over-shading.
- Border Privet (*Ligustrum obtusifolium*)
Capable of escaping to form dense thickets that can crowd out native species.
- Burning Bush (*Euonymus alatus*)
Threatens a variety of habitats including forests, coastal scrublands and prairies where it forms dense thickets, displacing many native woody and herbaceous plant species.
- Black Swallow-wort (*Cynanchum louiseae*)
Overgrows native plants and disrupt natural succession. Additionally, due to the tangling nature of swallow-wort, large patches can be difficult to walk through and may interfere with forest management and recreation.
- Chinese Silvergrass (*Miscanthus sinensis*)
Can form large clumps along disturbed areas, displacing native vegetation. The grass is also extremely flammable and increases fire risks of invaded areas.
- Common Buckthorn (*Rhamnus cathartica*)
Form thick hedges with long branches that crowd out and shade out native shrub and herbaceous species, preventing regeneration of native plants.
- Common Reed (*Phragmites australis*)
Rapidly form dense stands of stems which crowd out or shade native vegetation in inland and estuary wetland areas. Turns rich habitats into monocultures devoid of the diversity needed to support a thriving ecosystem.
- European (Common) Barberry (*Berberis vulgaris*)
Seeds stands that shade out and limit the growth of native plants. It can reduce wildlife habitat and forage.

- European Frogbit (*Limnobium laevigatum*)
Free-floating but stoloniferous growth form can lead to densely tangled floating mats, which can crowd and shade out native aquatic vegetation. It can dominate wetlands where it occurs, and the dense mats may affect wildlife as well as native plants.
- Garlic Mustard (*Alliaria petiolata*)
Forms dense stands that choke out native plants in the understory by controlling light, water, and nutrient resources.
- Glossy Buckthorn (*Frangula alnus*)
Out-competes native plants for nutrients, light, and moisture. Degrades wildlife habitat. Contributes to erosion by shading out other plants that grow on the forest floor.
- Golden Bamboo (*Phyllostachys aurea*)
Forms dense stands that displace native species.
- Japanese Barberry (*Berberis thunbergia*)
Displaces many native herbaceous and woody plants. In large infestations, its leaf litter causes changes in the chemistry of the soil, making it more basic.
- Japanese Honeysuckle (*Lonicera japonica*)
Fast growing vine that twines around stems of shrubs, herbaceous plants, and other vertical supports. Can kill shrubs and saplings by girdling.
- Japanese Knotweed (*Polygonum cuspidatum*)
Chokes-out native species by way of limiting sunlight infiltration, altering nutrient cycles, or by releasing toxic/inhibiting chemicals. Knotweed can contribute to stream bank erosion and flooding.
- Mile-a-Minute Vine (*Persicaria perfoliate*)
Invades open disturbed areas such as fields, forest edges, roadsides, ditches, and stream banks. Its rapid growth allows it to cover existing vegetation and restrict light availability, potentially killing plants below. Dense mats can also restrict establishment of new vegetation.
- Norway Maple (*Acer platanoides*)
Produces large numbers of seeds that are wind dispersed and invade forests and forest edges. The dense canopy formed by Norway maple inhibits the regeneration of sugar maple and other tree seedlings, reducing forest diversity.
- Oriental Bittersweet (*Celastrus orbiculatus*)
Commonly found in old home sites, fields and road edges. Fast growing vines can cover, shade and outcompete other vegetation and can even girdle and kill large trees.
- Parrot-Feather (*Myriophyllum aquaticum*)
Can form dense mats and compete with native aquatic plants especially in shallow ponds. Also provides habitat for mosquito larvae, impedes boats, and clogs drainage ditches.
- Purple Loosestrife (*Lythrum salicaria*)
Creates dense stands that outcompete native plants for habitat and result in changes to ecosystem functions.
- Russian Olive (*Elaeagnus angustilolia*)
Grows especially well in riparian situations and outcompetes native vegetation.
- Water Chestnut (*Trapa natans*)

Water chestnut can form dense, floating mats that cover the surface of the water. These mats limit the amount of light available to other aquatic plants, allowing it to quickly displace native species, decrease biodiversity, and impede recreational boating.

- Yellow Flag Iris (*Iris pseudacorus*)
Forms dense stands that can replace and crowd out valuable aquatic plants. Forms a dense mat which compacts soil and inhibits seed germination of other plants.
- Yellow Floating Heart (*Nymphoides peltata*)
Can create dense mats that shade out native aquatic plants, decrease oxygen levels, increase mosquito breeding habitat and impede boating activity, fishing and swimming.

The Cumberland Land Trust coordinates with the Rhode Island Invasive Species Council (RIISC) – a voluntary collaboration among organizations with substantial interests in the prevention, documentation, and management of invasive species in the state. RIISC's mission is to gather and convey information on the presence, distribution, ecological and economic impacts, and management of invasive species; promote uses of native species and non-invasive alternatives throughout Rhode Island; and work cooperatively with researchers, conservation organizations, government agencies, the green industries, and the general public to identify and manage invasive species pro-actively and effectively.

The Cumberland Land Trust and the Blackstone River Watershed Council have also collaborated with the RIDEM and the Town of Cumberland on efforts to eradicate invasives on Cumberland Land Trust properties, town properties and the Blackstone River. During the summer of 2022, Water Chestnut was removed from local ponds associated with the Blackstone River corridor. Eradication efforts have continued through 2023 for the removal of Water Chestnut from Carl's Pond through aquatic herbicide applications and several organized community 'pull' events scheduled. The Blackstone River Watershed Council also routinely monitors and removes Japanese Knotweed.

The Town is also participating in the Blackstone Valley Resilient Riparian Forests Project as part of the United States Department of Agriculture (USDA) Forest Service Landscape Scale Restoration grant. This is a cost-share grant with the USDA where professionally-certified private foresters will be developing forest stewardship plans for Mercy Woods, Diamond Hill Park, and the Monastery.

Property at Risk from Invasive Species

Invasive species typically harm native species through predation, habitat degradation and competition for shared resources. Negative consequences can be far-reaching, considering they can spread at astonishing rates and can affect property values, agricultural productivity, public utility operations, native fisheries, tourism, outdoor recreation, and the overall health of an ecosystem. Dependent upon the species, invasives often thrive along roadsides, forested and understory areas, lakes, ponds, rivers, streambanks, pond margins and along the coast.

Conservation Management Plans

Invasives management has been identified and incorporated into several of the Town's Conservation Management Plans for sites throughout the community, including:

- Metcalf-Franklin Farm
- Diamond Hill Town Park
- Heritage Park
- Mercy Woods Preserve

Probability of Future Occurrence of Invasive Species

Eradication involves both chemical and mechanical methods, combined with ongoing monitoring. Often, due to limited staffing and diminished municipal budgets, limited controlled stands are typically often realized at best. Because most invasives are considered more of a nuisance hazard and not directly associated with any primary impacts of other weather-related hazards such as loss of life, limited evacuation, or property damage, Cumberland is considered at moderate risk for future spread of invasive species (Table 2-2 Hazard Index).

2.4 Vulnerability

Vulnerability indicates what is likely to be damaged by the identified hazards and how severe that damage could be. After identifying types and areas of risk, a vulnerability analysis can help to determine the gaps in the community. This section examines the vulnerability of the built environment, such as structures, utilities, roads, and bridges, as well as social and environmental vulnerability. A vulnerability analysis also estimates the number of people exposed to hazards, including elderly populations and concentrated populations. This also includes such things as whether the shelter capacity is sufficient for the affected population, and whether businesses are likely to face temporary closure due to natural disasters. Historical damages are often good indicators for current exposure and potential damage.

A vulnerability chart was developed based on the identification and profile of the natural hazards that have occurred throughout Cumberland over time, as presented earlier in Section 2.3. Below, Table 2-14 Vulnerability Matrix 2023 Update describes the expected frequency of occurrence, and the potential severity of the damage resulting from each individual hazard evaluated for this update. Coordination with the State Plan was also a consideration in the development of the updated Vulnerability Matrix.

Table 2 - 14 Vulnerability Matrix 2023 Update

Hazard	Frequency	Severity
Flood-Related Hazards	High	Extensive
Winter-Related Hazards	High	Extensive/Serious
Wind-Related Hazards	High	Extensive/Serious
Geologic-Related Hazards	High	Minor
Drought-Related Hazards	Low	Minor
Extreme Heat-Related Hazards	High	Serious
Wildfire-Related Hazards	Medium	Serious
Invasive Species-Related	Medium	Minor

2.4.1 Development Trends

Since the 2017 plan, Cumberland's vulnerability to natural disasters has not significantly changed. In fact, new developments are in compliance with the updated State building codes and storm water standards, and in turn, these more restrictive codes help facilitate decreases in a structures' overall vulnerability.

Valley Falls and Lonsdale Economic Revitalization & Social Equity Plan²¹

The Town completed the Valley Falls and Lonsdale (VFL) District Economic Revitalization & Social Equity Plan in May 2023. The Plan provides both an overall vision and specific guidance to revitalize the VFL District by establishing a strategic approach and methodology to inspire private investment and improve the public realm. The collective goal for the VFL District is community revitalization and economic development along the Broad Street and Mendon Road corridors, with concerted preservation of its working-class character. Specifically, the goal of the Plan is to create concrete, attainable implementation strategies for attracting new investment and assisting local business owners. The Team identified opportunities for entrepreneurship and supportive business infrastructure in the district, building rehabilitation and streetscape improvements, revitalization of the Ann & Hope Mill and nearby sites, and adaptive reuse of the Naushon Mill property.

Key takeaways from the Market Analysis include the following existing near-term, market-supportable land uses in the VFL District study area:

- **Residential:** Based on an analysis of household formation and population growth, existing housing inventory and proposed housing developments, as well as an estimate of pent-up housing demand based on workers commuting into the primary market area, the VFL study area could capture unmet demand for up to 307 housing units over the next five years. Most of these units would be multi-family rental and targeted to working professionals and empty nesters seeking to downsize but remain within the VFL area.
- **Retail:** Given the large amount of available retail space in the five-mile radius surrounding the VFL study area, the commercial corridors should focus on locally serving service businesses and food-oriented establishments. Examples include businesses such as dry cleaners, child-care facility, shoe repair, bakery, and eateries catering to local ethnic groups.
- **Office:** Based on local real estate professional feedback, office demand in the study area is minimal – limited to small professional office space, as the current commercial market is adjusting to post-pandemic work trends and higher interest rates. Some small storefronts on Broad Street nearest Ann and Hope Way could accommodate the needs of an insurance broker or law office.
- **Light Industrial:** The Naushon Mill Property offers the best opportunity to accommodate a small- to medium-sized manufacturing or light assembly operation. The main building offers approximately 130,000 square feet of space over two floors (one floor being partially subterranean) and could accommodate multiple small light industrial businesses, as well as a commercial kitchen space on the eastern side of the building.

²¹ *Valley Falls and Lonsdale Economic Revitalization & Social Equity Plan*, 4Ward Planning, May 9, 2023.

Several of these key takeaways are reinforced by the discussion that follows regarding residential, commercial, and industrial development trends and focus areas.

Residential Development Trends

Cumberland's location in proximity to major cities and transportation routes continues to be a significant development force. Cumberland's population also continues to steadily increase since 2017 with the 2020 population estimated at 36,405 residents (2020 Census). Records of building permits issued by the Town show that 86% of the new housing stock since 2017 consisted of single-family homes (294 units), 8% or 25 units were new multi-family units, and 7% or 21 units were accessory dwelling units. Based on the number of building permits issued between 2017 and 2022, new development is split between the northern and southern sections of the town. Speculative future development is focused on the southern half of town, particularly in the Valley Falls area associated with mill redevelopment.

As part of the Town's Affordable Housing Production Plan, Low-Moderate Income (LMI) production strategies have been assigned to planning districts based upon economic considerations, environmental performance and the capacity of existing and future infrastructure within each planning district. *Strategy 4 Mill Conversion* presents the development of a master plan for the conversion of the mill complexes to a mixed-use land development including low- and moderate-income housing designed to create needed rentals for families of 2 to 4 persons as part of a mixed-use development that will include light industry, office and supporting service uses. Priority will be given to mill complexes supported by sewer and water and is located within proximate to an elementary school. The two mill complexes identified as possible candidates include the former Ann & Hope mill complex (potential of 241 units) and the former Corning site (potential of 266 units). While both sites meet the Town's criteria for economic considerations, environmental performance, the capacity of existing and future infrastructure, and adjacency to an elementary school, it should be noted that both sites are immediately adjacent to FEMA flood zones.

Large residential projects constructed, approved, or under review since 2017 include:

- Andrew's Way
 - Location: Andrew's Way
 - Number of units: 10
 - Status: Completed
- Ann & Hope Mill
 - Location: 100 Ann & Hope Way
 - Number of units: 241
 - Status: Pending Planning Board approval
- Hidden Meadow
 - Location: Hidden Meadow Drive
 - Number of units: 20
 - Status: Under construction
- Hunting Hill
 - Location: Meadowbrook Drive
 - Number of units: 115
 - Status: Under construction

- Kelley Court
 - Location: 426 Mendon Road
 - Number of units: 6
 - Status: Completed
- Naushon Mill
 - Location: 32 Meeting Street
 - Number of units: 100 (approximate)
 - Status: Speculative
- Residences at Broad
 - Location: Broad St./Mendon Road
 - Number of units: 23
 - Status: Under construction
- St. Patrick's Church
 - Location: 305 Broad Street
 - Number of units: 42
 - Status: Pending construction
- Shale Ridge Court
 - Location: Shale Ridge Court
 - Number of units: 15
 - Status: Completed
- Tuscan Court
 - Location: Tuscan Court
 - Number of units: 5
 - Status: Under construction
- Valley Stream Meadows (Blackberry Bluff)
 - Location: Blackberry Bluff
 - Number of units: 6
 - Status: Completed

Commercial and Industrial Development Trends

In order to promote economic development at the local level, a community needs two key elements: programs that foster economic growth as well as future sites for new economic activity.²² The Enterprise Zone Program, established by the Rhode Island State Legislation in 1992 to stimulate industrial and commercial business growth, includes two designated zones in Cumberland: Central Falls/Valley Falls (historic mill villages of Cumberland); and Woonsocket/Cumberland (Highland Corporate Park). Although the Enterprise Zone Program has been repealed since the designation of these two zones, they remain as the Town's preferred location for future economic development.

The Town also includes eight large sites currently used for industrial activity. These locations (as well as the smaller, scattered underutilized former textile mills) are the Town's preferred location for future economic development. These sites include:

Highland Corporate Park: 12 acres remain available for development.

²² Ibid

Martin Street Industrial Area: Majority of remaining vacant land is located within the Blackstone River flood plain/floodway, although an existing gravel extraction (37 acres) could be converted to light manufacturing and/or a business park.

Cumberland Industrial Park. North of I-295...Although fully utilized currently, vacancies occur from time to time. South of I-295...same as the development north of I-295.

R.I. Energy Site: In case of future consolidation, site could become available for re-use.

Lynch & Sons Inc.: If and when gravel operation ceases, site would become available for re-use.

Ann & Hope Way: A concern given its proximity to the Blackstone River, adjacency to the flood plain and past events of repetitive flooding.

Valley Falls Mill Corridor. A concern given its proximity to the Blackstone River, adjacency to the flood plain and past events of repetitive flooding.

Mill Citadel at River Bend: Again, a concern given its proximity to the Blackstone River, adjacency to the flood plain and past events of repetitive flooding.

Commercial development projects constructed, approved, or under review since 2017 include:

- JAK Medical (medical offices)
 - Location: 2295 Diamond Hill Road
 - Total Square Footage: 8,800 SF
 - Status: Completed
- Polyrack (warehouse)
 - Location: 1600 Highland Corporate Drive
 - Total Square Footage: 11,500 SF
 - Status: Under construction
- Storage Rentals of America (self-storage)
 - Location: 90 Industrial Road
 - Total Square Footage: 63,000 SF
 - Status: Pending Master Plan Review
- Washington Trust (bank)
 - Location: 1900 Mendon Road
 - Total Square Footage: 2,400 SF
 - Status: Completed

2.4.2 Economic Vulnerability

NFIP-Insured Property Damage

A repetitive loss property is defined as an NFIP-insured structure that has had at least 2 paid flood losses of more than \$1,000 each in any 10-year period , since 1978, while a severe repetitive loss property is defined as a residential property that is covered under

an NFIP flood insurance policy and: (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

As seen in Table 2-15, FEMA estimated that the value of property insured by the NFIP in Cumberland is over \$17 million as of December 2, 2022 (RI State Floodplain Coordinator). There are now four commercial and industrial properties that have experienced repetitive loss damages. According to data provided by the State Floodplain Coordinator, since the 2017 Plan, there have been nine repetitive loss claims townwide.

Table 2-15 Summary of NFIP Activity in Cumberland, RI

Total Policies		Coverage Value	Policies in A-Zone*	Claims Since 1978
52		\$17,407.00	13	46

Source: FEMA, NFIP, Loss Statistics from January 1, 1978, through December 2, 2022.

The majority of the NFIP-insured properties are located within the historic mill villages, along the Blackstone River and/or its flood plain/floodway.

Impacts of FEMA Flood Zones

As one of the highest risks to the community, HW performed an analysis to estimate the total land and building values within FEMA 100-year and 500-year flood zones. The number and types of residential, commercial, industrial, and municipally-owned structures are described earlier in Section 2.3.1 and quantified in Tables 2-16 Total Vulnerability FEMA 100-Year Flood Zone Summary and 2-17 Total Vulnerability FEMA 500-Year Flood Zone, Cumberland, RI. All flood zone data presented is based on the FEMA FIRMs as revised through 2015.

Table 2-16 Total Vulnerability FEMA 100-Year Flood Zone Summary

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate "Other" Value	Approximate Total Value
1% Annual Chance/100-Year Flood Zone					
Residential	501	\$132,484,741	\$347,304,000	\$52,695,712	\$532,484,453
Commercial	29	\$3,369,700	\$9,001,800	\$145,100	\$12,516,600
Industrial	69	\$8,302,800	\$44,891,000	\$327,100	\$53,520,900
Mixed Use	10	\$1,373,200	\$1,466,600	\$109,400	\$2,949,200
Cemetery	3	\$322,900	\$400,900	\$0	\$723,800
Religious	2	\$509,500	\$320,200	\$13,000	\$842,700
Charitable Land	1	\$30,500	\$0	\$0	\$30,500
Farm/Forest/Open Space	17	\$0	\$5,483,300	\$0	\$5,483,300
Tax Sales	8	\$1,189,800	\$2,822,600	\$12,000	\$4,024,400
Vote of Town	4	\$537,500	\$1,642,700	\$0	\$2,180,200
Municipal	66	\$28,400	\$21,243,100	\$0	\$21,271,500

State	9	\$0	\$3,014,800	\$0	\$3,014,800
Vacant	94	\$16,610,300	\$18,149,700	\$821,600	\$35,581,600
Unclassified	12	\$1,534,100	\$1,527,500	\$56,500	\$3,118,100
Total	825	\$166,293,441	\$457,268,200	\$54,180,412	\$677,742,053

Note: The two data sets utilized to develop this table did not directly correlate due to the variance in effective dates – 4/7/2014 v. 3/24/2016 (discrepancy of 833 records).

Source: Cumberland Tax Assessor CAMA data, Rhode Island Property Tax Use Code (2003).

There are approximately 501 residential structures located within the 100-year flood zone. There are also approximately 29 commercial properties and 66 municipally-owned properties including various critical facilities and infrastructure identified previously in Section 2.3.1.

Table 2-17 Total Vulnerability FEMA 500-Year Flood Zone Summary

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate "Other" Value	Approximate Total Value
0.2% Annual Chance/500-Year Flood Zone					
Residential	175	\$28,132,700	\$143,796,100	\$49,500	\$171,978,300
Commercial	38	\$17,310,200	\$39,532,600	\$2,556,200	\$59,399,000
Industrial	23	\$20,533,300	\$16,821,300	\$1,895,112	\$39,249,712
Mixed Use	5	\$767,100	\$2,909,600	\$27,000	\$3,703,700
Tax Sales	2	\$516,700	\$0	\$0	\$516,700
Vote of Town	2	\$2,958,000	\$15,183,400	\$1,090,400	\$19,231,800
Municipal	9	\$4,520,000	\$103,200	\$98,200	\$4,721,400
State	3	\$606,200	\$0	\$0	\$606,200
Vacant	15	\$982,027	\$0	\$84,000	\$1,066,027
Unclassified	13	\$0	\$0	\$0	\$0
Total	292	\$76,885,827	\$218,346,200	\$5,824,912	\$301,056,939

Source: Cumberland Tax Assessor CAMA data, Rhode Island Property Tax Use Code (2003).

There are approximately 175 residential structures located within the 500-year flood zone. There are also approximately 38 commercial properties and 9 municipally-owned properties including various critical facilities and infrastructure identified previously in Section 2.3.1.

Impacts of Business Interruption

Notwithstanding the obvious costs of commercial property damage, the impacts of potential business interruption from a natural disaster in Cumberland cannot be under estimated. Business closures result in a reduction of revenues to proprietors and a loss of wages to employees. In addition, State and local tax revenues can be significantly reduced. In addition to the costs of commercial property damage, the impacts from potential business interruption following a disaster in Cumberland could have long-lasting effects on the local economy, quality of life, and sense of place that has been maintained and revered for generations.

2.4.3 Social Vulnerability

A critical step in assessing risk and vulnerability of Cumberland to natural hazards is to identify the links between the potential destructive impacts to the built and natural environments and that relationship to the social structure. The social assets/potential losses continue to be key components of the community and include the closure of institutions, loss of vital services (communication and transportation systems), and disruption in the movement of goods and services, and emotional strain from financial and physical losses.

The vulnerability of a community obviously includes the potential for direct damage to residential, commercial and industrial property, as well as schools, government and critical facilities. However, it also includes the potential for disruption of communication and transportation following disasters. Any disruption to the infrastructure, such as a loss of electric power or break in gas lines, can interrupt businesses and cause stress to affected families. This is especially the case where residents are forced to evacuate their homes and become subject to shortages of basic supplies.

Public Infrastructure and Emergency Life Lines

There are several public infrastructure facilities located in the flood plain. In addition to potential structural damage, various access roads for these facilities also flood from time to time during an event. Two drinking water wells/pump stations, numerous dams, and various segments of roads and the P & W Railroad all experience intermittent flooding, the extent of flooding depends on the type, intensity and duration of the event.

Public Water Supply

The Cumberland Water Department (CWD) services 21,235 Cumberland residents. The remainder are served by the PWSB. CWD services and maintains five water storage tanks with a total storage capacity of 10.66 million gallons. CWD obtains water from three sources of supply, the largest being its own production from groundwater wells followed by purchased water from the PWSB and Woonsocket Water Department. On average, approximately 2.6 million gallons of water per day are distributed, with a peak daily rate of 5 million gallons. The peak daily demand has historically been as high as 7 million gallons per day but has declined over the last several years in part due to the loss of several large commercial/industrial customers.

The public water supply for the Town of Cumberland is drawn from gravel packed wells, the Woonsocket Reservoir, and the Pawtucket Reservoir. Existing interconnections between Cumberland, Woonsocket, and the PWSB are located at the intersection of Mendon Road and the exit side of Highland Corporate Drive (up to 2.0 mgd) and Marshall Avenue (up to 4.5 mgd) respectively.

Water is distributed via the CWD and the PWSB. CWD provides water service to customers north of Marshall Avenue, while the PWSB owns and operates the water distribution system south of Marshall Avenue. The PWSB sources consist of a series of surface water reservoirs located within the Town of Cumberland.

Three of Cumberland's wells are currently inactive. The Lenox Street well was taken out of service in 1979 due to organic contamination. The Martin Street well was taken out of

service in 1970 due to volatile organic chemicals and high iron and manganese levels. Abbott Run wells were taken out of service in 2018 due to polyfluoroalkyl/perfluorooctanoic acid (PFAS/PFOA) contamination.

The Sneece Pond Water Treatment Plant (WTP) was a major surface water treatment facility for the CWD; however, in addition to requiring substantial upgrades, several issues with the plant existed. Sneece Pond is in an area of the watershed primarily served by septic systems, which may impact source water, require more significant and costly treatment and increase the potential for contamination. The risk of deteriorating water quality is compounded by the fact that soils in much of the East Sneece Brook watershed, which flow to Sneece Pond, are not well-suited for septic systems due to shallow groundwater tables, flooding potential, slow percolation, and steep slopes. The Town of Cumberland performed an alternative analysis study for the WTP and determined that the facility should be taken off-line. Same was done in September 2021. Except for the lower station which presently houses the water system's supervisory control and data acquisition (SCADA) system, the facility is intended to be decommissioned.

The CWD has completed system wide unidirectional flushing since 2007 as well as completed an interconnection with the City of Woonsocket, cleaning/replacement of water mains on Diamond Hill Road, Hillside Road, Mason Drive and Meadow Brook Drive, system wide replacement of water meters and installation of a fixed antenna automatic meter reading system (AMR) and replaced its Fisher Road water storage tank. The Town placed a new groundwater source online in 2022 and is currently evaluating/designing an additional groundwater source to reduce reliance on purchased water. The combination of new well installation and infrastructure improvements have allowed the Water Department to keep pace with increasing demand.

Sanitary Sewer²³

The Town has a municipally owned and operated wastewater collection system that is connected to three Narragansett Bay Commission (NBC) interceptors. The Blackstone Valley Interceptor follows the Blackstone River from the Woonsocket City line, the Abbott Run Valley Interceptor serves eastern Cumberland as far north as Interstate 295, and the Highland Industrial Park Interceptor that runs from the industrial park along the Blackstone River each convey the wastewater to treatment facilities at Bucklin Point. The NBC jurisdiction encompasses all municipalities whose wastewater enters the Narragansett Bay.

Approximately 33 percent of Cumberland's total land area has sewer service. This represents service for roughly 5,916 acres of land. The rest of the Town is serviced with Individual Sewage Disposal Systems (ISDS).

A Town ordinance requires ties-ins to the sewer system however, this ordinance is not often enforced. The Town should consider strengthening this ordinance. If a property can be serviced with an ISDS, perhaps this should be encouraged rather than tie-ins and extensions to the sewer system, which may in turn result in the development of

²³ *Town of Cumberland Comprehensive Plan 2016 – 2036: Public Facilities and Services*, Mason Associates, 2016.

more land for residential purposes as well as the reduction of water available for recharge to aquifers.

Townwide Communications System

As a critical lifeline used by our first responders (police, fire, and emergency services) for the community we serve, the Town's existing analog radio communications system is insufficient and antiquated. Cumberland has numerous 'dead zones' where first responders have limited, or no coverage given the unique topography of large hills and small mountains. In addition, we are unable to support radio communications in the field with neighboring jurisdictions during mutual aid assistance requests or with our bordering partners in Massachusetts. Compounding this, when broadcasts are transmitted, there are instances where the technology has proven to be extremely limiting relative to clarity, resulting in significant delays in response time. This upgrade will enable the Town to leverage the RI Emergency Management Agency's RISCONE system of networked towers, greatly enhancing our coverage area while also facilitating mutual aid response and support to our neighboring jurisdictions, coverage over select wi-fi networks in schools and other large buildings currently unreachable by analog radio signals, and greatly improve the functional clarity of communications (and our overall response time). The Town's existing communications system needs a comprehensive overhaul/upgrade to a modern 800 MHz digital radio strategy.

Transportation

Roadway Network

A series of hilly north-south ridge lines has determined the layout of Cumberland's roadways and railways. Mendon Road and Diamond Hill Road are the major north/south corridors and lay within river valleys. Mill villages dating to the American Industrial Revolution are located on the Blackstone River in the southern and western edges of Town have narrow roads and tight urban patterns characteristic of the period. Otherwise, Cumberland is noted for suburban development and large expanses of open fields, woodlands and wetlands as one moves northward and eastward from the Blackstone River.

Continued residential development in this bedroom community has had the consequence of exacerbating an already high level of congestion during peak periods, especially on the two north/south highways, and interchanges with Interstate 295.

Development along Diamond Hill Road and Mendon Road is another significant concern. New commercial development requiring additional curb cuts impede traffic flow. The temptation to "improve" congested roadways by widening roads and installing new controls comes at a great cost: it is disruptive and very expensive, compromises the historic charm of a road corridor, discourages walking and bicycling, and ends up encouraging more sprawl and vehicular traffic.

Bus Service²⁴

Three Rhode Island Public Transportation Authority (RIPTA) bus routes provide regular service in Cumberland along two routes. The bus routes are as follows: Route 71

²⁴ https://www.ripta.com/wp-content/uploads/2020/05/RIPTA-sys-map-May2020_web.pdf.

(Broad Street): Provides access to downtown Pawtucket, Central Falls, the entire segment of Broad St. in Cumberland. This route begins in downtown Pawtucket at the Pawtucket Transit Center and ends at the Stop and Shop Supermarket Plaza on Mendon Rd./Route 122; and Route 75 (Dexter Street/Lincoln Mall): Provides access to downtown Pawtucket, Lonsdale Avenue, and Mendon Rd. in Cumberland as it winds its way along Rt 116 through Lincoln to the Lincoln Mall.

Paratransit/Elderly Transportation

The Cumberland Senior Center owns and operates a van transportation service for members of the Center. Transportation for regional workshops and meal sites is also available to segments of the elderly and disabled population from operators including:

- Northwest Transportation Services (Woonsocket)
- Blackstone Valley Chapter, RIARC (Pawtucket)
- Comprehensive Older Adult Services, Inc. (Pawtucket)
- R.I. Chapter of the National Multiple Sclerosis Society (Cranston)
- United Cerebral Palsy of R.I. (Pawtucket)
- RIPTA - RIDE Program (ADA Complementary Paratransit Service)

Freight Rail

The Providence and Worcester (P&W) railroad provides the only interstate freight service in Rhode Island; one of its principal yard operations known as “Cumberland Switch” is located in Valley Falls.

Rhode Island does not have any operating Class I freight railroads. The last Class I railroad to operate in the state was the Consolidated Rail Corporation (Conrail) which sold its lines within Rhode Island to the Providence & Worcester Railroad (P&W) in 1982. P&W is a Class II or regional railroad which comprises approximately 516 miles and operates in Massachusetts, Rhode Island, Connecticut, and New York. The P&W Railroad owns and operates 29.3 miles in Rhode Island plus 8.9 miles of rail line owned by the State of Rhode Island. P&W also has trackage rights over Amtrak’s Northeast Corridor line from Providence to New York City.

The P&W main freight rail line generally follows the historic Blackstone River/Canal route. Several spurs and sidings provide direct rail access to industries along the route.

Evacuation/Population at Risk

The use of mass care facilities during an emergency is dependent on a variety of circumstances. These include warning time, public awareness of the hazard, the level of encouragement from public officials and the availability of shelters. The primary shelter for the Town, also the regional shelter for the northeast part of the State (serving Woonsocket, Lincoln, Central Falls and Pawtucket) is the Joseph L. McCourt Middle School. The Wellness Center at the High School serves as the secondary shelter. Both can hold up to 350 persons pre-storm and 150 persons, post-storm. Cumberland also has two approved mass-care facilities (warming/cooling centers) located within the town. The first is located at the Cumberland Public Safety Complex, and the second is located at the Cumberland Public Library.

Shelter use is not easily predicted because each emergency situation has different variables such as the length of the warning period, official encouragement of the

evacuation, public awareness of the location and availability of shelter, and the severity of the approaching hazard. Shelter use may be higher in the winter, such as an ice storm since homes would be without heat. Historically, shelter use has not been high since residents seek safety at the homes of friends or family or hotels/motels. Traditionally, there are large numbers of residents who would not use the shelters because they would not leave their pets.

Cumberland Manor (Figure -7) is an eight-story, 176-unit apartment building that was built in 1969 and houses over 200 occupants. The population is 80% elderly and 20% disabled. Of significant concern is the potential for flooding at this site due to its close proximity to the Blackstone River. Access to the facility can be significantly compromised when the river is at flood stage. There also lies the potential of losing utilities at this building due to flooding as utilities are located on the lowest level of the building. Access to the upper floors would be through the stairwells as elevators will likely be compromised. Cumberland Manor does have Memorandum of Agreements (MOAs) with facilities to transport and house occupants of this facility in the event that evacuation is necessary.

Figure 2-7 Cumberland Manor



Cumberland Manor/One Mendon Road, immediate proximity to the Blackstone River poses a repetitive risk.

The historic mill villages of Cumberland are also a concern during flooding events. Some of these sites have been converted into multi-family residential developments. In addition, several industrial operations are also a concern. These sites' proximity to the Blackstone River and its associated floodplain/floodway are often subject to periodic flooding, dependent upon the severity of the event. Also, the P & W Railroad (rail yard and rail crossing) located adjacent to the former Ann & Hope Mill site is also of concern during flooding events. This line not only transports hazardous materials, but it also crosses Ann & Hope Way which has also been flooded (and ultimately closed) on several occasions – significantly limiting vehicular (emergency) access west of the railroad. An Emergency Action Plan for rail service through this area has been developed and is maintained by the Town.

2.4.4 Environmental Vulnerability

Hurricanes, earthquakes, nor'easters, floods or any weather-related hazard event will have particular impacts on the natural and built environment. Differences in storm size, speed of movement, wind speeds, and landfall location relative to vulnerable resources

makes for high variability in impacts and related costs. When the natural environment is impacted there are both direct (loss of habitat and salinization of land/ groundwater) and indirect costs (widespread inland damage to the built environment, threats to ecosystems/ species, and contamination of potable water supply).

2.5 FEMA Disaster Grant Assistance

FEMA has provided the Town of Cumberland with \$403,567.86 in grant assistance since the 2017 Plan, including:

- FEMA DR-4505 (2021/2022)
\$265,519.44

Main Items for Funding Provided for:

- Emergency Supplies
- Cumberland EMS Personnel (temporary hire)
- Vaccination Administration Materials

- 2022 BRIC
\$27,933.20

Main Items for Funding Provided for:

- The Cumberland Planning Department secured a BRIC grant to assist with the update of the Town's Hazard Mitigation Plan.

- FEMA DR-4505 (Winter Storm Keenan 2022)
\$110,115.22

Main Items for Funding Provided for:

- Personnel/Labor
- Equipment Use
- Debris Removal
- Salt/Sand

Section 3 Capability Assessment

3.1 Introduction

The Capabilities Assessment section includes local, state, and federal department, agency and program capabilities in terms of pre- and post-disaster activities. It is organized into three main sections: Planning and Regulatory Capabilities, Administrative and Technical Capabilities, and Financial Capabilities to better define the programs, policies, and funding opportunities each department or agency is implementing to reduce risk and work towards implementing hazard mitigation programs targeted at increased resiliency. Actions specific to natural hazards and resiliency were identified from the review of existing plans, studies, and reports, and included in Section 3 for consideration when developing the draft ‘hazard mitigation actions for consideration’ by the LHMC. Section 4.3 describes each mitigation action in detail and also provides the plan, study, report from which the action originated (below each action number).

The Town of Cumberland implements several hazard mitigation policies and procedures, current state laws, executive orders, and regulations to promote the safety of its residents and minimize risk to community assets. This section presents a brief description of each of the primary mitigation programs currently in place.

3.2 Planning and Regulatory Capabilities

Comprehensive Plan 2016 - 2036²⁵

The Comprehensive Plan is a planning document that outlines goals, policies, and actions to provide a framework for (state-approved June 2004). The State of Rhode Island now mandates natural hazard and adaptation planning at the local level through the Rhode Island Comprehensive Planning and Land Use Act (RIGL 45 - 22.2). The Act requires by 2016 that municipalities address natural hazards in municipal comprehensive plans, as outlined in Section 45 - 22.2 - 6(b) (10): “Natural hazards. The plan must include an identification of areas that could be vulnerable to the effects of sea level rise, flooding, storm damage, drought, or other natural hazards. Goals, policies, and implementation techniques must be identified that would help to avoid or minimize the effects that natural hazards pose to lives, infrastructure and property.”

Natural Hazard Element

Goal NH.1 Assure that the built environment and infrastructure are resilient to the impacts of natural hazards.

Policy NH.1.1 Catalog and evaluate the current conditions of all town owned property deemed “Critical Infrastructure”.

Action NH.1.1.1 Use GIS to inventory all Town Critical Infrastructure,

²⁵ *Town of Cumberland Comprehensive Plan 2016 – 2036*, Mason Associates, 2016.

Policy NH.1.2 Assure the continuity of town-wide emergency services in the event of a natural disaster.

Action NH.1.2.1 The Planning Department and Public Works Department will acquire funding for the purchase and installation of back-up generators to power the public safety facilities and water and sewer pumping stations during times of power loss.

Action NH.1.3.1 Establish a priority list of repetitive flood streets and create a capital spending plan for culvert and drainage work to alleviate the problems.

Policy NH.1.4 Evaluate new development projects for drainage and runoff issues.

Action NH.1.4.1 Establish procedure to review new developments/projects with respect to drainage and run-off. When new developments are proposed, establish a standard to review not just the proposed development, but the entire surrounding area to evaluate how the development will affect drainage and run-off in surrounding areas.

Action NH.1.4.2 Change Town Ordinance for new construction design storm from 25-year flood event to 100-year flood event.

Goal NH.2 Address natural hazard mitigation in local decision-making and planning.

Policy NH.2.1 Continue to explore joining the NFIP's CRS to increase floodplain building regulatory standards and attain greater flood insurance discounts for residents.

Policy NH.2.2 Continue to conduct outreach to businesses that are repetitive loss properties such as the former Ann and Hope, Hope Global, and the businesses located on Martin St., to assure that hazard mitigation planning and funding remains a collaborative effort.

Since the 2017 Plan, the Town has completed the following Natural Resource actions towards the advancement of protecting the Town's water supply:

N2. Preserve farms, sensitive ecological areas, watershed areas, and special natural resource areas through fee simple land purchase, conservation easements, or purchase of development rights.

Mercy Woods. The Town purchased Mercy Woods in 2018, a 229-acre site on West Wrentham Road. The parcel is preserved as open space, with the only development allowed being up to 17 acres of ballfields. Purchase partners: Town of Cumberland \$405,000, RIDEM \$400,000, Champlin Foundation \$295,000,

PWSB \$300,000, and Cumberland Land Trust \$100,000. This action precluded the development of as many as 85 housing units.

Rawson Pond: The Town purchased 30 acres for \$325,000 in 2017.

Schofield Farm. The Town purchased 7.2 acres at 500 Nate Whipple Highway for \$600,000 in 2020.

N8. Fill the staff position of Tree Warden, authorized to plan or approve all tree and shrub planting, trimming, and management on municipal property, including utility maintenance work.

Tree Warden. The Town has hired the Davey Group (2023) for a three-year contract which includes Tree Warden services.

N9. Implement the Valley Falls Urban Forest Master Plan.

The Town received two grants to implement this action, discussed in Section 3.5 Financial Capabilities.

Open Space Plan (2003)

The Open Space Plan is another planning document intended to advise the Town Council on open space preservation and acquisition efforts, act as a resource for other agencies with open space concerns and advise the Planning Board on elements of the Comprehensive Plan.

Cumberland possesses valuable natural areas which provide an opportunity for open space preservation and acquisition. Areas which should be targeted for acquisition include agricultural lands, wetlands, land in drinking water supply watersheds, river and stream corridors, and areas of groundwater recharge. Focus areas for protection in Cumberland identified by the State are those containing lime-based ‘greenstone’ supporting rare species. These areas should be acquired for the protection of biodiversity in the State. Designated Rare Species Habitats have been identified in Cumberland by the Natural Heritage Program and should also be acquired.

While no specific method for determining priorities for open space acquisition has been developed as of yet, current priorities include expansion of The Cumberland Greenway, creation of a pedestrian trail system, and acquisition of land adjacent to existing protected properties.²⁶ Ideally, the Town should also prioritize properties for open space acquisition based on vulnerabilities to flooding.

Flood Protection Services

As a public service the Building Official provide residents and businesses owners (upon request) with the following information regarding flood protection:

- Whether a property appears to be in or out of the Special Flood Hazard Area (SFHA) as shown on the current FIRM of the Town.

²⁶ *Town of Cumberland Comprehensive Plan 2016 – 2036*, Mason Associates, 2016.

- Additional flood insurance data for a site, such as the FIRM zone and the base flood elevation or depth, if shown on the FIRM.
- The Town has a handout on the flood insurance purchase requirement that can help people who need a mortgage or loan for a property in the SFHA.
- Assistance with FEMA Elevation Certificates for buildings built in the floodplain.

On May 26, 2021, the RIEMA conducted a Community Assistance Visit (CAV) to confirm the Town's commitment to the NFIP and managing development in its floodplains. RIEMA found no administrative issues or potential violations regarding the Town's implementation of the NFIP. RIEMA did provide a list of Community Recommended actions intended to strengthen the Town's participation in the NFIP.

- The Town must continue to track development in the floodplain for new structures and improvements to existing structures (to ensure those improving their home 50% or greater of structural value are brought into/or maintain compliance with NFIP regulations). Actions such as physically writing permit dates, type of work, and costs on the inside folder of a permit file can improve the capability to track improvements.
- The Town should continue to keep permits digitally and is strongly advised to consider adding a formal question/identifier regarding whether a property is or is not in the Special Flood Hazard Area (SFHA).
- The Town should continue to coordinate with RIEMA to organize training opportunities and develop a set of best practices for other local officials and contractors in the Town.
- The Town should continue to develop a relationship with State agencies, such as RI Department of Environmental Management (RIDEM) and RI Department of Transportation (RIDOT) to ensure the Town is aware of projects occurring within the Town that could potentially impact the SFHA.
- The Town should continue to work with RIEMA staff to address the severe repetitive loss properties and submit to rate properties in the Town.
- The Town should continue to work with the RIEMA State Hazard Mitigation Officer to work on any items identified in their local HMP.
- An additional staff person should attend the L273 course (Managing Development through the NFIP) for comprehensive training on floodplain management requirements and higher standards.

Land Development and Subdivision Regulations, Amended February 4, 2015

The Town's Land Development and Subdivision Regulations provide for additional protections in the form of Project Impact Statements for subdivisions and development projects.

Section 5 I(a): Review and Approval of Plans and Plats: Project Impact Statements –

- (a) A project impact statement may be required by the Board, to be prepared and paid for at the applicant's expense, for the purpose of protecting the health, safety, convenience, and welfare of the inhabitants of the Town, and to protect, preserve and, maintain the quality of surface and subsurface waters and other natural resources deemed to be of irreplaceable value upon which residents of the Town of Cumberland and

others depend, and to determine those conditions tending to adversely affect the environment of the Town.

- (b) The Board shall stipulate the information which shall be required and why as part of the request for a project impact statement. The Board may require that the Statement contain one or more of the following:
- A statement of any prior or anticipated flood levels, and of the expected flood hazard present on the site.²⁷

Section 6 (c): Flood Hazard Areas

The following requirements shall apply to any plat which is located wholly or partly within Zone A and Zones A1-A30 as identified on the flood insurance rate map as part of the flood insurance study which also includes the flood boundary and floodway map. Said maps and any amendments thereto are hereby made part of this section of these Regulations.

- (1) All submissions shall show the location of any portion of the plat which lies within any Zone A or Zones A1-A30 and the floodway and shall show the base flood elevation as prescribed for these zones at the specific location. Where the plat location is entirely within these zones, it shall be noted on the plat drawing.
- (2) In grading land and installing improvements, no watercourse shall be altered in such a manner as to reduce its carrying capacity. Prior to permitting any alteration or relocation of a watercourse, the Planning Board will send notification to the neighboring communities, the Rhode Island Statewide Planning Program and the Federal Insurance Administration.
- (3) All plat proposals will be reviewed by the Planning Board or its agent to assure that the design of the plat is consistent with the need to minimize flood damage. Public improvements, facilities, and utilities are constructed or installed in a manner that will minimize flood damage. Adequate drainage will be provided to minimize the accumulation of water.

Code of Ordinances, Chapter 17 Special Flood Hazard Areas and Flood Fringe Areas, Section 17

The Town of Cumberland has adopted regulations to ensure public safety; minimize hazards to persons and property from flooding, to protect watercourses from encroachment and to maintain the capability of floodplains to carry off floodwaters. Specifically, the ordinance adopted definitions, types/fees for permits required, development standards, variance procedures, and enforcement for development within special flood hazard areas/flood fringe areas. The ordinance also reinforces the Town's commitment to maintain eligibility to purchase flood insurance through compliance and participation in FEMA's NFIP.

Section 17-2 Applicability:

- (a) The Town of Cumberland (hereinafter "the Town") elects to comply with the requirements of the National Flood Insurance Act of 1968 (P.L. 90-488, as amended). The National Flood Insurance Program, established in the aforesaid Act, provides that areas of the town having a special flood hazard be identified by the Federal Emergency Management Agency and that

²⁷ *Town of Cumberland Land Development and Subdivision Regulations.*

floodplain management measures be applied in such flood hazard areas. The requirements of this chapter shall apply to any construction or other development which lies wholly or partly within an area of special flood hazard, as identified as zone A, AE, AH, AO, A1-30, A99, V, V1-30, VE on the Flood Insurance Rate Map (FIRM) prepared by Federal Emergency Management Agency as dated September 18, 2013, and revised on October 2, 2015. Said flood map, including any amendments adopted after the date hereof, is hereby made part of this chapter. The exact boundaries of the district may be defined by the one-hundred-year base flood elevations shown on the FIRM and further defined by the Flood Insurance Study Booklet dated September 18, 2013, and revised on October 2, 2015. [Amended 9-23-2015 by Ord. No. 15-16]

Code of Ordinances, Chapter 20 Land Disturbing Activities, Article III, Section 20-61 Soil Erosion and Sedimentation Control Ordinance²⁸

Section 20-62: Findings and Purpose:

- (a) The Town Council finds that excessive quantities of soil are eroding from certain areas that are undergoing development for certain nonagricultural uses such as housing developments, industrial areas, gravel removal operations, recreation facilities, commercial facilities and roads. Erosion occurring in these areas makes costly repairs necessary to gullies, washed out fills, roads and embankments. The resulting sediment clogs storm sewers, road ditches, roils streams, and deposits silt in ponds and reservoirs. In some of the Town's waters, silt resulting from erosion has become a major water pollutant and threatens the water supply as well as the recreational, aesthetic and wildlife habitat values associated with these waters. The Town finds that certain agricultural lands also experience extensive erosion and sedimentation.
- (b) The purpose of this article is to prevent soil erosion and sedimentation from occurring as a result of nonagricultural development within the Town by requiring proper provisions for water disposal and the soil surfaces during and after construction, in order to promote the safety, public health and general welfare of the residents of the Town.

Code of Ordinances, Article V, Section 14-121 Stormwater Ordinance (July 19, 2017)²⁹

The Stormwater Ordinance (Article V) is promulgated pursuant to the RI DEM General Permit Rhode Island Pollutant Discharge Elimination System Stormwater Discharge from Small Municipal Separate Storm Sewer Systems (MS4s) and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s and in accordance with the provisions of R.I.G.L. § 45-6-1. Regulation of illicit connections and discharges to the municipal storm drain system is necessary for the protection of the Town's water bodies and groundwater, and to safeguard the public health, safety and welfare and the environment. The objectives of this article include:

²⁸ Town of Cumberland Code of Ordinances, *Chapter 20 Land Disturbing Activities, Article III, Section 20-61 Soil Erosion and Sedimentation Control Ordinance*, March 4, 2009.

²⁹ Town of Cumberland Code of Ordinances, *Article V, Section 14-121 Stormwater Ordinance*, July 19, 2017.

1. Prevent (or reduce to the maximum extent practicable) pollutants entering the Town's municipally-owned separate storm sewer system;
2. Prohibit illicit connections and unauthorized discharges to the MS4;\
3. Require the removal of all such illicit connections and discharges;
4. Comply with state law and federal statutes and regulations relating to stormwater discharges; and
5. Set forth the legal authority and procedures to carry out all inspection, monitoring and enforcement activities necessary to ensure compliance with this article.

Code of Ordinances, Article VI, Section 6-16 Stormwater Basins Ordinance³⁰

Section 6-16 Stormwater Basins.

A stormwater basin shall mean any man-made aboveground area, which is typically constructed of earth, to temporarily collect and store stormwater for purposes of temporary detention and/or retention so as to control peak surface run-off and allow for the gradual absorption or release of the stored water at controlled rates. Stormwater basins are often referred to as detention or retention ponds for this reason.

(a) Scope. When a landowner or developer has demonstrated to the Town that property cannot be developed without an aboveground stormwater basin, the basin shall be subject to the provisions of this article.

(b) Purpose. This article is established to:

- (1) Provide for the health, safety, and welfare of the public.
- (2) Avoid or lessen the hazards created by the construction of stormwater basins.
- (3) Allow for the use of land which requires the creation of stormwater basins and protect the interests of neighboring landowners.

(c) Applicability. This article shall apply to all land in the Town.

(d) Penalty. Any person who shall violate any of the provisions of this article or fail to comply with this article or with any of the requirements of this article or who shall build or alter any stormwater basin in violation of any detailed statement or plan submitted and approved under this article, upon conviction thereof, shall be punished in accordance with Section 17-5.

(e) Specifications

- (1) All designs of stormwater basins shall be approved by the department of public works.
- (2) All stormwater basins shall be designed to control a 100-year storm.
- (3) All stormwater basins shall not exceed a maximum wet depth of 42 inches.
- (4) Each stormwater basin shall be enclosed with a six-foot-high, black vinyl-coated chain-link fence, which shall have an eight-foot-wide swing gate, to allow for maintenance of the stormwater basin. The fence shall be placed a minimum of 10 feet from the edge of the berm or embankment of the stormwater basin. Whereupon a physical condition or obstruction prohibits the installation of the fencing at the minimum ten-foot offset dimension, the fencing shall be installed at a location

³⁰ Town of Cumberland Code of Ordinances, *Article VI, Section 6-16 Stormwater Basins Ordinance*, December 16, 2021.

determined to be a suitable distance away from the edge of the berm or embankment, as approved by the Director.

(5) All stormwater basins shall be entirely located within a single lot and shall have a twenty-five (25) foot buffer area between the existing property lines and the edge of the stormwater basin, which may not include buildings or structures, but may include vegetation as may be approved by the Planning Board or Director, as the case may be.

(6) Land area required to establish a stormwater basin and its required buffer area shall not be used in calculating the minimum lot size required by the zoning ordinance.

(7) Upon Town approval of a stormwater basin, the owners of property or, in the case of a subdivision that includes a homeowners association, where a stormwater basin is to be constructed shall place on file with the deed to the property a copy of the stormwater basin operation and maintenance plan design and the terms and conditions imposed on this design. The operation and maintenance plan shall address periodic inspections, sediment removal, vegetation maintenance, mowing requirements, and any other information required by the Planning Board or Director, as the case may be. This filing shall take place prior to the construction of the stormwater basin and prior to the transfer of title to this property.

(8) The design and installation of all stormwater basins shall comply with the latest version of RIDEM's Rhode Island Stormwater Design and Installation Standards Manual.

(f) Liability

(1) The legal liability for and maintenance of a stormwater basin shall be the sole responsibility of the landowner or homeowner's association.

(2) The landowner or homeowners association shall have an inspection of the stormwater basin performed by a professional engineer every three years to ensure maintenance and proper function of the stormwater basin. Records of inspections shall be kept on file with the landowner and the department of public works.

(3) Stormwater basins not properly maintained shall be subject to corrective action by the Town, the costs of which shall be imposed as a lien on the property or properties within the homeowner's association.

(g) Obligation to disclose

(1) The developer or subdivider of property within the Town who shall develop or subdivide property within the Town in such a manner so as to qualify under the provisions of this article and who shall transfer, lease, or otherwise convey any portion of such property upon which is constructed a stormwater basin to any person, partnership, corporation, holding company or other personal or business entity, shall be obliged to inform such person, partnership, corporation, holding company or other personal or business entity to which such property is transfer of the existence thereupon of a stormwater basin governed by the provisions of this article and the obligations and liabilities hereinunder. Similarly any subsequent owner of the property has the same obligation to disclose under the provisions of this article to any subsequent grantee.

(2) Compliance with such obligation to inform shall be in the form of a written description of the legal status of the stormwater basin by assessor's plat and lot; the obligations which are being assumed by the purchaser or grantee thereof,

especially liability hereof; and shall contain the witnessed or notarized signatures of the grantor and the grantee.

(3) A copy of such document shall be conveyed to the director of public works of the Town of Cumberland, Rhode Island by the grantor. The director of public works shall file a copy of such document in the Land Evidence Records of the Town of Cumberland, Rhode Island, which filing shall constitute a lien against the property for title examination purposes.

(4) Failure to comply with this provision shall be punishable by a fine of up to \$100 per day for each consecutive individual day beyond the date of the transfer of a property containing a stormwater basin subject to this article, or, such other subsequent penalty which may be imposed by the municipal court of the Town of Cumberland, Rhode Island.

(h) Waiver or modification

(1) The Town Planning Board is hereby empowered and authorized to grant a variance waiver or modification from the strict application of the provisions of only this articles 6-16(e)(4) and 6-16(e)(5), and 6-16(e)(6), so as to prevent any undue hardship and to further safeguard the public, health, safety and welfare.

(2) Such variance waiver or modification shall only be considered at a public hearing called for such purpose. Such hearing may be included in the routine agenda of the Planning Board, however such hearing shall be separately listed on the Planning Board agenda and considered as a matter separate from any land development or subdivision hearing for the subject property which may also be on the Planning Board agenda.

(3) Notice of any hearing which takes place pursuant to this section shall be given by the Planning Board to the owners of real property within 200 feet of the lot on which the proposed stormwater basin shall be located. Should the proposed stormwater basin be a part of a land development project or subdivision being considered by the Planning Board the notice area shall be 200 feet of the perimeter of the entire parcel under consideration.

(4) Notice shall be by first class mail, return receipt requested, at least 10 days in advance of the hearing, and shall contain the date, time and place of the public hearing, the name of the property owner or developer, the assessor's plat and lot and a brief description of the matter under consideration. Should the request for variances waiver or modifications involve a land development project or subdivision also being considered by the Planning Board at such meetings, the notices may be included in the same mailing; provided, however, that separate notice shall be required in written form.

(5) Copies of the notice of such hearing shall be delivered to the director of public works of the Town of Cumberland, Rhode Island, as well as any other municipal, state or federal official or agency deemed appropriate by the administrative officer. Such notice shall solicit written comments. All final written comments to the Planning Board from the administrative officer, the director of public works, municipal departments, state and federal officials or agencies shall be a part of the permanent record of the application for relief, as well as the development application, if any.

(6) The determination of the Planning Board shall be by the majority of the full membership of the board. All records of the board, together with the

rational thereof shall be written and kept as a part of the permanent record of the Planning Board and shall be for available public review.

Town of Cumberland, RI Storm Water Management Program Plan (March 10, 2003)³¹

One of Cumberland's goals, as stated in its 1991 Comprehensive Plan, is "to protect and preserve the Town's natural resources including unique environmental areas; surface and ground water quality; agricultural soils; and rural character." The Town has long recognized its dependence on local surface and groundwater for drinking and appreciates the role the Blackstone River has played in shaping the Town's environment and history.

The development of Cumberland's Storm Water Management Program Plan has provided the opportunity to focus on how day-to-day activities throughout the Town affect these prized natural resources, and to record those activities and effects in one document. The Phase II Rhode Island Pollutant Discharge Elimination System (RIPDES) Program provides a measuring stick for the Town to compare its actions, and to seek new methods for enhancing water quality.

Rhode Island State Building Code³²

The Town of Cumberland enforces the Rhode Island State Building Code which includes many detailed regulations regarding hurricane/storm/flood standards, existing structures, flood resistant construction, substantial improvements, damages exceeding 50%, 25-50%, under 25%, and physical value determination.

23-27.3-100.1.5.5 Hurricane, storm, and flood standards

The state building code standards committee has the authority, in consultation with the building code commissioner, to adopt, maintain, amend, and repeal code provisions, which shall be reasonably consistent with recognized and accepted standards and codes, including for existing buildings, for storm and flood resistance. The code provisions shall, to the extent reasonable and feasible, take into account climatic changes and potential climatic changes and sea level rise and inundation areas below dams classified by the department of environmental management as high hazard, significant hazard, or low hazard. Flood velocity zones may incorporate freeboard calculations adopted by the Coastal Resources Management Council pursuant to its power to formulate standards under the provisions of § 46-23-6.

23-27.3 – 106.0 Existing structures.

(a)(1) Except as provided in this section, existing buildings or structures when altered, renovated, reconstructed or repaired or a change of use occurs as specified in this section shall be made to conform to the requirements of the rehabilitation building and fire code for existing buildings and structures. See chapters 2 through 34 of regulation SBC-1 for new buildings.

³¹ Town of Cumberland *Part II: Code of Ordinances, Article V Stormwater*. July 19, 2017.

³² *R.I. State Building Code*, RIGL 23-27.3 106 – 106.5,
<http://webserver.rilin.state.ri.us/Statutes/TITLE23/23-27.3/23-1/INDEX.htm>.

(2) Except as provided for in the rehabilitation building and fire code for existing buildings and structures, the alternative procedures of SBC-1, chapter 34, entitled Repair, Alteration, Addition to, and Change of Use of Existing Buildings, may be used in lieu of the provisions of this section for all existing buildings in which there is work involving repairs, alterations, additions, or changes of use and occupancy.

(b) Flood resistant construction for buildings or structures in flood hazard areas. In order to determine the percentage between the costs for alterations, renovations, reconstruction and repairs and the physical value of the building or structure, to establish whether a substantial improvement or a substantial damage occurs, the building official shall exclude the alteration, renovation, reconstruction and repair cost of the following item:

All non-permit items such as painting, decorating, landscaping, fees, and the like.

23-27.3-106.1. Substantial improvements.

If substantial improvements are made within any twelve (12) month period costing in excess of fifty percent (50%) of the physical value of the building, this code's requirements for flood resistant construction for new structures shall apply.

23-27.3-106.2. Substantial damages exceeding fifty percent.

If the building is damaged by fire or any other cause to an extent in excess of fifty percent (50%) of the physical value of the building before the damage was incurred, this code's requirements for flood resistant construction for new structures shall apply.

23-27.3-106.3. Improvements and damages between twenty-five and fifty percent of value.

If the cost of alterations or repairs described in this chapter is between twenty-five (25%) and fifty percent (50%) of the physical value of a structure, the building official shall determine to what degree the portions so altered or repaired shall be made to conform to the requirements of the rehabilitation building and fire code for existing buildings.

23-27.3-106.4. Improvements or damages under twenty-five percent of value.

If the cost of alterations or repairs described in this chapter is twenty-five percent (25%) or less of the physical value of the building, the building official shall permit, consistent with the requirements of the rehabilitation building and fire code for existing buildings and structures, the restoration of the building to its condition previous to damage or deterioration with materials of equal quality as those of which the building was originally constructed; provided, however, that the construction does not endanger the general health, safety, and welfare.

23-27.3-106.5. Physical value.

In applying the provisions of §§ 23-27.3-106.0 — 23-27.3-106.5, physical value of the building or structure shall be based on the current market value. Market value shall be established by the owner who shall provide the market value of the building or structure prior to alteration, as established by an appraiser, estimator or real estate broker.

Rhode Island Sea Grant Fact Sheets/Climate Change Science Summary

Rhode Island Sea Grant, collaborating with scientists from the University of Rhode Island and other institutions, continue to better understand the science and policy implications of climate change. Recognized as a leader within the State, and region overall, RI Sea Grant provides assistance to decision makers at both the State and local level regarding vulnerability and risk reduction. Specifically, RI Sea Grant has developed fact sheets to highlight impacts to the built environment, public health and welfare, and natural resources which include *Precipitation and Storms in Rhode Island: Trends and Impacts*; and *Sea Level Rise in Rhode Island: Trends and Impacts*.

Valley Falls Emergency Action Plan (VFEAP)

Following a table top exercise organized by RIEMA (Figure 3-1) that brought together abutting communities and stakeholders (including the Providence & Worcester Railroad) to address the potential of a rail incident in Valley Falls, RIEMA supplied the Town of Cumberland with a \$21,000 grant to fund a private contractor to develop an Emergency Action Plan for the periodic rail service through the Valley Falls section of Cumberland. The plan has since been completed and was forwarded to the state as a ‘stand-alone document’ due to concerns over public disclosure of critical information.

Figure 3-1 VFEAP Rail Exercise/Railbed through thickly settled area



Rail Table Top Exercise



Rail bed traverses through thickly-settled residential areas.

Municipal Resilience Program Community Resilience Building Process and Workshop Summary of Findings, July 2021³³

The need for municipalities, regional planning organizations, corporations, states, and federal agencies to increase resilience to extreme weather events and a changing climate is strikingly evident amongst communities across the state of Rhode Island. In the spring of 2021, the Town embarked on certification within the state’s Municipal Resilience Program (MRP). As part of that certification, the Rhode Island Infrastructure Bank (RIIB) and the Nature Conservancy (TNC) provided the Town with a community-driven process to assess current hazard and climate change impacts and to surface projects, plans, and policies for improved resilience. In July 2021, Cumberland’s Core

³³ *Municipal Resilience Program Community Resilience Building Process and Workshop Summary of Findings, July 2021.*

Team helped organize a Community Resilience Building Workshop facilitated by the TNC in partnership with RIIB. The primary objectives of the workshop included:

- Define top local, natural, and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Identify and prioritize actions for the Town; and
- Identify opportunities to collaboratively advance actions to increase resilience alongside residents and organizations from across the Town and beyond.

The MRP Workshop ended with the identification of priority actions related to the community's key concerns. Actions related to hazard mitigation planning are categorized below.

- Approve a Town Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on the budgets for Public Safety, Public Works, Highway, Fire, EMS, and Water Departments and ensure CIP is in place for future administrations.
- Incorporate resulting resilience actions from CRB workshop into future updates of Comprehensive Plan and Hazard Mitigation Plan.
- Create a comprehensive and robust framework for resident communication and engagement before, during, and after emergencies including:
 - Develop/consolidate procedures for emergency communication and alert systems for the Town, in preparation for, and in, emergency scenarios regarding evacuation routes, shelters, weather events, resources, etc. (real time build on Code Red and Special Needs Registry and preparation through different media including resident pamphlets).
 - Increase resident awareness and engagement with these issues, procedures, and foster buy-in through community engagement, outreach, and education.
 - Increase/diversify regular Town communications (website, social media, sign-up campaigns, etc.) focused on services offered, recreation and regular updates on needs and activities.
- Comprehensive flood mitigation along Blackstone River via projects for specific culverts, undersized drainage pipes, road grading corrections, and catch basins projects via the following actions:
 - Direct/relocate development to areas that are already watered/sewered and are above natural river level, surge, and floodplain to preserve open space and avoid inappropriate parcel development as well as encourage low impact development (LID).
 - Identify sites for flood mitigation projects including the removal of impervious surfaces, wetland restoration, and other natural solutions which would establish green spaces that can accommodate flooding, filter water and serve recreation and ecosystems.
 - Pursue grant opportunities to resume feasibility studies in the lower Martin St. area which currently have massive pumps due to development mistakes (excavated and graded too much material and are now below river level)., in hopes of returning these areas to green space with relocation of occupants to higher ground.

- Coordinate efforts with Blackstone River watershed towns, councils, and organizations.
- Develop and implement a comprehensive tree management plan which addresses tree maintenance particularly along power lines to prevent outages, and tree canopy expansion in more developed areas with inclusion of the following sections:
 - Determine schedule for tree maintenance in coordination with R. I. Energy.
 - Provide education and resources to property owners responsible for tree maintenance.
 - Develop pre/post storm event tree procedures to protect electricity infrastructure and prevent outages, limit addition of trees to rivers as projectiles, etc. The Town is currently working with Groundwork RI to plant an additional 300 trees by the end of 2025. Groundwork RI is going door-to-door in Valley Falls and Lonsdale soliciting private property owners to adopt/plant a tree on their property, free of charge.
 - Increase tree canopy coverage in Valley Falls and Lonsdale areas where a decrease in tree canopy has contributed to rising temperatures, increased flooding, and threats to the health and well-being of vulnerable residents...In June 2023, Stillwater Construction and Central Nurseries planted 132 trees in Valley Falls, Berkeley, and Lonsdale. A second planting of approximately 130 more trees is scheduled for Fall 2023.
 - Build on social equity ties and integrate tree equity score information (lot level) into tree management plan...In Summer 2023, the Davey Resource Group completed the GIS-based street tree inventory in the southern and central sections of Town. 2,080 trees were documented including species, location, size, health, and any risks that require attention.
 - Coordinate with existing tree planting initiatives (e.g., along roadways on private property, jobs program, etc.) which may not have an explicit resiliency lens but are geared towards economic development.

State of Rhode Island

Office of Energy Resources³⁴

The 2014 Resilient Rhode Island Act established the EC4. It also set specific greenhouse gas emissions reduction targets, established an advisory board and a science and technical advisory board to assist the Council, and incorporated consideration of climate change impacts into the powers and duties of all state agencies. The EC₄ is charged with developing and tracking the implementation of a plan to achieve greenhouse gas emissions reductions below 1990 levels of: 10% by 2020; 45% by 2035; and 80% by 2050.

R.I. Energy

Gas Infrastructure, Safety, and Reliability Plan (Gas ISR) FY 2020 Proposal

In consultation with the Rhode Island Division of Public Utilities and Carriers, R.I. Energy has released the Gas ISR Plan to address capital spending on gas infrastructure and other costs related to maintaining the safety and reliability of the utility's gas distribution system, as per R.I. General laws §39-1-27.7.1.

³⁴³⁴ <http://www.energy.ri.gov/policies-programs/ri-energy-laws/resilient-rhode-island-act-2014.php>.

3.3 Administrative and Technical Capabilities

Comprehensive Emergency Management Plan

The purpose of the CEMP is to outline the emergency management program for planning and response for potential emergency or disaster situations. It assigns responsibilities and functions, which will provide for the safety and welfare of its citizens against the threat of natural, technological, and national security emergencies and disasters. The plan addresses the Mitigation, Preparedness, Response, and Recovery aspects of emergency management organizations, programs, protective actions, and specific hazards.

The plan is currently undergoing review and revision as needed and is being reformatting as follows:

- **Section I: Introduction**
- **Section II: Purpose**
- **Section III: Situation**

The section characterizes the “planning environment” for the Town of Cumberland. This section describes the characteristics of the town, identifies, and details the hazards and vulnerabilities that impact or may impact the town, identifies mutual aid agreements to which the town is a party, and the critical facilities in the community.
- **Section IV: Threat, Hazard, and Vulnerability Analysis Summary**

This section summarizes the threat, hazard and vulnerability analysis conducted by the town, identifying the hazards and threats likely to impact the town, the vulnerability to these threats and hazards, and the impacts these threats may have on residents, property, and critical infrastructure. This section also describes the assumptions and methods used to complete the town’s hazard and vulnerabilities analysis.
- **Section V: Planning Assumptions**

This section identifies what the planning assumptions to be facts for planning purposes in order to make it possible to execute the Emergency Operations Plan (EOP). During operations, the assumptions indicate areas where adjustments to the plan must be made as the facts of the incident become known. These also provide the opportunity to communicate the intent of emergency leadership regarding emergency operations priorities.
- **Section VI: Concept of Operations (CONOPS)**

The Concept of Operations sections, also known as the CONOPS, describes in easily understood language the sequence and scope of coordinating emergency response among municipal partners. It is a description of how resources will be coordinated to support the response to an incident or event, and helps our partners understand their roles and responsibilities in the context of other partners’ roles and responsibilities.
- **Section VII: Direction, Control and Coordination**

This section describes the framework for all direction, control, and coordination activities. It identifies who has tactical and operational control of response assets. Additionally, Direction, Control, and Coordination explain how multijurisdictional coordination systems support the efforts of organizations to coordinate efforts across jurisdictions while allowing each jurisdiction to retain its own authorities.

This section also provides information on how individual department and agency plans nest into the CEMP (horizontal integration) and how higher-level plans are expected to layer on the EOP (vertical integration).

- **Section VIII: Organization and Assignment of Responsibilities**

This section describes the organizational structure that we employ to respond to an emergency. It articulates the roles and responsibilities that various members of the emergency management organizational structure have in any response.

- **Section IX: Emergency Operations Center (EOC) Structure and Operations**

This section describes the incident command and Emergency Support Function structure for the EOC and the describes the department/discipline-based structure of the EOC.

- **Section X: Information Collection, Analysis and Dissemination**

This section describes the critical or essential information common to all operations identified during the planning process. It identifies the type of information needed, the source of the information, who uses the information, how the information is shared, the format for providing the information, and any specific times the information is needed. This section specifically details our methods internal and external messaging (social media, print media, Code Red®, websites, radio messaging) in an emergency.

- **Section XI: Communications**

This section describes the communication protocols and coordination procedures that are utilized between response organizations during emergencies and disasters. It discusses the framework for delivering communications support and how our communications integrate into the State and national disaster communications network.

- **Section XII: Administration, Finance and Logistics**

This section addresses authorities for, and policies on augmenting staff by reassigning staff and soliciting volunteers, along with relevant liability provisions. Also addressed are general procedures for keeping financial records and reporting.

- **Section XIV: Annexes**

This section contains annexes detailing the response to and planning for various threats and situations. Examples include, but are not limited to winter storms, hurricanes, hazardous materials incidents, flooding, tornadoes, extreme heat or cold.

Emergency Operations Center

The Town maintains a primary and alternate (in the event that the primary location is rendered or deemed unusable) Emergency Operations Center (EOC) which serve as the central point for coordination of the community emergency management and response activities, maintaining situational awareness about the emergency situation, and facilitating requests for deployment of resources.

Primary EOC:

Cumberland Public Safety Complex
1379 Diamond Hill Road
Cumberland, RI 02864
(401) 333-2500

Interim/Alternate EOC:

Cumberland Fire District (Headquarters)

3502 Mendon Road
Cumberland, RI 02864
(401) 658-0544

Shelters:

McCourt Middle School (regional shelter)
45 Highland Avenue
Cumberland, RI 02864
(401) 725-2092

Cumberland High School – Wellness Center
2600 Mendon Road
Cumberland, RI 02864
(401) 658-2600

Mass Care Facilities:

Cumberland Public Safety Complex (24 hours)
(Warming/Cooling Center)
1379 Diamond Hill Road
Cumberland, RI 02864
(401) 333-2500

Cumberland Public Library
(Warming/Cooling Center)
1464 Diamond Hill Road
Cumberland, RI 02864
(401) 333-2552

Mutual Aid Systems

The Town of Cumberland is part of multiple local and state mutual aid systems (the provision of services from one jurisdiction to another) for additional critical resources.

- Community-to-Community Mutual Aid. The Town of Cumberland maintains mutual aid agreements with adjacent communities. This allows the Town to request support for response activities. It also provides a way for Cumberland to share its resources with neighboring communities that are endured by an emergency resource shortfall.
- State-to-Community Mutual Aid. RIEMA is authorized to make available any equipment, services, or facilities owned or organized by the State for use by the Town of Cumberland upon request (Emergency Management Assistance Compact).

Emergency Alerts and Warnings

Emergency alert and warning systems are designed to allow the Town to warn the public of impending or current threats or emergencies that will affect the area. Public warning systems communicate critical emergency information to the public during times when other communications systems may not be dependable. Public warnings may be issued during severe weather, flooding, fire, extreme temperatures, hazardous materials release, terrorist threat, water contamination, and any other threats to life, property, and safety.

Public alerts and warnings are disseminated through specific channels, as appropriate:

- CodeRed/Reverse 911
- Town and public safety websites
- Town and public social media

Conservation and Management Plans³⁵

Over the years, the Town of Cumberland has worked with various municipal departments in collaboration with a number of private and non-profit organizations to develop a series of Conservation and Management Plans to address some of the most significant natural resource/open space areas throughout the community – some of which have both direct and indirect impacts on some of the hazards profiled in this 2023 Update.

- Albion Town Landfill (August 4, 2020)
 - The purpose is to facilitate the determination of how to permanently and safely remediate, cap and close the landfill, in addition to try and secure potentially responsible parties to help share the remediating, capping and closure costs. In November 2021, the Town submitted a Site Investigation Report to RI DEM, with RI DEM returning an order to perform an additional year of gas and groundwater testing, anticipated to begin in 2024.
 - Consideration is also being given to converting the landfill to a solar farm by entering into a 20/25-year integrated Power Purchase Agreement with a solar energy developer.
- Mercy Woods (October 14, 2017)
 - The purpose is to work with collaborating partners to create ‘Mercy Woods’, a 211.5-acre conservation project and a 17.5-acre active recreation area – the Town’s potentially largest open space purchase in 50 years.
- Monastery (April 17, 2018)
 - The purpose is to reaffirm its commitment to the preservation of the Monastery’s natural environment.
- Metcalf-Franklin Farm (2022)
 - The purpose is to confirm the Farm is to be used to promote historic preservation, education, passive recreation, agriculture, conservation and community involvement.
 - Includes Objectives/Action Items for property maintenance: The Historic Metcalf-Franklin Farm Preservation Association (HMFPPA) will continue to manage alien invasive vegetation species. In 2023, a new two million gallon per day well field was installed.
- Diamond Hill Town Park (February 15, 2020)
 - The purpose is to document and evaluate the current state of the Park’s attributes, to articulate a vision for the Park’s future, and to specify steps to be taken to achieve that vision. In 2022, the Town completed the construction of a trailhead building with restroom facilities. The Town is also going out to bid for the reconstruction of the parking area with new access/egress alignments, circulation pattern, and landscaping. A new

³⁵ <https://www.cumberlandri.org/196/Planning-Community-Development>.

Ski Lodge building is planned for completion by the end of 2024 with a new septic system. The pond was also dredged, and circulation flows restored.

- Includes Objectives/Action Items for property maintenance: The Town will be vigilant as to the establishment of any invasive plants.
- Epheta Neighborhood Park (November 9, 2017)
 - The purpose is to facilitate Phase 1 improvements, including: multi-use play field; and sensory playground equipment designed for children ages 1 – 8. RI DEM improvements were funded/completed in 2022.
- Heritage Park (February 15, 2020)
 - The purpose is to work with collaborating partners to maintain and improve the Park to engender pride and increase use by residents of Valley Falls and Cumberland.
 - The Town secured permitting from the RI DEM in Spring of 2022 and removed 45 invasive Norway Maples, while also planting 24 new native species in the Park. The Town is also investing \$2 million to restore and adaptively reuse the brick Amaral Building (1890) to create a new Community Outreach and Health Center. As part of this project, a new access pathway into the Park will be constructed and sculpting of the sloped area will create an amphitheater for education and cultural engagement.
- New Pond Park (May 20, 2020)
 - The purpose is to document the remediation and capping of the now Superfund site, and potential for the Town to petition to 'clear the title' and negotiate the final site design features and enjoy a new 62-acre park. The Town is currently engaged with the Environmental Protection Agency (EPA) and the Settling Performing Defendants (SPD) to determine a reuse design for the 62-acre site. Although the Nunes parcel is constrained by the capping of a large amount of waste, the hope is that a park scape can be installed to make the site more attractive.

Citizens Emergency Response Team (CERT)

The CERT program (Figure 3-2) educates citizens about disaster preparedness for hazards that may affect them and trains the public in basic disaster response skills such as fire safety, light search and rescue, team organization and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others following an event when professional responders are not immediately available to help, or by taking a more active role in emergency preparedness projects in the community. The Cumberland CERT maintains a roster of approximately 32 members, meeting every other month (except for July/August). The Town held a recruitment campaign in 2022 and on-boarded nine new members. The Town's EMA also sponsored a 12-week academy for new members/existing members who did not have the opportunity to attend a formal CERT Academy.

Figure 3-2 MEDS Full-Scale Exercise



CERT Team participating in a Medical Emergency Distribution System (MEDS) Full-Scale Exercise, February 18, 2016.

Left Photo: Mayor Murray (former) with Public Safety Officials
Photos Courtesy of Town of Cumberland.

Right Photo: Dispensing Room

Coordination with Local Business Community

The Town continues to coordinate with several of the businesses located within flood hazard areas associated with the Berkeley Industrial Park (Martin Street/Blackstone River), industrial businesses impacted by repetitive flooding due to inadequate drainage (Industrial Road, Ann & Hope Mill Redevelopment), and Stop n' Shop on Mendon Road (Blackstone River).

In the past, the Town worked with Hope Global and the USACE - New England District (*Flood Mitigation Feasibility Study*) in an effort to protect them from future catastrophic floods. Other industrial businesses within the same flood area, (Dean Warehouse and Okonite) were not factored into the study for acquisition as they are located at higher elevations and would have provided less project-related benefits. Unfortunately, for Hope Global, the non-structural acquisition alternative was not compliant with USACE single-owner policy as described in ER 1165-2-123, and the study was terminated.

Hope Global did receive a \$1.5 million community block grant back in May 2015 to outfit machinery to be raised off the floor and relocate all of the companies' IT infrastructure (computers and servers) to the second floor, keeping the company in Cumberland and preserving hundreds of jobs.

Berkeley Industrial Park

Hope Global

Hope Global continues to coordinate with the Town on their individual *Business Continuity Plan Update Procedure* (2021) which calls for the annual update of the following:

- Contact lists for suppliers, vendors, customers and active employees
- Business Unit Recovery Plan
- Crisis Management Plan

- IT Recovery Plan
- Emergency Preparedness Plan

Hope Global has also developed a *Flood Emergency Response Plan: Flood Emergency Quick Guide/Flood Recovery Plan* (2021) to reduce the Company's flood damages and downtime, as much as possible, by planning the event in advance.

Recent coordination efforts with representatives of Hope Global (as part of the 2023 Update) identified additional concerns associated with intermittent flooding of the front parking lot and rear outdoor materials storage area. The company is interested in a feasibility study to better understand the primary source of flooding and potential remediation measures for implementation. A mitigation action has been added to the mitigation strategy.

Berkeley Business Center

Recent coordination efforts with representatives of the Berkeley Business Center revealed that the business has not been impacted by previous flooding events emanating from the river or collective drainage issues, although the basement and parking area does flood occasionally during periods of heavy rain due to inadequate drainage onsite. The business is currently updating their onsite stormwater management system by installing a holding tank and recommissioning an existing inlet/outlet pipe that will direct overflow to the Blackstone River. With the ongoing improvements, representatives do not see the need for any additional projects/coordination at this time.

Dean Industries

The site has been impacted by two previous flooding events, although not significantly. In recent discussions with the business owner, it was stated that they utilize a pump to keep water out of the parking lot from the undersized, centralized catch basin, with a backflow preventor in place to stop any water from backing up from the Blackstone River. A berm along the Blackstone River (Narragansett Bay sewer easement) also provides additional protection when the levels in the River rise. The owner does not see the need for any projects/additional coordination at this time.

Industrial Road Businesses

August 18, 2023, brought heavy rain and wind to the Industrial Road area resulting in knee-deep water leaving businesses to ask when they might see drainage improvements implemented (Figure 3-3). The Mayor commented that the engineering firm the Town hired just completed their evaluation (August 8, 2023) of the flooding issues, which identified potential alternatives requiring approval from the RI Department of Transportation. The root cause of the problem is that all drainage from all properties on Industrial Road goes to the same pipe of a certain size, which then shrinks as it reaches Okonite, the Mayor said. The Town has the \$2 million or so it needs to complete work, funded through various grants, and the council hired an engineering firm, said the Mayor, and they're right at the point, with multiple options, to make a decision on a design. The issue here is that water has to go somewhere, he said, and the problem won't be solved by moving it from one area to create an issue somewhere

else.³⁶

Figure 3-3 Flooding on Industrial Road



***Industrial Road floods again; delayed help on the way.
Photo courtesy of The Valley Breeze.***

Most recently (2022), as part of the MRP through the RIIB, the Town secured a \$500,000 grant to address chronic flooding and stormwater improvements along Industrial Road, Cumberland's largest commercial area and home to over twenty-nine businesses and over 450 jobs that support the local economy.

Townwide Sites

Stop n' Shop

Recent coordination efforts with representatives of Stop & Shop (as part of the 2023 Update) revealed damages associated with intermittent flooding of the electric room in the basement of the retail building (requiring full electrical equipment replacement, 2010) and damage to the asphalt parking lot (requiring replacement). Since, the retail building has been sandbagged a number of times as a result of warnings in advance of the Blackstone River cresting, and multiple sump pumps have been installed in the basement of the retail building. The company is interested in a Flood Mitigation Study to evaluate mitigation measures to alleviate intermittent flooding of the Utility Room and retail space. A mitigation action has been added to the mitigation strategy.

Ann & Hope Mill Redevelopment Site

Coordination with the development company associated with the Ann & Hope Mill redevelopment site revealed flooding damages onsite as a result of heavy precipitation and inadequate drainage in the Broad Street corridor on September 11, 2023. The company is interested in a drainage infrastructure assessment along the Broad Street corridor to alleviate impacts to the site's access/entrance and building. A mitigation action has been added to the mitigation strategy.

³⁶ https://www.valleybreeze.com/news/industrial-road-floods-again-delayed-help-on-the-way/article_81cc3a88-409b-11ee-9126-7773f9d1725c.html.

The Town will continue to work with local businesses located within flood hazard areas to identify mitigation measures to reduce their vulnerability to flooding, as well as continue to support them in identifying and securing grant funding. The Town will also inventory and maintain a summary of the following information for those participating businesses/industries:

- Flood mitigation efforts completed to date
- Information regarding Standard Operating Procedures (SOPs)
- Information regarding Continuity of Operations (COOP) plans

Coordination with Neighboring Municipalities

The Town of Cumberland coordinates with the Town of Lincoln, City of Central Falls and City of Pawtucket frequently across many municipal issues. The Town will continue to coordinate with these adjacent communities on natural hazard mitigation planning, specifically any shared resource plans (PWSB), and evacuation plans.

Municipal Administration and Staff

The Cumberland Town Council, Planning Board, Cumberland LHMC, and municipal officials all work well together to develop, implement and update policies and plans to promote the safety of its residents and minimize risk to the community.

State of Rhode Island

Warning Systems

Emergency Management State Radio System (EMSTARS) The Rhode Island

EMSTARS is a Simplex (non-repeated) radio system that links local EOCs to the Rhode Island State EOC. This is an encrypted radio system that is located and kept secure in each EOC. It has been designed to afford communities a redundant mode of secure communications to the state EOC. EMSTARS is designed to be a base-to-base system only. There are no other talk groups on the VHF system.

National Warning System (NAWAS)

NAWAS system used to convey warnings to United States-based Federal, State and local governments, as well as the military and civilian population. NAWAS has proven invaluable to local emergency managers responding to or coping with natural disasters.

Notification Systems

Rhode Island Broadcasters Association's (RIBA) Cancellation System

The RIBA has a unified cancellation/delay notification system that transmits weather-related class cancellations throughout Rhode Island and bordering communities. The Town submits notices through RIBA's secure automated telephone or web-based system. The data is then available in real-time to all participating radio and television stations as well as on their websites. The TV and radio stations broadcast this information as they have in years past. RIBA has modified its system to include more than just weather-related closings and they have initiated a program to send alert messages to cell phones, email addresses, or home phone numbers of individuals who "subscribe" on the websites of any of their member stations.

Rhode Island Red Cross Emergency Notification System (ENS)

The Rhode Island Red Cross ENS enables immediate information dissemination of updates, reminders and emergencies to ARC-RI Volunteers via various contact methods. The system enables appointed personnel to quickly and easily contact one, several or all individuals via web or telephone interface and distributes notifications via multiple media, including telephones, cell phones, email, pager, text messaging. The system is capable of recorded voice and text-to-speech notifications, multilingual text-to-speech conversion, pre-defined messages, and recipient acknowledgement.

Amber Alert System

The State of Rhode Island Department of Public Safety's AMBER Alert Program is a voluntary partnership between law-enforcement agencies, broadcasters, transportation agencies, and the wireless industry, to activate an urgent bulletin in the most serious child-abduction cases. The goal of an AMBER Alert is to instantly galvanize the entire community to assist in the search for and the safe recovery of the child.

Executive Climate Change Coordinating Council (EC4)

*Resilient Rhody*³⁷

Resilient Rhody is a statewide climate resilience action strategy that responds to changing weather and environmental conditions in Rhode Island caused by climate change and proposes bold yet implementable actions to better prepare the state for these impacts. Under the leadership of Governor Gina M. Raimondo, steps have been taken to begin the hard work necessary to address the effects of climate change. Now is the time to invest in priority projects, continue to work collaboratively across agencies, and reinforce the strong partnerships between the state and municipalities to empower and prepare communities for a new climate reality. To accelerate actions and investments, Governor Raimondo signed an Executive Order on September 15, 2017, calling for the development of the state's first comprehensive climate preparedness strategy. *Resilient Rhody* lays the groundwork for collective action, involving state agencies, municipalities, and statewide organizations. This strategy will focus the state's attention on catalytic climate resilience actions both within government and together with business, academic, and nonprofit partners. Building on the climate leadership of state government, municipalities, and organizations, it leverages existing studies and reports to identify critical actions that move from planning to implementation.

RIDEM³⁸

Implications of Climate Change for Rhode Island Wastewater Collection & Treatment Infrastructure

RIDEM, in collaboration with the state's Office of Housing and Community Development, recognized the need to begin integrating climate change considerations into wastewater system planning and design. This study is a planning tool intended to help Rhode Islanders understand the projected implications of climate change on the state's 19 public wastewater treatment systems. It focused on the municipal treatment plants and the major pump stations that help bring flow to those treatment plants. It did not include wastewater infrastructure owned by private entities or onsite systems with subsurface disposal. The study includes recommendations for adaptive strategies.

³⁷ <http://climatechange.ri.gov/documents/resilientrhody18.pdf>.

³⁸ <http://www.dem.ri.gov/programs/water/wwtf/wwtf-climate.php>.

Rhode Island Department of Health (RIDOH)

SafeWater RI: Ensuring Safe Water for Rhode Island's Future

To help address the implications of climate change to drinking water utilities, RIDOH, Office of Drinking Water Quality launched *SafeWater RI: Ensuring Safe Water for Rhode Island's Future*. The objective is to assess changing conditions including temperature, precipitation patterns, SLR and storm surge and their potential impacts to drinking water infrastructure in Rhode Island. The project includes a desktop literature review of the following issues: the state of knowledge regarding climate change trends for the Northeast and specifically Rhode Island, potential climate change impacts of drinking water utilities, and best practices used in adaptation strategies for drinking water utilities.

*Rhode Island Special Needs Emergency Registry*³⁹

This registry allows police, fire, and other first responders in the community to better prepare for and respond to community needs during a hurricane, storm, or other emergency.

Many people may need extra help during a time of emergency, including people who:

- Use life support systems such as oxygen, respirator, ventilator, dialysis, pacemaker, or are insulin dependent,
- Have mobility disabilities and use a wheelchair, scooter, walker, cane, or other mobility device,
- Are visually impaired, blind, hard of hearing, or deaf,
- Have speech, cognitive, developmental or mental health disabilities, or
- Use assistive animals or a prosthesis.

Rhode Island Department of Transportation (RIDOT)

As mentioned earlier, through RhodeWorks, RIDOT initiated work on the reconstruction of structurally deficient bridges as well as preventative approaches to prevent others from also becoming deficient. A number of these structures are in Cumberland, scheduled for rehabilitation or preservation through the STIP projected through 2022 - 2031 (Table 3-1).

Table 3-1 Cumberland STIP Projects (RIDOT)

Location	State #	Owner	Bridge Group # (TIP)	Description of Work
Bridge Program				
Second Avenue SB	098421		14/3016	Minor Rehabilitation
Second Avenue NB	098401		14/3016	Minor Rehabilitation
Newell	020401		17C/3183	Total Replacement work to start 2024/2025
Abbott Run Valley Rd. SB	075521		08A/3282	Major Rehabilitation
Abbott Run Valley Rd. NB	075521		08A/3282	Major Rehabilitation

³⁹ <http://www.health.ri.gov/emergency/about/specialneedsregistry/>.

Mendon Rd.	075101		37/3053	Major Rehabilitation 2023/2024
Blackstone Viaduct SB	075021		08E/3276	Minor Rehabilitation 2024/2025
Blackstone Viaduct NB	075021		08E/3276	Minor Rehabilitation 2024/2025
Cumberland Mills	040701		0/9540	Minor Rehabilitation
John St.	039501		17/3026	Minor Rehabilitation
Sneech Brook	016501		24F/3236	Minor Rehabilitation
Arnold Mills	030101		48H/3070	Total Replacement
Abbott Run Culvert	075601		08A/3282	Minor Rehabilitation
Mackenzie	069101		48H/3070	Preservation
Lonsdale Arch	069101		48H/3070	Preservation
Ashton Viaduct	027501		24CH/3231	Historic Minor Rehabilitation
Sneech Pond Culvert	124501		17C/3183	Major Rehabilitation
Diamond Hill Rd.	075401		17A/3181	Total Replacement
Corridor Projects Program				
High St. (RI-123 to E. Earle St.)	PAVE 44681		0/9540	Reconstruction
SDW Dexter St. W (Curran Rd. to Broad St.)	SDW 9970		0/9450	Rehabilitation
SDW Dexter St. E (Broad St. to MA SL)	SDW 9969		0/9450	Rehabilitation
Pavement Program				
I-295S (MA/SL to Lincoln TL)	PAVE 90		0/1275	Level/Overlay
I-295S (MA/SL to Lincoln TL)	PAVE 92		0/1275	Level/Overlay
RI-122 (RI-120 to Homestead Rd.)	PAVE 120		0/9539	Mill/Fill Treatment
RI-123 Dexter St. (Broad St. to MA SL)	PAVE 121		0/9540	Reconstruction
RI-114 Broad St. (Mill St. to Blackstone St.)	PAVE 175		0/9007	Reconstruction 2023
Sneech Pond Rd. (RI-120 to end)	PAVE 199		17C/3183	Total Replacement 2024/2025
RI-114 Broad St. (Central Falls to end)	PAVE 217		0/9007	Reconstruction 2023
RI-116 Angell Rd. (RI-122 to RI-114)	PAVE 227		0/1322	Level/Overlay 2023
RI-122 Mendon Rd. (I-295 to Lincoln TL)	PAVE 318		0/1318	Level/Overlay
Route 122 at Broad St.	HSIP 206		0/1318	Upgrade Signal System

				2023
Route 122 at Angell Rd.	HSIP 206		0/1318	Upgrade Signal System 2023
SDW Mendon Rd. N (RI-122 to I-295N ramp to I-295)	SDW 9957		0/1318	Rehabilitation 2023/2024
SDW Mendon Rd. N (Lincoln TL to G. Washington Hwy.)	SDW 9956		0/1318	Rehabilitation
SDW Mendon Rd. S (I-295 to Lincoln TL)	SDW 9958		0/1318	Rehabilitation

Source: RIDOT

<https://risegis.ri.gov/portal/apps/opsdashboard/index.html#/a2122bbbf1434cd6b73d6b2216458c1b>

Rhode Island Department of Public Safety

Reverse 911

Reverse 911 is a communication system that allows emergency services to quickly contact members of a community or organization with information. This system allows emergency services to do the "reverse" and inform the public of a known hazard. Reverse 911 is designed to provide map- or list-based communications with key audiences. Geographic calling zones are created based on immediate circumstances or ahead of time based on anticipated needs.

3.4 Financial Capabilities

Federal/State Grant Opportunities

The Town, across all municipal departments, considers and pursues all applicable federal, state and local grant opportunities to assist in implementing hazard mitigation programs, such as FEMA, Housing and Urban Development (HUD CDBG) Program, United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) and Rural Development Grants, GrantWatch, U.S. Economic Development Administration (EDA) and various other grant programs.

FEMA Hazard Mitigation Assistance (HMA) Program (HMGP, BRIC, and FMA) – In 2020, the Town of Cumberland applied for and received \$27,933.20 (BRIC grant) to update the Town's Hazard Mitigation Plan.

HUD CDBG Program – a flexible program that provides communities with resources to address a wide range of unique community development needs, particularly the Disaster Recovery Assistance Program which provides grants to help cities, counties, and States recover from Presidentially-declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.

RIDEM Bay and Watershed Restoration Fund – The Town received a grant in 2017 (\$197,500) for a vacuum/jet truck for enhanced catch basin cleaning capabilities.

RIEMA State Homeland Security Grant – The Town received a grant in 2018 (\$45,000) towards outfitting the new Emergency Operations Center.

RIIB MRP Grants – Since becoming an MRP-Certified community in 2021, the Town has received two grants to mitigate priority projects:

- Valley Falls/Lonsdale Urban Forestry Project (\$250,000): The Town of Cumberland is a pilot community for American Forests, Tree Equity Score Analyzer (TESA), a tool for analyzing and prioritizing where trees need to go the most. Trees create an infrastructure that beautifies neighborhoods, increases property values, provides shade, enhances quality of air, reduces stormwater runoff, and makes streets more walkable. Cumberland’s tree planting will include over 196 tree sites, at over 26 locations within the Town and RIDOT rights of way and complement the \$18.2 million DOT Broad Street Regeneration Project.
- Industrial Road chronic flooding and stormwater improvements (\$500,000): Industrial Road is Cumberland’s largest commercial area; the business park is home to over twenty-nine businesses: Okonite Company, YRC Freight, FedEx Freight, Dean Warehouse and many others. Industrial Road is the primary road of access to and from Diamond Hill Road and Route 295. The chronic flooding in this area has greatly impacted business loss and disruption; over 450 jobs support the local economy.

USDA NRCS and Rural Development Grants – provides conservation technical assistance, financial assistance, and conservation innovation grants. USDA Rural Development operates over fifty financial assistance programs for a variety of rural applications.

USEDA - EDA disaster grants are available under the Economic Adjustment Assistance (EAA) program. EAA funds can be awarded to assist a wide variety of activities related to disaster recovery, including economic recovery strategic planning grants, and public works construction assistance.

U.S. National Forest Service Grants – The Town received a grant to plant 300 trees on private property in Valley Falls, Lonsdale and Berkeley, focusing on areas based on heat, lack of canopy, impervious surfaces and environmental justice. Tree plantings began in the spring of 2023 and are anticipated to conclude by the end of 2025.

3.5 National Flood Insurance Program

Cumberland implements and enforces the state building code and fully participates in the NFIP. Cumberland has supported natural resource management and protection, which is articulated in the *Comprehensive Community Plan* and the *Open Space Plan*. Cumberland understands that participation in the NFIP is an essential step in mitigation flood damage and is working to consistently enforce NFIP compliant policies in order to continue its participation in this program.

Table 3-2 Actions for Continued Compliance with NFIP below lists those actions that the Town has done and will continue to do and those actions that will be done within the next five years for continued compliance with the NFIP.

Table 3-2 Actions for Continued Compliance with NFIP

Actions (Listed in order of priority)	Done/Ongoing	To be Done
Join the NFIP.	X	
Participate in NFIP training by State and/or FEMA.	X	
Establish mutual aid agreements with neighboring communities to address administering the NFIP following a major storm		X
Address NFIP monitoring and compliance	X	
Revise/adopt subdivision regulations and erosion control regulations to improve floodplain management in the community.	X	
Participate in the CRS.		X
Prepare, distribute, or make available NFIP, insurance and building code explanatory	X	
Identify and become knowledgeable on non-compliant structures in the community.		X
Identify and become knowledgeable of submit to rate structures.		X
Identify cause of submit to rate structure and analyze how to prevent non-compliant structures in the future.		X
Inspect foundations at time of completion before framing to determine if lowest floor is at or above	X	
Require use of elevation certificates.	X	
Report any changes in the Special Flood hazard Area to FEMA within 180 days of change.	X	
Identify and keep track of LOMA/LOMR in the community.	X	
Gain familiarity with community's Flood Insurance Rate Maps.	X	
Address repetitive loss structures.	X	

Source: Cumberland LHMC.

3.6 Community Rating System

NFIP's CRS Program is a voluntary program that recognizes and encourages a community's efforts that exceed the NFIP minimum requirements for floodplain management. The CRS program emphasizes three goals:

- the reduction of flood losses
- facilitating accurate insurance rating
- promoting the awareness of flood insurance

By participating in the CRS Program, communities can earn a 5-45% discount for flood insurance premiums based upon the activities that reduce the risk of flooding within the community.

The Town does not currently participate in the NFIP's CRS Program. The Town's adoption, enforcement and maintenance of the Flood Zone Mapping and Special Flood Hazard Area Ordinance allows the Town to continue to participate in the NFIP which means that all property owners in Town continue to be eligible to purchase flood insurance for their property.

3.7 Existing Protection Matrix

A summary of the main identified existing and future protection measures presented above are summarized on Table 3-3. These measures constitute the baseline protection that was further evaluated by the Cumberland LHMC to determine gaps in Cumberland's protection from natural disasters. Goal statements and specific actions were then developed to mitigate the identified gaps in the existing protection. These identified protection measures facilitate the Town of Cumberland to implement various hazard mitigation programs, ultimately making the community more resilient.

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Planning and Regulatory				
Comprehensive Plan 2016 - 2036				
	The 2016-2036 Plan includes a Natural Hazards element. This element includes mitigation goals, also referenced in this 2023 Update. Moving forward, the Town will integrate new mitigation actions from this 2023 Update in the next Comprehensive Plan Update.	Townwide	Effectiveness: Very Good Enforcement: Managed by Town Council and Mayor	Update concurrently with Hazard Mitigation Plan
Open Space Plan 2003				
	The 2003 Plan includes some of the mitigation actions regarding open space preservation and acquisition included in the 2017 Hazard Mitigation Plan, still relevant for this 2023 Update. Moving forward, the Town will integrate new mitigation actions from this 2023 Update in the next Open Space Plan Update.	Townwide	Effectiveness: Good Enforcement: Managed by Conservation Commission, Town Council, and Mayor	Update concurrently with Hazard Mitigation Plan
Flood Protection Services				
	As requested, the Planning/Community development Department and/or Building Official provide residents and business owners with information regarding properties located within the Special Flood Hazard area, flood insurance/Flood Insurance rate Maps (DFIRMs), and elevation certificates.	Properties located within Special Flood Hazard areas	Effectiveness: Good Enforcement: Managed by Town Planner	Continue to Utilize
Land Development & Subdivision Regulations (2015)				
	Provide for additional protections by way of Environmental Impact Statements (EISs) by assessing short and long-term cumulative environmental impacts including flooding and drainage. Also regulates development in the flood plain, specifically within the velocity flood zone.	Townwide	Effectiveness: Good Enforcement: Planning Board, Building Inspector, and Director of Community Development	Continue to Enforce

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Planning and Regulatory				
Code of Ordinances, Chapter 17 Special Flood Hazard Areas and				
	Regulations to ensure public safety; minimize hazards to persons and property from flooding, to protect watercourses from encroachment and to maintain the capability of floodplains to carry off floodwaters.	Townwide	Effectiveness: Very Good Enforcement: Managed by Department of Public Works	Continue to Enforce
Code of Ordinances, Chapter 20 Land Disturbing Activities, Article III Section 20-61 Soil Erosion and Sediment Control Ordinance				
	Regulations to prevent soil erosion and sedimentation from occurring as a result of nonagricultural development within the Town, requiring proper provisions for water disposal and the soil surfaces during and after construction to promote the safety, public health, and welfare of residents.	Townwide	Effectiveness: Very Good Enforcement: Managed by Department of Public Works	Continue to Enforce
Code of Ordinances, Article V Section 14-121 Stormwater Ordinance (2017)				
	Regulation of illicit connections and discharges to the municipal storm drain system for the protection of the Town's waterbodies and groundwater, and to safeguard the public health, safety, and welfare of the environment.	Townwide	Effectiveness: Very Good Enforcement: Managed by Department of Public Works	Continue to Enforce
Code of Ordinances, Article VI, Section 6-16 Stormwater Basins Ordinance (2021)				
	Regulation of stormwater basins for the temporary collection and storage of stormwater so as to control peak surface runoff and allow for the gradual absorption or release of the stored water at controlled rates.	Townwide	Effectiveness: Very Good Enforcement: Managed by Department of Public Works	Continue to Enforce
Cumberland, RI Stormwater Management Program Plan (2003)				
	Regulations to protect and preserve the Town's natural resources including unique environmental areas; surface and ground water quality; agricultural soils; and rural character.	Townwide	Effectiveness: Good Enforcement: Managed by Department of Public Works	Continue to Enforce

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Planning and Regulatory				
R.I. State Building Code				
	The Rhode Island State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing and snow loads.	Town-wide	Effectiveness: most effective for new construction Enforcement: Planning Board/Building Dept.	Continue to Utilize
R.I. Sea Grant Fact Sheets/Climate Change Science Summary				
	Highlights impacts to the built environment, public health and welfare, and natural resources.	Inland areas subject to inundation	Effectiveness: Good Enforcement: Across municipal officials/departments	Continue to Utilize
Valley Falls Emergency Action Plan				
	Identifies SOP's through and Emergency Action Plan in the event of an incident regarding the hazardous materials rail transport through the Valley Falls section of Cumberland.	Valley Falls	Effectiveness: Good Enforcement: Managed by EMA/Police/Fire	Continue to Utilize
Municipal Resilience Program: RI Infrastructure Bank				
	A community-driven process to assess current hazard and climate change impacts and to surface projects, plans, and policies for improved resilience through the identification of primary objectives/projects.	Townwide	Effectiveness: Good Enforcement: Across municipal officials/departments	New to this Update
State of RI: Office of Energy Resources				
	2014 Resilient RI Act set greenhouse gas emissions reduction targets.	Townwide	Effectiveness: Good Enforcement: Across municipal officials/departments	New to this Update
National Grid: Gas Infrastructure, Safety, and Reliability Plan				
	In consultation with the RI Division of Public Utilities and Carriers, National Grid has released the Gas ISR Plan to address capital spending on gas infrastructure and other costs related to maintaining the safety and reliability of the utility's gas distribution system.	Townwide	Effectiveness: Good Enforcement: Across municipal officials/departments	New to this Update

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Administrative and Technical				
Comprehensive Emergency Management Plan				
	Outlines the emergency management program for planning and response for potential emergency or disaster situations.	Townwide	Effectiveness: Good Enforcement: Across municipal officials/departments	Currently under review/revision
Town of Cumberland Conservation Management Plans				
	A series of protection plans to address significant natural resource/open space areas throughout the community as impacted by natural hazards.	Townwide	Effectiveness: Good Enforcement: Across municipal officials/departments	New to this Update
Citizens Emergency Response Team (CERT)				
	Responds to all types of emergency situations (excluding medical, law enforcement) in Cumberland.	Townwide	Effectiveness: Very Good Enforcement: Managed by EMA Director and Mayor	Continue to Operate
Coordination with Local Business Community				
	Town regularly coordinates with local business community before, during and after flood events.	Townwide	Effectiveness: Very Good Enforcement: Department of Planning and Community Development	Continue to Utilize
Coordination with Neighboring Municipalities				
	Coordination to identify applicable efficiencies (resource-sharing, Mutual Aid agreements).	Regional context	Effectiveness: Very Good Enforcement: EMA Director, Mayor	Continue to Utilize
Municipal Administration and Staff				
	Municipal officials, staff, Boards, and Commissions all work together to develop, implement and update policies and plans to promote the safety of residents and minimize risk to the community.	Townwide	Effectiveness: Very Good Enforcement: Town Administrator, Town Council, Municipal Staff	Continue to Utilize

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Administrative and Technical				
State of Rhode Island				
	<i>Emergency Management State Radio System</i> The EMSTARS is a Simplex (non-repeated) radio system that links local EOCs to the Rhode Island State EOC.	Statewide	Effectiveness: Very Good Enforcement: Managed by Cumberland EMA	Continue to Utilize
	<i>National Warning System (NAWAS)</i> NAWAS system used to convey warnings to United States-based Federal, State and local governments, as well as the military and civilian population.	Statewide	Effectiveness: Very Good Enforcement: Managed by Cumberland EMA	Continue to Utilize
	<i>Rhode Island Broadcasters Association's (RIBA) Cancellation System</i> Has a unified cancellation/delay notification system that transmits weather-related class cancellations throughout Rhode Island and bordering communities.	Statewide	Effectiveness: Very Good Enforcement: RIBA	Continue to Utilize
	<i>RI Red Cross Emergency Notification System (ENS)</i> Enables immediate information dissemination of updates, reminders and emergencies to Rhode Island Red Cross Volunteers via various contact methods.	Statewide	Effectiveness: Very Good Enforcement: RI Red Cross	Continue to Utilize
	<i>Amber Alert System</i> The State of Rhode Island Department of Public Safety's AMBER Alert Program is a voluntary partnership between law-enforcement agencies, broadcasters, transportation agencies, and the wireless industry, to activate an urgent bulletin in the most serious child-abduction cases.	Townwide	Effectiveness: Very Good Enforcement: Dept. of Public Safety	Continue to Utilize
	<i>Resilient Rhody</i> A statewide climate resilience action strategy that responds to changing weather and environmental conditions in RI caused by climate change and proposes bold yet implementable actions to better prepare the state for these impacts.	Statewide	Effectiveness: Very Good Enforcement: Executive Climate Change Coordinating Council	Continue to Utilize

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Administrative and Technical				
State of Rhode Island				
	<p><i>Implications of Climate Change for Rhode Island Wastewater Collection & Treatment Infrastructure</i></p> <p>Integrates climate change considerations into wastewater system planning and design. This study is a planning tool intended to help Rhode Islanders understand the projected implications of climate change on the state's nineteen public wastewater treatment systems.</p>	Statewide	Effectiveness: Very Good Enforcement: RIDEM	Continue to Assess Vulnerability
	<p><i>SafeWater RI: Ensuring Safe Water for Rhode Island's Future</i></p> <p>Assess changing conditions including, temperature, precipitation patterns, sea level rise and storm surge and their potential impacts to drinking water infrastructure in Rhode Island.</p>	Statewide	Effectiveness: Very Good Enforcement: RIDOH	Continue to Utilize
	<p><i>Rhode Island Special Needs Emergency Registry</i></p> <p>Allows police, fire, and other first responders in the community better prepare for and respond to community needs during a hurricane, storm, or other emergency.</p>	Statewide	Effectiveness: Very Good Enforcement: RIDOH	Continue to Utilize
	<p><i>RhodeWorks</i></p> <p>The reconstruction of structurally deficient bridges and has acted on others to prevent them from becoming structurally deficient.</p>	Statewide	Effectiveness: Very Good Enforcement: RIDOT	Continue to Implement
	<p><i>Reverse 911</i></p> <p>A communication system that allows emergency services to quickly contact members of a community or organization with information. This system allows emergency services to do the "reverse" and inform the public of a known hazard.</p>	Statewide	Effectiveness: Very Good Enforcement: RI Dept. of Public Safety	Continue to Utilize

Table 3-3 Existing Protection Matrix, Cumberland, Rhode Island

Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Financial				
Federal Funding Opportunities				
	FEMA 2013 Hazard Mitigation Guidance, HMA Guidance, FEMA requirements regarding HMGP, BRIC and FMA grants. http://www.fema.gov/media-library/assets/documents/33634?id=7851	Townwide		Continue to utilize
	HUD CDBG Disaster Recovery Assistance: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/drsi	Low-income areas.		Continue to Utilize
	USDA, Natural Resources Conservation Service (NRCS) Conservation Technical Assistance: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/cta Financial Assistance: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/	Townwide		Continue to Utilize
	USEDA Economic Adjustment Assistance Program: https://www.eda.gov/economic-adjustment-assistance	Townwide		Continue to Utilize
	US National Forest Service Grant Program: https://www.fs.usda.gov/working-with-us/partnerships/funding	Townwide		Continue to Utilize
State Funding Opportunities				
	RIDEM Bay and Watershed Restoration Fund: https://dem.ri.gov/environmental-protection-bureau/water-resources/financial-assistance/narragansett-bay-and-water	Townwide		Continue to Utilize
	RIEMA Homeland Security Grant Program: https://riema.ri.gov/grants-finance	Townwide		Continue to Utilize
	RI Infrastructure Bank MRP Program: https://riib.org/solutions/programs/	Townwide		Continue to Utilize

Section 4 Mitigation Strategy

4.1 Introduction

Removing and precluding development from hazardous areas is the best method of mitigation. However, this cannot be the sole focus of hazard mitigation in Cumberland. The Town's character and functionality require a level of intimacy with the areas of greatest risk – flood-related, winter-related and wind-related hazard events. Consequently, Cumberland's approach to mitigation is primarily comprised of:

- Informing citizens and business owners how to protect themselves, their property, and their livelihood (and providing resources for doing so whenever possible);
- Reinforcing and upgrading the Town's built environment and municipal systems;
- Incorporating hazard resilience into the provisions for land redevelopment, with special emphasis on post-disaster recovery and rebuilding; and
- To the extent feasible, removing repetitively damaged structures from floodplains.

4.2 Mitigation Activities

In completing the risk and vulnerability analyses, the LHMC considered projects and actions that would reduce Cumberland's vulnerability to the identified hazards. The updated 2023 Risk Assessment Matrix (Table 2-1, p. 23) is the basis for the mitigation actions presented in Section 4.3.

4.3 Mitigation Action Plan

The LHMC considered the goals of this plan and re-prioritized the matrix and the associated actions based on historical damage, safety of the population, property protection and consistency with Town-wide goals and objectives. After the 'Priority Score' for each mitigation action, the '2017 Plan Score' has been included to reflect any changes in the prioritization of actions for this 2023 Update by the LHMC (also included in Table 1-1, 2017 Plan Report Card). Issues and objectives were aligned to public health risks, evacuation and mass care considerations, disruption of essential services and potential economic losses to the town.

The LHMC determined that the identified objectives could be met by continued alignment with the Mitigation Categories developed for the 2017 Plan, including:

- Public Education and Awareness
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services
- Planning and Prevention

The LHMC has worked to set goals and objectives that are bounded by a time frame and are compatible and consistent with state hazard mitigation goals. The time frames used for this strategy are as follows:

- Short Term = 0 to 6 Months
- Medium Term = 6 to 18 Months
- Long Term = 18 Months to 5 Years

The following actions use the Risk Assessment Matrix (Table 2-1) to identify areas at risk, offer mitigation strategies and consider benefits. Each action offers a discussion of the project and if applicable, includes the options considered. Multiple actions associated with a vulnerable area reflect town priorities and are simply prioritized high, medium or low. If known, the actions include cost estimates and assign responsible parties to lead the efforts to complete the action. The cost ranges used for this strategy are as follows:

- Staff Time – municipal personnel time
- Minimal – less than \$5,000
- Moderate – more than \$5,000, but less than \$25,000
- Significant – over \$25,000

Other relevant departments/agencies that can offer support to the project are also listed. Finally, possible finance options are offered. Once the 2023 Update receives FEMA's 'Approved Pending Adoption', the mitigation strategy will be put into motion.

Evaluation/Selection of Mitigation Actions

After reviewing the Town's identified risks and vulnerabilities to natural hazards, the input/feedback from the public workshop and recommendations from the Town, and the local Capability Assessment, the LHMC selected mitigation actions to incorporate into the 2023 Update.

Prioritization of Actions

Due to budgetary constraints and other limitations, it is often impossible to implement all mitigation actions. The LHMC needed to select the most cost-effective actions for implementation first to use resources efficiently and develop a realistic approach toward mitigation risks. The DMA 2000 supports this principle of cost-effectiveness by requiring action plans to follow a prioritization process that emphasizes benefits over costs. DMA 2000 states:

"The mitigation strategy section shall include an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs."

Part 1: Review Benefits and Costs

As part of the planning process, the LHMC utilized Review Tools 1, 2, and 3 associated with each action identified.

Part 2 Prioritize Actions – Quantitative Method, Relative Score

The LHMC utilized Method B: Prioritization using the Social, Technical, Administrative, political, Legal, Economic and Environmental (STAPLEE) criterion Relative Scores, suggested in FEMA’s Hazard Mitigation Planning How-to-Guide Series (Table 4-1).

Table 4-1 STAPLEE Review and Selection Criteria

Category	Criteria
Social	Is the proposed action socially acceptable to the community?
	Are there equity issues involved that would mean that one segment of the community is treated unfairly?
	Will the action cause social disruption?
Technical	Will the proposed action work?
	Will it create more problems than it solves?
	Does it solve a problem or only a symptom?
	Is it the most useful action considering other community goals?
Administrative	Can the community implement the action?
	Is there someone to coordinate and lead the effort?
	Is there enough funding, staff, and technical support available?
	Are there ongoing administrative requirements that need to be met?
Political	Is the action politically acceptable?
	Is there public support both to implement and to maintain the project?
Legal	Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
	Are there legal side effects? Could the activity be construed as a taking?
	Is the proposed action allowed by a comprehensive plan, or must a comprehensive plan be amended to allow the proposed action?
	Will the community be liable for action or lack of action?
	Will the activity be challenged?
Environmental	How will the action affect the environment?

	Will the action need environmental regulatory approvals?
	Will it meet local and state regulatory requirements?
	Are endangered or threatened species likely to be affected?
Economic	What are the costs and benefits of this action?
	Do the benefits exceed the costs?
	Are initial, maintenance, and administrative costs considered?
	Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
	How will this action affect the fiscal capability of the community?
	What burden will this action place on the tax base of the local economy?
	What are the budget and revenue effects of this activity?
	Does the action contribute to other community goals, such as capital improvements or economic development?
	What benefits will the action provide?

Part 3 Documentation of the Process

Each of the mitigation actions were scored against each of the STAPLEE criteria outlined above with a numerical score. These numbers were then totaled and developed into an overall priority score. The ranking of the Priority Score is a guideline for when the Town should begin acting on the identified strategies, or actions (Table 4-2).

The STAPLEE Method includes a cost-benefit review as part of the Mitigation Actions prioritization process. A more detailed cost-benefit analysis will be done, at the time of application, for those proposed Mitigation Actions that the Town applies for funding under the BRIC and HMGP Programs.

Table 4-2 STAPLEE Analysis

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PUBLIC EDUCATION AND AWARENESS											
2023 - 1	Develop/Distribute informational natural hazards pamphlet to residents/businesses that describes natural hazards threatening the community, steps to take to prevent/mitigate damages, awareness of evacuation routes and shelter locations, and increase resident awareness/communications.	Cost	2	2	2	2	2	2	0	12	26
		Benefit	2	2	2	2	2	2	2	14	
PROPERTY PROTECTION											
2023 - 2	Acquire residential properties in the special flood hazard area.	Cost	-1	0	2	2	-1	-1	0	1	15
		Benefit	2	2	2	2	2	2	2	14	
2023 - 3	Prepare an 'After the Storm Recovery Plan' for the community.	Cost	2	2	-1	2	2	2	0	9	23
		Benefit	2	2	2	2	2	2	2	14	
2023 - 4	Partner with Hope Global representatives to complete a Flood Mitigation Study to evaluate the cause of flooding on the front/rear parking areas.	Cost	1	1	1	1	1	1	1	7	14
		Benefit	1	1	1	1	1	1	1	7	
2023 - 5	Partner with Premier Land Development representatives (Ann & Hope Mill redevelopment project) to evaluate drainage infrastructure along the Broad St. corridor impacting the site's access/entrance and building.	Cost	1	1	1	1	1	1	1	7	19
		Benefit	2	2	2	2	1	2	1	12	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PROPERTY PROTECTION											
2023 - 6	Partner with Stop & Shop representatives to complete a Flood Mitigation Study to evaluate mitigation measures to alleviate flooding of the parking lot, Utility Room and retail space.	Cost	1	1	1	1	1	1	1	7	17
		Benefit	2	1	1	2	1	2	1	10	
2023 - 7	Develop/Implement a comprehensive tree management plan to address tree maintenance (particularly along power lines to prevent outages), and tree canopy expansion in more developed areas that includes policies for maintenance with RI Energy, pre/post storm event procedures to protect utility infrastructure, increasing tree canopy, build social equity into the conversation, and coordinate with other tree planting initiatives.	Cost	2	-1	-1	2	2	-1	0	4	18
		Benefit	2	2	2	2	2	2	2	14	
NATURAL RESOURCE PROTECTION											
2023 - 8	Support the implementation of recommended improvements/projects identified in the Town's various Conservation and Management Plans.	Cost	2	-1	1	2	2	-1	0	5	19
		Benefit	2	2	2	2	2	2	2	14	
STRUCTURAL PROJECTS											
2023 - 9	Protect drinking water infrastructure (floodproofing of Manville 1/2 pump stations).	Cost	2	0	2	2	0	2	2	10	21
		Benefit	2	2	2	2	-1	2	2	11	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
STRUCTURAL PROJECTS											
2023 - 10	Develop an implementation strategy to address property and streets subject to flooding from poor drainage and run-off.	Cost	2	1	2	2	1	2	0	10	24
		Benefit	2	2	2	2	2	2	2	14	
EMERGENCY SERVICES											
2023 - 11	Update the Town's Comprehensive Emergency Management Plan.	Cost	2	0	2	2	0	2	0	8	22
		Benefit	2	2	2	2	2	2	2	14	
2023 - 12	Create a Heat Emergency Action Plan.	Cost	2	0	2	2	0	-1	0	5	19
		Benefit	2	2	2	2	2	2	2	14	
2023 - 13	Fund and implement a comprehensive overhaul of the Town's existing analog radio communications system to a modern 800 MHz digital radio strategy.	Cost	2	2	2	2	2	2	2	2	28
		Benefit	2	2	2	2	2	2	2	2	
PLANNING AND PREVENTION											
2023 - 14	Pursue a comprehensive flood mitigation study/evaluation of properties along the Blackstone River via a range of actions.	Cost	2	0	2	2	-1	2	0	7	21
		Benefit	2	2	2	2	2	2	2	14	
2023 - 15	Approve a Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.	Cost	2	2	2	2	2	2	2	14	24
		Benefit	2	2	2	2	2	2	2	14	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PLANNING AND PREVENTION											
2023 - 16	Strengthen the Town's participation in the National Flood Insurance Program (NFIP).	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 17	Annually update Emergency Action Plans (EAPs) for both high and significant hazard dams (publicly-owned) within the Town of Cumberland including: Diamond Hill Reservoir Dam, Arnold Mills Reservoir Dam, Happy Hollow Reservoir Dam, Rawson Pond Dam, and Robin Hollow Dam.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 18	Annually update Emergency Action Plans (EAPs) for both high and significant hazard dams (privately-owned) within the Town of Cumberland including: Miscoe Lake Dam.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 19	Coordinate with the Pawtucket Water Supply Board to complete a Phase 1 Inspection Report (where applicable), then ensure the completion of recommended improvements identified in the updated Reports for the following dams: Arnold Mills (Pawtucket) Reservoir Dam (overdue), Diamond Hill Reservoir Dam (overdue), Happy Hollow Pond Dam (due 9/14/2025), and Robin Hollow Pond Dam (due 9/8/2025).	Cost	2	2	2	2	-1	2	2	13	27
		Benefit	2	2	2	2	2	2	2	14	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PLANNING AND PREVENTION											
2023 - 20	Coordinate with private dam owners to complete a Phase 1 Inspection Report, then ensure completion of recommended improvements identified in the updated Reports for the following dam: Miscoe Lake Dam (overdue).	Cost	2	2	2	2	-1	2	2	13	27
		Benefit	2	2	2	2	2	2	2	14	
2023 - 21	Complete a Phase 1 Inspection Report, then ensure completion of recommended improvements identified in the updated Report for the following dam: Rawson Pond Dam (overdue).	Cost	2	2	2	2	-1	2	2	13	27
		Benefit	2	2	2	2	2	2	2	14	
2023 - 22	Develop Operations & Maintenance Manual for Rawson Pond Dam as per the Rawson Pond Dam Purchase Agreement and February 27, 2017 correspondence from former Mayor Bill Murray.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 23	Implement public outreach campaign for residents/businesses location within a dam inundation zone.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 24	Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Road neighborhood in the event of an emergency at the LNG site.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 25	Identify alternative storage location and/or strategy for critical town records/documents.	Cost	2	2	2	2	2	1	2	13	27
		Benefit	2	2	2	2	2	2	2	14	

PUBLIC EDUCATION AND AWARENESS

Action #1

...2017 Plan (updated to incorporate content from Municipal Resilience Program)

Develop/Distribute Informational Natural Hazards Pamphlet.

Develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten the community and describes steps they can take for each hazard to mitigate damages to their property. Include evacuation routes and shelter locations along with items that can and cannot be taken to the shelters as well as information regarding the risk to our community for brush/forest fires and how residents can help prevent them.

- *Develop/consolidate procedures for emergency communication and alert systems for the Town, in preparation for, and in, emergency scenarios regarding evacuation routes, shelters, weather events, resources, etc. (real time build on Code Red and Special Needs Registry and preparation through different media including resident pamphlets).*
- *Increase resident awareness and engagement with these issues, procedures, and foster buy-in through community engagement, outreach, and education.*
- *Increase/diversify regular Town communications (website, social media, sign-up campaigns, etc.) focused on services offered, recreation and regular updates on needs and activities.*

- Action Type: Planning, Pre-Disaster
- Priority Score: 26 (2017 Plan: 24)
- Lead: CERT
- Supporting: Cumberland Emergency Management Agency (CEMA)
- Time Frame: Short Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Minimal; \$3,000 for printing (personnel time to develop pamphlet)
- Benefit: Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities
- Vulnerable Area: Residents' safety

PROPERTY PROTECTION

Action #2

...2017 Plan

Acquire residential properties in the special flood hazard area.

The Town will work with private homeowners in these areas to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property. By purchasing these residential properties, the Town is utilizing an effective program designed to remove people and property from high-risk areas and reduce disaster losses. The buildings are either demolished or relocated, and the land is then restricted to open space in perpetuity.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: 15 (2017 Plan: 15/2011 Plan: Priority not identified)
- Lead: Planning & Community Development Department

- Supporting: Town Council, Building Official, Open Space Commission
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of property, reduced damage claims
- Vulnerable Area: Residential flooding

Action #3

...2017 Plan

Prepare an “After the Storm Recovery” Plan for the Community.

The Town should utilize the opportunity of a disaster to improve its’ disaster resilience. Once critical life and safety issues and vital public services have been addressed and re-established, emphasis should be placed on the long-term recovery of the community, balancing the need to rebuild rapidly and return to normal against the objective of building back better and stronger.

Additional items for consideration as part of the Plan’s development include the completion of Community Assessments, a Recovery and Reconstruction Ordinance and development of a Debris Management Plan. The Town to coordinate with Statewide Planning to review the permitting processes, develop and adopt an ordinance to streamline the process in the aftermath of a hazard impact including the process to allow homeowners to retrofit structures in order to reduce risk. Formalize the existing process, and also maintain current policy to waive permit fees for building permits to repair storm-damaged properties.

- Action Type: Planning, Pre-Disaster/Post Disaster
- Priority Score: 23 (2017 Plan: 22)
- Lead: Planning & Community Development Department/NFIP Coordinator
- Supporting: Building Official
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/HMGP funds
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Improved resilience, accelerated recovery
- Vulnerable Area: Residential vulnerability

Action #4

...Interview with Business representative

The Town will partner with Hope Global representatives to build on previous flood mitigation efforts (as detailed in the 2017 Cumberland Hazard Mitigation Plan) and seek funding to complete a Flood Mitigation Study to evaluate the cause of intermittent flooding of the front and rear parking lots (where approximately 200 employees park daily).

- Action Type: Property Protection, Pre-Disaster
- Priority Score: 14
- Lead: Hope Global representatives

- Supporting: Town of Cumberland
- Time Frame: Long Term
- Financing Options: FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of public safety/property/tax base, reduced damage claims, improved resilience
- Vulnerable Area: Public Safety/Repetitive Loss Properties

Action #5

...Interview with Business representative

The Town will partner with Premier Land Development representatives (Ann & Hope Mill Redevelopment Project) to evaluate drainage infrastructure along the Broad Street corridor causing flooding impacts to the site's access/entrance and building.

- Action Type: Property Protection, Pre-Disaster
- Priority Score: 19
- Lead: Premier Land Development representatives
- Supporting: Town of Cumberland
- Time Frame: Short Term
- Financing Options: FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of public safety/property/tax base, reduced damage claims, improved resilience
- Vulnerable Area: Public Safety/Residential (future) Flooding

Action #6

...Interview with Business representative

The Town will partner with Stop & Shop representatives to seek funding to complete a Flood Mitigation Study to evaluate mitigation measures to alleviate intermittent flooding of the parking lot, Utility Room, and retail space.

- Action Type: Property Protection, Pre-Disaster
- Priority Score: 17
- Lead: Stop & Shop representatives
- Supporting: Town of Cumberland
- Time Frame: Long Term
- Financing Options: FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of public safety/property/tax base, reduced damage claims, improved resilience
- Vulnerable Area: Public Safety/Repetitive Loss Properties

NATURAL RESOURCE PROTECTION

Action #7

...Municipal Resilience Program

Develop/Implement a comprehensive tree management plan to address tree maintenance (particularly along power lines to prevent outages), and tree canopy expansion in more developed areas that includes policies for the following:

- *Determine schedule for tree maintenance in coordination with R.I. Energy.*
- *Provide education and resources to property owners responsible for tree maintenance.*
- *Develop pre/post storm event tree procedures to protect electricity infrastructure and prevent outages, limit addition of trees to rivers as projectiles, etc.*
- *Increase tree canopy coverage in Valley Falls and Lonsdale areas where a decrease in tree canopy has contributed to rising temperatures, increased flooding, and threats to the health and well-being of vulnerable residents.*
- *Build on social equity ties and integrate tree equity score information (lot level) into tree management plan.*
- *Coordinate with existing tree planting initiatives (e.g., along roadways on private property, jobs program, etc.) which may not have an explicit resiliency lens but are geared towards economic development.*

- Action Type: Mitigation, Pre-Disaster
- Priority Score: 18
- Lead: Conservation Commission
- Supporting: Planning and Community Development Department
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget/MRP program/ FEMA BRIC/HMGP funds
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Protection of natural resources
- Vulnerable Area: Natural Resources

Action #8

...Conservation and Management Plans

Support the implementation of recommended improvements/projects identified in the Town's various Conservation and Management Plans :

- *New Pond Park:*
 - *Plant adjacent floodplain with native trees, bushes, plants, and grasses designed to address local riparian buffer and wildlife concerns.*
 - *Restore wetland and floodplain habitats.*
- *Monastery:*
 - *Support forest management efforts.*
- *Mercy Woods:*
 - *Ensure the conservation of contiguous forestland to ensure high quality drinking water.*
 - *Support the removal of invasive species.*
- *Heritage Park:*
 - *Conduct annual tree removal and vegetation control exercise.*

- *Support final redevelopment phase which includes a new direct access pathway into the park from the Amaral Building and sculpting of the sloped area to create an amphitheater for education and cultural engagement.*
- *Metcalf/Franklin Farm:*
 - *Support the removal of invasive species.*
- *Diamond Hill:*
 - *Support the removal of invasive species.*
 - *Support the reconstruction of the parking area with new access/egress alignments, circulation pattern, and landscaping.*
- *Albion Town Landfill:*
 - *Support the ongoing gas and groundwater testing.*

- Action Type: Mitigation, Pre-Disaster
- Priority Score: 19
- Lead: Conservation Commission/Cumberland Land Trust
- Supporting: Planning and Community Development Department/Planning Board/Town Council
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget/Cumberland Land Trust funds
- Cost Estimate: Minimal to Significant (varies)
- Benefit: Protection of natural resources
- Vulnerable Area: Natural Resources

STRUCTURAL PROJECTS

Action #9

...2023 HMP Update/Risk Assessment

Protect Drinking Water Infrastructure.

- *Ensure that Manville 1, 2 Wells/Pump Stations are adequately protected against flooding (100-year flood zone).*
- Action Type: Planning, Pre-Disaster
 - Priority Score: 21
 - Lead: DPW
 - Supporting: Engineering
 - Time Frame: Long Term
 - Financing Options: Municipal Operating Budget, FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Continuity of municipal services/Minimized Potential for contamination
 - Vulnerable Area: Municipal Drinking Water Infrastructure

Action #10

...2017 Plan

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off.

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring

(State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street. (e.g., address those roads that are part of the town evacuation route first, then main thoroughfares, etc.).

Streets/Properties Subject to Flooding

Maintenance

(Included here to illustrate a comprehensive review of flooding issues, however, not applicable for funding under any hazard mitigation grant programs)

Ann and Hope Way

- Specific Flooding Area: Periodic surcharge and overflow of drains due to Blackstone River elevation during select heavy storm water events.
- Flooding Cause: Flood Plain area.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck.

Crestwood Court

- Specific Flooding Area: Culvert location
- Flooding Cause: Continual maintenance and clean-out of debris to prevent entering drainage system.

Fairview Avenue

- Specific Flooding Area: Select driveways
- Flooding Cause: Debris or other extraneous matter clogs slotted pipes across driveways. Pipe jetted to restore drainage capability. Requires periodic monitoring and maintenance.

Franklin Street

- Specific Flooding Area: Dead-end section near Wildwood Drive
- Flooding Cause: Flood Plain area.
 - Need to perform ongoing maintenance.

Fredrick Lane

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Grundy's Way

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

- Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Hannah Drive

- Specific Flooding Area: Dead end/cul de sac area
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Highridge Road

- Specific Flooding Area: Entire street
- Flooding Cause: Continual clogging and blockage of drainage catch basins due to leaves in heavily treed area. Periodic monitoring and clean-up maintenance required.

Kings Row

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Laurel Lane

- Specific Flooding Area: Grandview
- Flooding Cause: Periodic clogging of slotted drain pipes during interim period of maintenance and cleaning.

Oakwood Drive

- Specific Flooding Area: Culvert location
- Flooding Cause: Catch basin and culvert blockage associated with debris and roots which have been removed periodically. Maintenance issue.

Tower Hill Road

- Specific Flooding Area: Diamond Hill Road end
- Flooding Cause: Silt build-up. Requires dredging and clean-up.

Wildwood Drive

- Specific Flooding Area: Dead-end section
- Flooding Cause: Existing Flood Plain area
 - Downstream maintenance of culverts on Mendon Rd. is important to reduce/prevent flooding.

Monitoring

Abbott Run Valley Road

- Specific Flooding Area: Jenna Way
- Flooding Cause: Reduced detention basin due to heavy rates of sedimentation from upstream construction sites in conjunction with catch basin blockage. Ongoing accumulation of debris in culvert which requires periodic monitoring and clean-out.
 - Improved in 2017/2018
 - Ongoing monitoring for flooding

Angell Road (State road)

- Specific Flooding Area: Easterly end at Diamond Hill Road
- Flooding Cause: Blocked catch basins require periodic cleaning by RIDOT.
 - Repaired by RIDOT
 - Ongoing monitoring for flooding

Club Drive

- Specific Flooding Area: Lippitt Estates/Low Point of Club Drive
- Flooding Cause: No existing drainage system. Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Old Reservoir Road

- Specific Flooding Area: Jason's Grant
- Flooding Cause: Drainage system in this area requires upgrading.
 - An interconnected infiltrating system was installed 2022. Ongoing monitoring will be required (during significant storms).

Ronald Avenue

- Specific Flooding Area: North Brook area
- Flooding Cause: Undersized culvert and drainage pipes are the probable cause at this location.
 - Dams created by beavers appears to be the cause of flooding.

Theater Drive

- Specific Flooding Area: Scott Road culvert
- Flooding Cause: Culvert was previously blocked and subsequently cleaned. Still requires periodic monitoring and maintenance, particularly due to ice dam blockage during winter months.
 - Ongoing monitoring required

Structural/Replacement

Bear Hill Road

- Specific Flooding Area: Crestwood Court
- Flooding Cause: Deteriorated and undersized drainage pipes in conjunction with periodic blockage of pipes with debris.

Hines Road

- Specific Flooding Area: Northerly section at Miller's Brook
- Flooding Cause: Undersized drainage pipes.

Hilltop Road

- Specific Flooding Area: Allen's Avenue
- Flooding Cause: Undersized drainage pipes serve this area. However, there are physical restrictions preventing construction in this area due to the existence of NGRID diffuser facilities.
 - Need to install additional shallow culverts to fit under the RI Energy's system.

Industrial Road

- Specific Flooding Area: Lower and relatively flat section of roadway near Diamond Hill Road adjacent to Okonite commercial property
- Flooding Cause: Additional catch basins installed, and drainage pipe modifications recently installed to improve drainage. New drainage modifications not in place long enough to subject to sufficient number of heavy storm events to confirm effectiveness. However, other measures will be required at upstream commercial and industrial areas where holding ponds will require maintenance and other onsite drainage improvements to mitigate probable additional flows to this area.
 - This area is under design, and it is anticipated to be corrected Summer 2024.

Martin Street

- Specific Flooding Area: Blackstone River and railroad area
- Flooding Cause: Existing flood plain area associated with Blackstone River.
- Supplemental: Possible collapse or deterioration of drains below railroad crossing also contributing to flooding condition.
 - Need to upgrade piping.

New York Avenue

- Specific Flooding Area: Miller's Brook area
- Flooding Cause: Undersized drainage pipe.

Ridgewood Drive

- Specific Flooding Area: Entire street
- Flooding Cause: Blockage of drainage pipe as a result of persistent root growth during interim periods of maintenance and removal.
 - Need to replace drainage pipe to eliminate the roots entering the pipe.

Seneca Street

Specific Flooding Area: Culvert location

- Flooding Cause: Undersized culvert pipe is considered the probable cause.
 - To be completed 2023.

Shirley Drive

- Specific Flooding Area: Swale associated with CVS property.

- Flooding Cause: Deterioration of drainage pipes. Replacement required.
 - To be completed by property owner 2023.

Pavement Management

Follett Street

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Maybury Street

Specific Flooding Area: Entire Street (Meadowcrest subdivision)

- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Sneech Pond Road (State road)

- Specific Flooding Area: Entire street
- Flooding Cause: Impeded drainage. Low points and ponding areas as a result of significantly deteriorated pavement. Requires complete rehabilitation.
 - To be completed by RIDOT 2023/2024.

- Action Type: Mitigation, Pre-Disaster
- Priority Score: 24 (2017 Plan: 24/2011 Plan – No priority identified)
- Lead: DPW
- Supporting: Engineering
- Time Frame: Medium Term
- Financing Options: Capital Improvement Planning/ FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure, maintained access/evacuation, increased public safety, improved street drainage
- Vulnerable Area: Local Roads Subject to Flooding

EMERGENCY SERVICES

Action #11

...2023 HMP Update/Capability Assessment

Update the Town's Comprehensive Emergency Management Plan.

- Action Type: Planning, Pre-Disaster
- Priority Score: 22
- Lead: Emergency Management Agency
- Supporting: Town Council
- Time Frame: Short Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/HMGP funds
- Cost Estimate: Moderate

- Benefit: Coordinated emergency response, Improved public safety
- Vulnerable Area: Emergency Response/Evacuation

Action #12

...2023 HMP Update/Risk Assessment

Create a Heat Emergency Action Plan.

- *Prioritize creating cooling centers for those most vulnerable to heat, systematic communications strategies, and back-up energy plans.*
 - *Stress the importance of tree canopy for cooling buildings (reduce clear-cutting) and anticipate heat damage to roads. The Town is working on a proposed landscape ordinance (modeled after the City of Providence) that will make vegetation specifications much more clear and will require the preservation of more natural features during development projects.*
- Action Type: Planning, Pre-Disaster
 - Priority Score: 19
 - Lead: Emergency Management Agency
 - Supporting: Planning & Community Development Department
 - Time Frame: Medium Term
 - Financing Options: Municipal Operating Budget, FEMA BRIC/HMGP funds
 - Cost Estimate: Moderate
 - Benefit: Continuity of emergency response/Improved public health, safety and welfare
 - Vulnerable Area: Emergency Response

Action #13

...2023 HMP Update/Risk Assessment

Fund and implement a comprehensive overhaul of the Town's existing analog radio communications system to a modern 800 MHz digital radio strategy.

- Action Type: Emergency Services, Pre-Disaster
- Priority Score: 28
- Lead: Public Safety Departments (Police/Fire/EMS)
- Supporting: Mayor's Office/Town Council
- Time Frame: Short Term
- Financing Options: Capital Improvement Planning/ FEMA BRIC/HMGP funds
- Cost Estimate: Significant
- Benefit: Enhanced public safety, mutual aid, and communications
- Vulnerable Area: Public Safety/Emergency Response

PLANNING AND PREVENTION

Action #14

...Municipal Resilience Program

Pursue a comprehensive flood mitigation study/evaluation of properties along the Blackstone River via the following project actions:

- *Direct/relocate development to areas that are already watered/sewered and are above natural river level, surge, and floodplain to preserve open space and avoid*

inappropriate parcel development as well as encourage low impact development (LID).

- *Identify sites for flood mitigation projects including the removal of impervious surfaces, wetland restoration, and other natural solutions which would establish green spaces that can accommodate flooding, filter water and serve recreation and ecosystems.*
- *Pursue grant opportunities to resume feasibility studies in the lower Martin St. area which currently have massive pumps due to development mistakes (excavated and graded too much material and are now below river level)., in hopes of returning these areas to green space with relocation of occupants to higher ground.*
- *Coordinate efforts with Blackstone River watershed towns, councils, and organizations.*

- Action Type: Planning, Pre-Disaster
- Priority Score: 21
- Lead: DPW/Planning and Community Development Department
- Supporting: Private Business Owners
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget/CIP/ FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Improved resilience
- Vulnerable Area: Repetitive flood loss properties

Action #15

...Municipal Resilience Program

Approve a Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.

- Action Type: Planning, Pre-Disaster
- Priority Score: 24
- Lead: Mayor/Department Directors
- Supporting: Town Council
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget/CIP
- Cost Estimate: Staff Time
- Benefit: Improved resilience
- Vulnerable Area: Municipal infrastructure/capabilities

Action #16

...RIEMA Community Assistance Visit, May 26, 2021

Strengthen the Town's participation in the NFIP.

- *The Town must continue to track development in the floodplain for new structures and improvements to existing structures (to ensure those improving their home 50% or greater of structural value are brought into/or maintain compliance with*

NFIP regulations). Physically writing permit dates, type of work, and costs on the inside folder of a permit file (s).

- *The Town should continue to keep permits digitally and consider adding a formal question/identifier regarding whether a property is or is not in the Special Flood Hazard Area (SFHA).*
- *The Town should continue to coordinate with RIEMA to organize training opportunities and develop a set of best practices for other local officials and contractors in the Town.*
- *The Town should continue to develop a relationship with State agencies, such as RI Department of Environmental Management (RIDEM) and RI Department of Transportation (RIDOT) to ensure the Town is aware of projects occurring within the Town that could potentially impact the SFHA.*
- *The Town should continue to work with RIEMA staff to address the severe repetitive loss properties and submit to rate properties in the Town.*
- *The Town should continue to work with the RIEMA State Hazard Mitigation Officer to work on any items identified in their local HMP.*
- *An additional staff person should attend the L273 course (Managing Development through the NFIP) for comprehensive training on floodplain management requirements and higher standards.*

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Building Official
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Staff Time
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Development/redevelopment within the SFHA

Action #17

...2017 Plan (modified)

Annually update Emergency Action Plans (EAP's) for both High and Significant hazard dams (publicly-owned) within the Town of Cumberland, including:

- *Diamond Hill Reservoir Dam (most recent EAP: August 2019)*
- *Arnold Mills Reservoir Dam (most recent EAP: August 2019)*
- *Happy Hollow Reservoir Dam (most recent EAP: August 2019)*
- *Rawson Pond Dam (most recent EAP: August 2019)*
- *Robin Hollow Dam (most recent EAP: August 2019)*

An EAP is a plan of action to reduce potential property damage and loss of life in an area affected by a dam failure. An EAP identifies the areas, structures, facilities and roads that could be affected by dam failure. It also establishes a monitoring system which can activate the plan. Lastly, it identifies the corresponding official(s), organizations, and agencies along with their responsibilities in regard to implementing the plan.

All high and significant hazard dams must have a current EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both RIEMA and RI DEM.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28 (2017 Plan: 28)
- Lead: Cumberland Emergency Management Agency (CEMA)/PWSB
- Supporting: Planning & Community Development Department
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT
- Cost Estimate: Minimal/Moderate; \$4,000 - \$5,500 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #18

...2017 Plan (modified)

Annually Update Emergency Action Plans (EAP's) for both High and Significant hazard private dams (privately-owned), including:

- *Miscoe Lake Dam (most recent EAP: August 2019)*

All high and significant hazard dams must have a current EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both RIEMA and RI DEM.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28 (2017 Plan: 28)
- Lead: Cumberland Emergency Management Agency (CEMA)/Private Dam Owners
- Supporting: Planning & Community Development Department
- Time Frame: Short Term
- Financing Options: CEMA/CERT
- Cost Estimate: Minimal/Moderate; \$3,500 - \$5,000 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #19

...2023 HMP Update/Risk Assessment

Coordinate with the PWSB to complete a current Phase 1 Inspection Report (where applicable), then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dams:

- *Arnold Mills (Pawtucket) Reservoir Dam (most recent Phase 1: September 14, 2020/every two years)*
- *Diamond Hill Reservoir Dam (most recent Phase 1: September 8, 2020/every two years)*
- *Happy Hollow Pond Dam (most recent Phase 1: September 14, 2020/every five years)*

- *Robin Hollow Pond Dam (most recent Phase 1: September 8, 2020/every five years)*
 - Action Type: Planning, Pre-Disaster
 - Priority Score: 27
 - Lead: PWSB
 - Supporting: Cumberland Emergency Management Agency (CEMA)/Planning & Community Development Department
 - Time Frame: Short Term
 - Financing Options: PWSB, FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Protection of property, protection of life/infrastructure
 - Vulnerable Area: Residential, Business and Industrial areas

Action #20

...2023 HMP Update/Risk Assessment

Coordinate with private dam owners to complete a current Phase 1 Inspection Report, then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dams:

- *Miscoe lake Dam (most recent Phase 1: August 20, 2014/every two years)*
 - Action Type: Planning, Pre-Disaster
 - Priority Score: 27
 - Lead: Private dam owners
 - Supporting: Cumberland Emergency Management Agency (CEMA)/Planning & Community Development Department
 - Time Frame: Medium Term
 - Financing Options: Private Dam Owner's, FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Protection of property, protection of life/infrastructure
 - Vulnerable Area: Residential, Business and Industrial areas

Action #21

...2023 HMP Update/Risk Assessment

Complete a current Phase 1 Inspection Report, then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dam:

- *Rawson Pond Dam (most recent Phase 1: July 13, 2012/every five years)*
 - Action Type: Planning, Pre-Disaster
 - Priority Score: 27
 - Lead: Cumberland Emergency Management Agency (CEMA)
 - Supporting: Planning & Community Development Department
 - Time Frame: Medium Term
 - Financing Options: Municipal Operating Budget/CIP/ FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Protection of property, protection of life/infrastructure

- Vulnerable Area: Residential, Business and Industrial areas

Action #22

...2023 HMP Update/Risk Assessment

Develop Operations and Maintenance Manual for Rawson Pond Dam as per the Rawson Pond Dam Purchase Agreement and February 27, 2017, correspondence from former Mayor Bill Murray.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Cumberland Water District
- Supporting: Cumberland Emergency Management Agency (CEMA)/Planning & Community Development Department
- Time Frame: Long Term
- Financing Options: CEMA
- Cost Estimate: Moderate
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #23

...2017 Plan

Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone.

Once EAPs have been developed for both High and Significant hazard dams (both public and private), it is important to conduct a public information session for residents and businesses within the various inundation areas regarding what they should do in the event of a dam breach. This could be completed in one general session, or individual sessions for each structure and affected neighborhood.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28 (2017 Plan: 26/2011 Plan – High Priority)
- Lead: PWSB/Private dam owners
- Supporting: Cumberland Emergency Management Agency (CEMA)/Planning & Community Development Department/CERT
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life/infrastructure, uninterrupted services
- Vulnerable Area: Residential problems/Businesses and Industry

Action #24

...2017 Plan

Coordinate with R.I. Energy to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the R.I. Energy LNG site.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: 28 (2017 Plan: 26)

- Lead: Mayor's Office – Chief of Staff/ CEMA
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Staff/personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life, maintained access
- Vulnerable Area: Residents' safety

Action #25

...2017 Plan

Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents .

To determine if an alternate on or off-site location, or conversion to electronic records filing is the best course for the Town to undertake.

- Action Type: Planning, Pre-Disaster/Post-Disaster
- Priority Score: 27 (2017 Plan: 22)
- Lead: Mayor's Office
- Supporting: Town Council, Town Clerk
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Significant; Staff Time \$30,000 (dependent upon option selected)
- Benefit: Protection of critical Town records/documents
- Vulnerable Area: Public Facilities

Section 5 Plan Implementation and Maintenance

5.1 Implementation, Evaluation, and Revision of Plan

Implementation

The LHMC realized that assigning a time frame to each recommended mitigation action is important so that activities can be coordinated with other important governmental functions, such as committee meetings and budget hearings. Assigned time frames also provide input to a project plan used for tracking the progress of all activities. Once the 2023 Update receives FEMA's 'Approved Pending Adoption', the mitigation strategy will be put into motion and the Town Council will adopt the Plan (within one year of FEMA's approval) through resolution. It is recognized that progress on plan implementation may vary dependent upon available funding and capacity of staff to complete assigned tasks.

Evaluation

The Cumberland Emergency Management Agency will bring the LHMC together annually during the month of May to evaluate and document the status of the mitigation actions by initiating a 'Report Card' (action completed/partially completed, responsible department/agency, cost/funding mechanism). The CEMA and LHMC will also evaluate the 2023 Update's effectiveness annually by determining if any of the stated goals have been met and if completed actions have indeed mitigated the problem/vulnerability. Within two months of this meeting, a status report will be given to the Planning Board and Town Council. Progress will be reviewed annually at advertised public hearings held by the Cumberland Planning Board. It is advantageous the annual review be conducted prior to the Town's annual budget process so any locally funded projects can be considered in the budget process.

Revision

As per 44 CFR S 201.6(d)(3), the Plan will be reviewed and revised to reflect progress in local mitigation efforts and changes in priorities and resubmitted for approval within 5 years in order to continue to be eligible for mitigation project grant funding. In order to ensure that the Plan remains current, the LHMC will meet annually. The Plan will also be evaluated and updated after a disaster, or as funding opportunities arise for the actions and projects identified in the plan. Any updates will be reviewed and submitted to RIEMA upon local approval to ensure that the state hazard mitigation strategy remains current.

The Town of Cumberland Hazard Mitigation Plan will be incorporated into the Town's Comprehensive Emergency Management Plan (CEMP), Comprehensive Plan, Zoning/Subdivision Regulations, Conservation Management Plans, and other planning documents as updated and for consistency, similar to the review of existing plans, studies, and reports for this 2023 Update.'

5.2 Continued Public Involvement

The Town of Cumberland will continue public involvement in the plan maintenance process by:

- The approved/adopted plan will be posted on the Town's web site;

- Annual status reports will be presented to elected officials in advertised public meetings;
- The annual meeting of the LHMC to review the implementation of the Plan will be posted/advertised as a public meeting as per Town guidelines; and
- The LHMC will include the public in the preparation of the five-year Update using the same public participation process as in the development of this 2023 Update.

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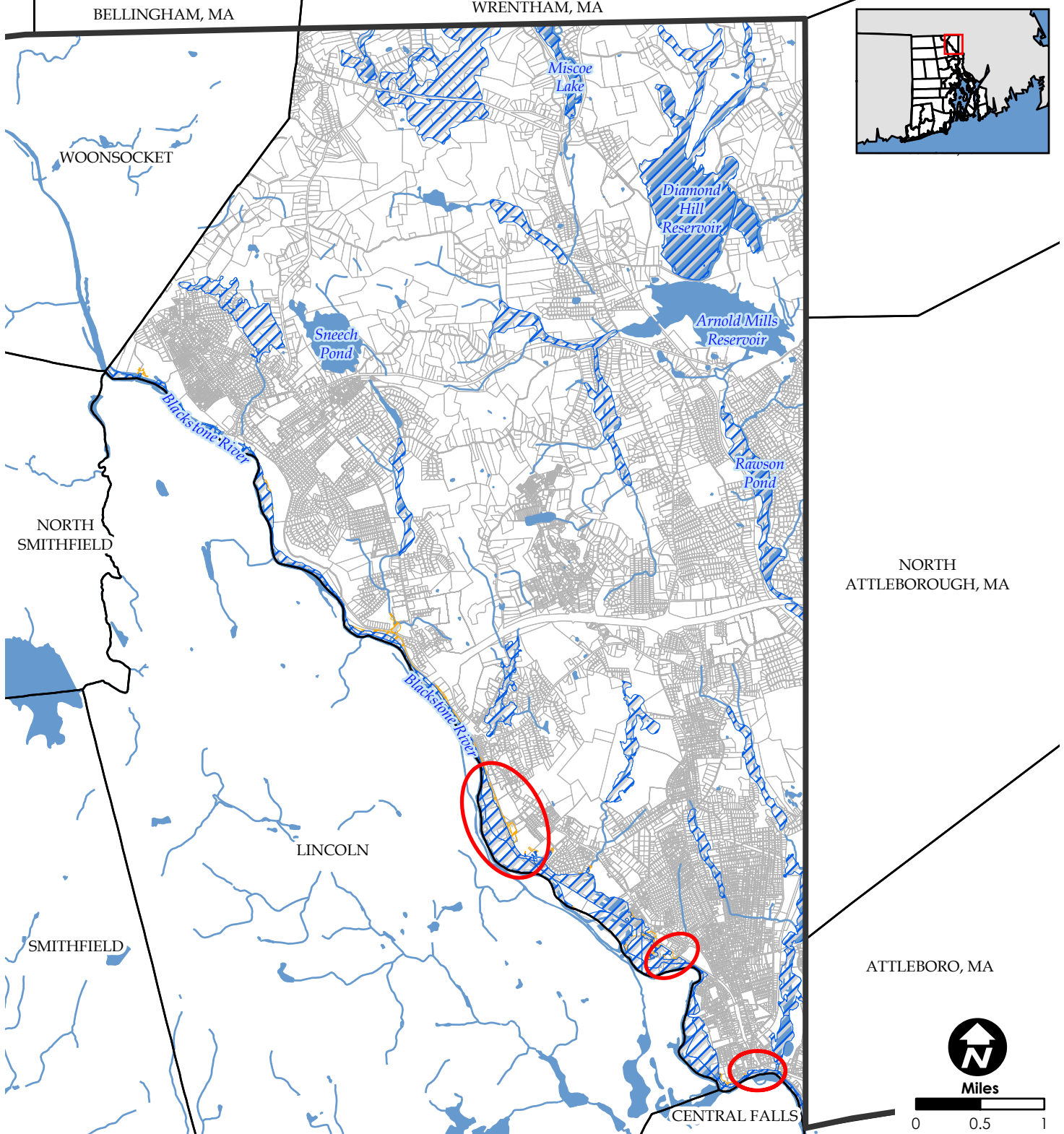
Appendix A – Maps

Figure A.1 Flood Risks and Repetitive Flood Loss Areas

Figure A.2 Hurricanes




Figure A.3 Critical Facilities and Vulnerable Populations



Path: H:\Projects\2022\22123 Cumberland HMP\GIS\Maps\Flood Risks_230201.mxd




Date: 7/7/2023
Data Sources: Town of Cumberland, RIGIS, Bureau of Geographic Information (MassGIS), ESRI

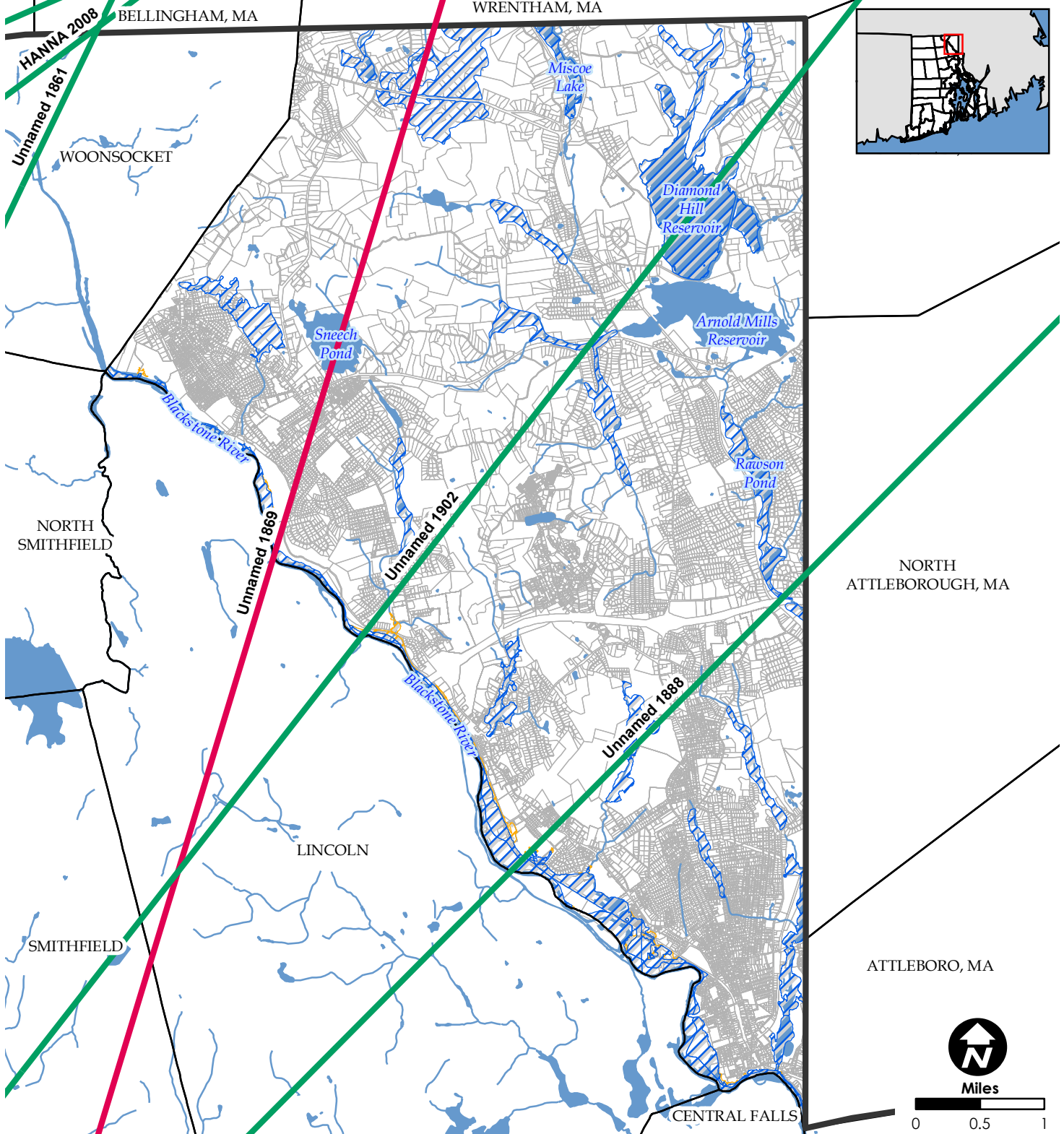
This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

-  Parcels
-  Rivers/Streams
-  Lakes/Ponds

- FEMA Flood Zones
-  A & AE (100-Year)
 -  X (500-Year)

-  Repetitive Loss Area (7/2023)

Path: H:\Projects\2022\22123 Cumberland HMP\GIS\Maps\Hurricanes_230202.mxd



Date: 4/5/2023

Data Sources: Town of Cumberland, RIGIS, Bureau of Geographic Information (MassGIS), NOAA-NCEI IBTrACS, ESRI

This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

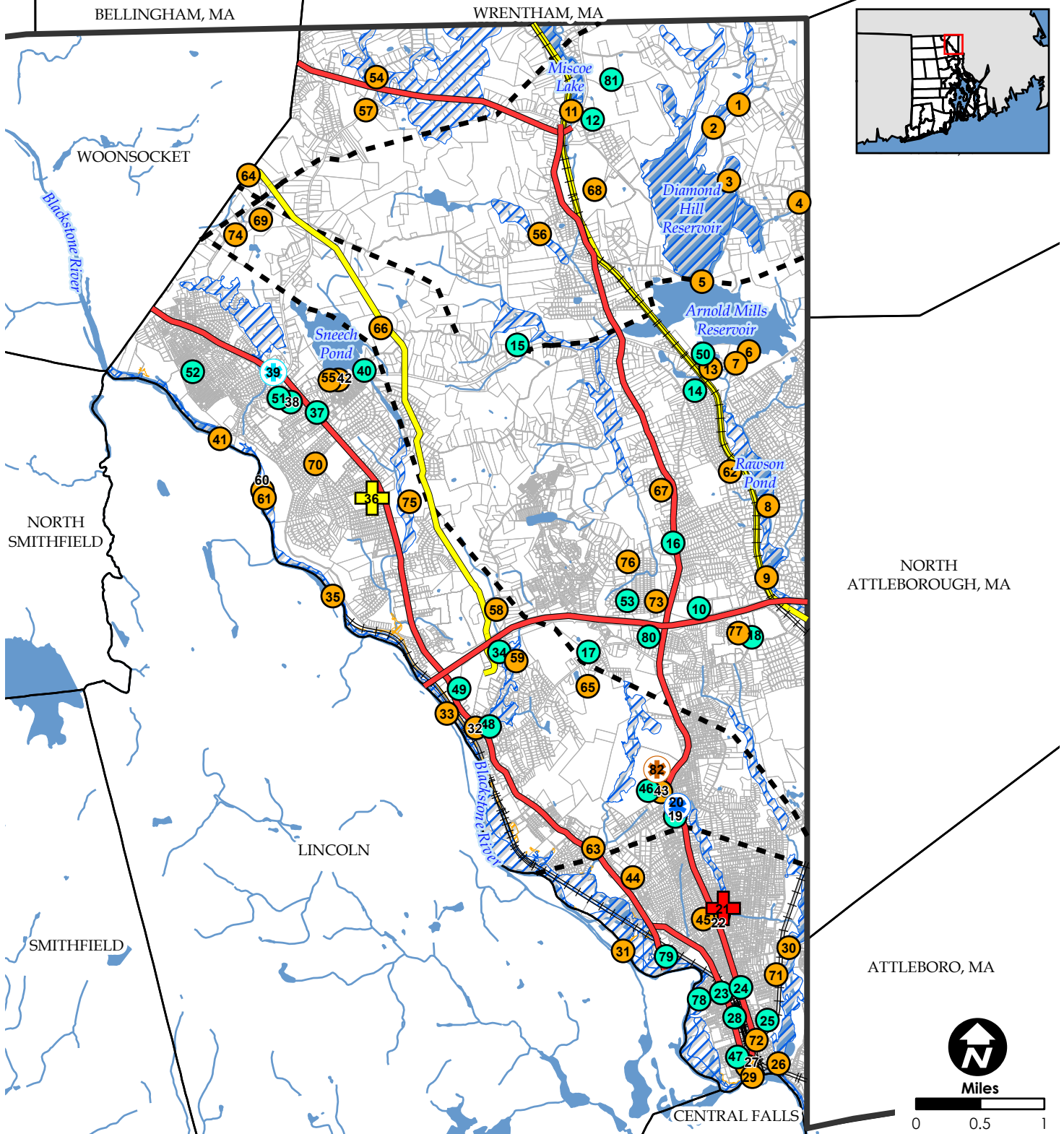
- Parcels
- Rivers/Streams
- Lakes/Ponds
- Tropical Storm: 33-63 kt
- Category 3: 96-112 kt

FEMA Flood Zones

- A & AE (100-Year)
- X (500-Year)

Hurricane Tracks

Path: H:\Projects\2022\22123 Cumberland HMP\GIS\Maps\CriticalFacilities_230331.mxd



Date: 6/1/2023
Data Sources: Town of Cumberland, RIGIS, Bureau of Geographic Information (MassGIS), ESRI

This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

- | | | |
|------------------------|--------------------------------------|-------------------|
| Critical Facility | Primary EOC & Warming/Cooling Center | Gas Pipeline |
| Vulnerable Population | Secondary EOC | Rivers/Streams |
| Regional Shelter | Emergency Evacuation Route | Lakes/Ponds |
| Secondary Shelter | Rail Line | FEMA Flood Zones |
| Warming/Cooling Center | Electric Transmission Lines | A & AE (100-Year) |
| | | X (500-Year) |

Table A – 1 Critical Facilities

Site ID	Site Name	Site ID	Site Name
1	Duhollow Pond Dam	44	Cumberland Highway Department
2	Ker-Anna Pond Dam	45	Blackstone Street Town Garage
3	Cranberry Bog Dam	54	Carl's Pond Dam
4	Thornley Farm Pond Dam	57	Resurrection Cemetery Dam
5	Diamond Hill Reservoir Dam	68	Fisher Storage Tank
6	Pawtucket Reservoir Dam	66	Coppermine Storage Tank
7	Arnold Mills Dam	55	Northern Town Garage
8	Rawson Pond Dam	62	Franklin Farm 2 & 3 Well/Pump Station
9	Howard Pond Dam	67	Thompson Storage Tank
11	Miscoe Lake Dam	76	2 Eric Court (Great Woods Estate)
13	North Cumberland Fire Department	73	Broadview Ave. Pump Station
20	Cumberland Public Safety Complex	77	15 Bear Hill Rd (Apple Ridge Estates)
21	Joseph L. McCourt Middle School	65	Palomino Drive Storage Tank
22	Valley Falls Fire Department/Rescue 2	59	Scott Lower Dam
26	Happy Hollow Pond Dam	58	Scott Upper Dam
27	Cumberland Town Hall	70	Girard Station Booster Station
29	Valley Falls Pond Dam	72	Abbott St. Ejector Station
30	Robin Hollow Pond Dam	56	Catamint Dam
31	Pratt Dam	63	Pawtucket Connection Pump Station
33	Ashton Dam	64	Woonsocket Connection Pump Station
32	Cumberland Fire District/Rescue 1	69	Highland Storage Tank
35	Albion Dam	75	2675 Mendon Rd
36	Cumberland High School	74	Highland II Pump Station
39	Cumberland Hill Fire Department	71	Curran Rd Pump Station
41	Manville Dam	60	Manville 1 Well/Pump Station
42	Cumberland Water Department	61	Manville 2 Well/Pump Station
43	Edward J. Hayden Public Library	82	Cumberland Public Library

Table A - 2 Vulnerable Populations

Site ID	Site Name
10	Academy for Little Children of Cumberland
12	Mercymount Country Day School
14	Community School
15	North Cumberland Middle School
16	The Neighborhood Nursery Preschool
17	Hand in Hand Christian Preschool
18	Four Corners YMCA Early Learning Center
19	Garvin Memorial School
21	Joseph L. McCourt Middle School
23	B.F. Norton Elementary School
24	Paintbox School Preschool
25	Fatima Church
28	Blackstone Valley Prep Mayoral Academy
34	Ashton School
36	Cumberland High School
38	John J. McLaughlin Cumberland Hill School
37	Cherry Blossom Journey School
40	Emmanual Nursery School
46	Senior Center
47	Blackstone Valley Prep Mayoral Academy
48	Highland Child Care Center
49	Kids Play
81	Mount St. Rita Healthcare
50	Cumberland Kindergarten School's Out
53	Kidstop Family Home Daycare
80	Chapel Hill Senior Living
51	Kids Club
52	Little Dreamers Playtime
78	Grandview Center
79	Cumberland Manor

Appendix B – Public Information and Outreach

Project Webpage

Project Kickoff Meeting: December 12, 2022

LHMC Meeting #1: January 5, 2023

Public Workshop #1: April 24, 2023

Local Hazard Mitigation Committee Meeting #2: June 9, 2023

Local Hazard Mitigation Committee Meeting #3: October 3, 2023

Local Hazard Mitigation Committee Meeting #4: October 19, 2023

Public Workshop #2: November 15, 2023

Interviews: Local Businesses

On-Line Survey

Project Webpage

Town of Cumberland, RI Hazard Mitigation Plan Update



FEMA defines hazard mitigation as:

A series of actions and policies designed to reduce and/or eliminate the impacts of naturally occurring disasters on people and property.

About the Cumberland Hazard Mitigation Plan Update Project

The Town of Cumberland has hired the Horsley Witten Group, Inc. to assist with the development of the 2017 Cumberland Hazard Mitigation Plan Update.

Why is this important? Hazard mitigation planning enables municipalities to identify risks and vulnerabilities associated with natural hazards and develop long-term strategies for protecting people and property from future hazard events. Further information is available on FEMA's Hazard Mitigation Planning page: <http://www.fema.gov/hazard-mitigation-planning>.

A hazard mitigation plan should be considered a living document that must grow and adapt, keeping pace with a community's growth and change. The Disaster Mitigation Act of 2000 (DMA) places high priority on the continuation of the planning process after the initial submittal, requiring communities to seek and receive re-approval from FEMA in order to remain eligible for financial assistance.

The approach for this plan development is premised on four primary methods, all geared towards meeting the requirements of the DMA 2000 Public Law 106-390, October 10, 2000:

- Planning Process—Outreach and Stakeholder Coordination
- Risk Assessment—Identifying Hazards and Estimating Losses
- Mitigation Strategy— Identifying Mitigation Actions and Implementation Strategies
- Plan Maintenance—Implementation, Evaluation and Revision/Update

Contacts

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Town of Cumberland
Director, Planning and Community Development
jstevens@cumberlandri.org
(401) 728-2400 Ext. 142

Craig Pereira
Horsley Witten Group, Inc.
Project Manager
cpereira@horsleywitten.com
(401) 263-6048

Stay tuned for more information on how to get involved!

Project Kickoff Meeting: December 12, 2022



Memorandum of Meeting

To: Hazard Mitigation Plan Update Core Committee - Town of Cumberland

From: Craig Pereira

Date: December 12, 2022

Re: Cumberland Hazard Mitigation Plan (HMP) Update

In attendance:

Jonathan Stevens — Director, Planning and Community Development
Glenn Modica — Town Planner
John Pliakas — Chief, Emergency Medical Services
Joe Duarte — Director, Public Works

Consultant Team

Craig Pereira, Project Manager - Horsley Witten Group, Inc. (HW)

The Core Committee for the HMP Update was convened to conduct a virtual kickoff meeting for the HMP update prior to pulling the full Local Hazard Mitigation Committee (LHMC) together. Zoom link:

<https://us02web.zoom.us/j/86164802270?pwd=eDcvWWtPVjJmMnhNSFNlZkpQcitZdz09>.

1. Primary Point of Contact. Craig Pereira asked who will serve as the primary point of contact for the project?
 - a. Jonathan Stevens will be the primary contact while individuals in attendance at this kickoff meeting will serve as the Core Team, outside of the LHMC.
2. LHMC. Craig asked if the LHMC has already been assembled. Typically this includes municipal department directors, representation from several Boards/Commissions, a CERT team member and a representative from the general public. Craig also commented that as part of the 2017 HMP, several members from the business community (Hope Global – Leslie Taito) and a Pawtucket Water Supply Board representative (Chris Collins) also served on the LHMC at that time.
 - a. Jonathan Stevens commented that the LHMC has not been formed, but that the Town has a 'Resilience Team' from the Municipal Resilience Program – Community Resilience Building Process & Workshop (July 2021) that could be brought back together for this effort.
 - b. Craig stated that the goal of the LHMC membership should be no more than 12 - 15 individuals. HW will also be conducting municipal interviews for individuals not serving on the LHMC. Craig has provided the following list of Departments/Boards/Commissions and community reps. for consideration on the LHMC:
 - i. Building Official
 - ii. Emergency Medical Services (Chief Pliakas)

- iii. Fire Department (Chief or designee)
- iv. Senior Services/Parks and Recreation
- v. Planning and Development (Jonathan Stevens/Glenn Modica)
- vi. Police (Chief or designee)
- vii. Public Works (Joe Duarte)
- viii. Mayor's Office (Chief of Staff and/or Community Outreach Coordinator)
- ix. CERT representative
- x. General public/resident representative
- xi. PWSB representative
- xii. Business community representative
- xiii. Conservation Commission representative
- xiv. RIEMA State Hazard Mitigation Planner (Melinda Hopkins)...Craig will reach out to Melinda.

1. Jonathan and/or Glenn Modica will reach out and assemble the LHMC as an ad-hoc group in preparation for a mid-January 2023 meeting and provide the list of names/titles/contact email to Craig.

- 3. Project Webpage. Craig requested a project webpage be created and hosted on the Town's website. This will serve as a repository for project meetings/presentations, the link for the Community Survey, and eventually the draft plan for public comment. Craig will provide the content to be included.
 - a. Jonathan will work with the Town to get a project webpage developed.
- 4. Inter-departmental Email. Craig requested that once the project webpage is up and running, an inter-departmental email go out to also include Boards/Commissions to announce the kickoff of the HMP update project, directing folks to the webpage. It should be conveyed that HW staff will be reaching out to folks individually as part of the data collection process.
 - a. Jonathan will send out the project kickoff email.
- 5. Project Schedule. Craig commented that the proposed project schedule provided with HW's proposal had a start date of three months prior (September 12, 2022 kickoff), starting this effort off behind. Craig commented that updating the 2017 HMP, as its primary author, should accelerate the update process and all agreed to work on getting the update completed as quickly as possible. Craig will update the original schedule to reflect an end of summer 2023 draft deliverable to RIEMA. Glenn commented that the grant through RIEMA expires December 2024.
- 6. Proposed HMP Update. Craig asked if the Core Team is happy maintaining the 2017 plan layout. The layout was developed to align with FEMA's Plan Review Tool which is submitted with the draft and used to confirm that minimum requirements have been met. The Core Team agreed they are happy with updating the plan utilizing the current layout.
- 7. Capability Assessment. Section 4 of the HMP update includes the Capability Assessment. This is a required review of all municipal plans, studies, reports and regulations that demonstrate the Town's capacity to address hazards and resulting vulnerabilities. Craig has already started to update this section and mentioned the following data needs:
 - a. Comprehensive Plan 2016 – 2036.

- i. Jonathan and/or Glenn to update any actions that may have been completed as referenced in the 2017 HMP (Natural Hazards element).
- b. Open Space Plan (2003). Craig asked if there was an update to this plan. Jonathan commented that there has not been an update to this plan, but that there are a number of Conservation Management plans that have been developed as of late. Craig will review these online and incorporate any relevant information.
- c. Land Development and Subdivision Regulations, Amended February 4, 2015. Craig has already reviewed/updated as necessary.
- d. Chapter 17 Special Flood Hazard Areas and Flood Fringe Areas. Craig has already reviewed/updated as necessary.
- e. Article V, Section 14-21 Stormwater Ordinance (July 19, 2017). Craig has already summarized and incorporated in the update accordingly.
- f. Town of Cumberland, RI Storm Water Management Plan (March 10, 2023). Craig has already summarized and incorporated in the update accordingly.
- g. RI Sea Grant Fact Sheets/Climate Change Science Summary. No Change, keep as is.
- h. Valley Falls Emergency Action Plan.
 - i. Chief Pliakas will update any activities that have occurred since the 2017 plan (TTX, After Action Planning, photos (to include date/description/responsible party)).
- i. Municipal Resilience Program Community Resilience Building Process and Workshop (July 2021). Craig has already summarized and incorporated the key actions in the update accordingly.
- j. State of Rhode Island 2014 Resilient Rhode Island Act (EC4). Craig has already summarized and incorporated into the update accordingly.
- k. National Grid Gas Infrastructure, Safety, and Reliability Plan (2020). Craig has already summarized and incorporated into the update accordingly.
- l. Cumberland CERT Team.
 - i. Chief Pliakas will update any activities/trainings that have occurred since the 2017 plan (to include date/description/responsible party).
- m. Coordination with Local Business Community. Primarily addresses the work that Hope Global had completed (Flood Mitigation Feasibility Study).
 - i. Jonathan and/or Glenn to update any additional coordination efforts associated with business in the Berkely Industrial Park or other flood prone areas (mitigation efforts completed, information regarding Standard Operating Procedures and Continuity of Operations Plans.
- n. Municipal Administration and Staff. Specifically mentions in the 2017 Plan an updated, improved GIS system.
 - i. Jonathan and/or Glenn to coordinate with GIS Dept. to identify what has been accomplished from the following:
 - Complete GIS Software/Program Upgrades. To facilitate full GIS integration Town-wide, an ArcGIS suite of software upgrades and additional seat (s) of ArcInfo or ArcEditor would facilitate the periodic update and maintenance of the Town's GIS data.

- Periodic maintenance of parcel-based GIS Database conducted at a minimum of a 6-month cycle.
- Develop (and implement) a GIS Integration Strategy Town-wide. Update and integrate GIS capabilities throughout Town departments for use in emergency situations.
- o. State of Rhode Island. Craig has already summarized and incorporated into accordingly except where noted below:
 - i. Warning Systems
 - 1. EMSTARS
 - Chief Pliakas to identify where Cumberland's EMSTARS site is located.
 - 2. NAWAS
 - ii. Notification Systems
 - 1. RIBA Cancellation System
 - 2. RI Red Cross ENS
 - 3. Amber Alert System
 - iii. Executive Climate Change Coordinating Council (Resilient Rhody)
 - iv. RI Dept. of Health
 - 1. Safewater RI: Ensuring Safe Water for RI's Future.
 - 2. RI Special Needs Emergency Registry
 - v. RI DOT
 - 1. Cumberland's STIP projects. Craig has already updated the Town's projects listed on the TIP for 2022 and forward. During the municipal interviews, Craig will confirm this list.
 - vi. RI Dept. of Public Safety
- p. Comprehensive Emergency Management Plan. Craig requested a copy. Sections of this plan need to be incorporated into the HMP update. Chief Pliakas indicated the plan is dated and in need of an update.
 - i. Chief Pliakas will scan the plan and provide to Craig.
- q. FEMA HMA Assistance.
 - i. Jonathan and/or Glenn to provide a list of grants the Town has received under the 2017 plan, to include:
 - 1. Date/Name of event
 - 2. Disaster Number
 - 3. Total amount awarded
 - 4. Brief description of what the funds were used for
- 8. NFIP/Repetitive Loss Data. Craig stated that FEMA Region 1 has been experiencing significant delays in the processing of data requests regarding severe repetitive loss data. FEMA has since hired a new vendor to complete this work. A Town official is required to request this data – vendors/contractors cannot. HW is aware we cannot include physical addresses of severe repetitive loss sites...we will show this as a general 'radius' on the FEMA Flood Zone mapping.
 - a. Jonathan to send email to Melinda Hopkins requesting NFIP data for the update of the HMP as specified below. Joe Dwyer (RIEMA) will likely provide the data.

Melinda Hopkins, CFM

State NFIP Coordinator & Hazard Mitigation Officer

Melinda.hopkins@ema.ri.gov (401) 462-7141

Information requested includes:

- Total number of active flood insurance policies
- Total coverage value
- Number of policies in VE, A zone
- Number and value of claims since 1978

- b. Jonathan to send email to Brian Kennedy requesting Severe Repetitive Loss data for the update of the HMP as specified below. Peri Bowser (HMTAP 316 Contractor) will likely send Jonathan the ISAA agreement for signature before the request is filled.

Brian Kennedy

Emergency Management Specialist

FEMA Region I

99 High St

Boston, MA 02110

202-957-4109

brian.m.kennedy@fema.dhs.gov

Information requested includes:

- Coordination with FEMA on Repetitive Flood Loss Properties (ISAA Agreement)
- Physical Address
- Building Type/Use...commercial, residential, etc.

9. Parcel-Level GIS dataset. Craig requested an updated parcel data set. This should include all columns from the attribute table...specifically need the following:

- a. Parcel/GIS ID
- b. Land Use Classification
- c. Land/Building/Total Assessed Value (Computer-Assisted Mass Appraisal data)
- d. Built/Vacant

- i. Jonathan to request updated parcel shapefile. Can be sent to Craig via HW's FTP site, access information provided below.

Data Transfer (large files)

- Go to <http://www.horsleywitten.com>
- On the lower right-hand side of the webpage, click on 'Click here to send us your large files'
- Enter your email address
- Enter recipient at HW (Craig Pereira)
- Password is StormWater (case sensitive)
- Browse the files you would like to send
- Click on 'Send this File'

If the new parcel shapefile does not include updated Assessor's information, Craig will request this data export from the Assessor directly.

10. 2017 Plan Report Card. In advance of the first LHMC meeting anticipated for January 2023, it would be great to start looking at what has been accomplished from the 2017 plan. We will report on this information at the first public workshop. Craig has provided a separate document (attached) to be used when documenting this process.

a. All Core Team members to review the 2017 plan Report Card and indicate the following:

- o Completed?
- o Month/Year completed?
- o Responsible Party?
- o Funding mechanism/grant amount?
- o If not completed, is it still a valid action to carry forward?

11. Dam Information. New to this HMP update will be the incorporation of FEMA's High Hazard Potential Dams Rehabilitation Grant Program requirements (officially effective April 19, 2023). Plan guidance calls for coordination by the local community to coordinate with the dam owner and the state dam safety office to determine any issues or risks associated with the structure. Jonathan indicated there has been some work completed on the dams located in Cumberland, specifically the development of Emergency Action Plans (EAPs).

a. Joe Duarte to provide most recent electronic copies of any Phase I Inspection Reports, Emergency Action Plans and/or Operations & Maintenance Plans for any structures provided in the table below from the 2017 HMP.

Table 2-4 High and Significant Hazard Dams, Cumberland, RI

RIDEM #	Body of Water	Location	Ownership	Hazard
<i>Dams</i>				
RI 00801	Miscoe Lake	35 Grant's Mill Road	Private	High
RI 00802	Diamond Hill Reservoir	Reservoir Road	PWSB	High
RI 00803	Pawtucket Reservoir	North Attleboro Road	PWSB	High
RI 00804	Rawson Pond	Rawson Road	Private	Significant
RI 00805	Robin Hollow Pond	Mill Street	PWSB	Significant
RI 00806	Happy Hollow Pond	Dexter Street	PWSB	Significant

Source: RIDEM Inventory of Dams

12. Next Steps. Craig will provide the Core Team with an updated schedule.

Cumberland, RI 2017 Hazard Mitigation Plan – Report Card

PUBLIC EDUCATION AND AWARENESS

Action #1

Distribute Informational Natural Hazards Pamphlet

Develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten the community and describes steps they can take for each hazard to mitigate damages to their property. Include evacuation routes and shelter locations along with items that can and cannot be taken to the shelters as well as information regarding the risk to our community for brush/forest fires and how residents can help prevent them.

- Action Type: Planning, Pre-Disaster
- Priority Score: **24** (2011 Plan – Medium Priority)
- Lead: CERT
- Supporting: Cumberland Emergency Management Agency (CEMA)
- Time Frame: Short Term
- Financing Options: N/A
- Cost Estimate: Minimal; \$3,000 for printing (personnel time to develop pamphlet)
- Benefit: Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities
- Vulnerable Area: Residential problems

Completed Yes or No: No, carry forward into 2023 plan update

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #2

Develop an Emergency Management Agency website for the Town.

The website will include the Hazard Mitigation Plan, Emergency Operations Plan, as well as phone numbers and information on what to do in case of emergencies.

- Action Type: Planning, Pre Disaster/Post-Disaster
- Priority Score: **24** (2011 Plan – Priority not identified)
- Lead: Mayor's Office – Chief of Staff/Town of Cumberland Information Management Director
- Supporting: CEMA
- Time Frame: Medium Term
- Financing Options: N/A
- Cost Estimate: Staff Time
- Benefit: Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities
- Vulnerable Area: Residential problems

Completed Yes or No: Yes...Cumberland Fire Department website and Emergency Medical Services web page on Town's site

Month/Year: 2017

Responsible Party:

Funding Mechanism/Amount:

PROPERTY PROTECTION

Action #3

Acquire residential properties in the flood area.

The Town will work with private homeowners in these areas to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property. By purchasing these residential properties, the Town is utilizing an effective program designed to remove people and property from high-risk areas and reduce disaster losses. The buildings are either demolished or relocated, and the land is then restricted to open space in perpetuity.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: 15 (2011 Plan – Priority not identified)
- Lead: Planning & Community Development Department
- Supporting: Town Council, Building Official, Open Space Commission
- Time Frame: Long Term
- Financing Options: Town budget, State/FEMA/RIDEM grants
- Cost Estimate: Significant
- Benefit: Protection of property, reduced damage claims
- Vulnerable Area: Residential problems

Completed Yes or No: No, carry forward into 2023 plan update

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #4

Prepare an "After the Storm Recovery" Plan for the Community.

The Town should utilize the opportunity of a disaster to improve its' disaster resilience. Once critical life and safety issues and vital public services have been addressed and re-established, emphasis should be placed on the long-term recovery of the community, balancing the need to rebuild rapidly and return to normal against the objective of building back better and stronger. Additional items for consideration as part of the Plan's development include the completion of Community Assessments, a Recovery and Reconstruction Ordinance and development of a Debris Management Plan. The Town to coordinate with Statewide Planning to review the permitting processes, develop and adopt an ordinance to streamline the process in the aftermath of a hazard impact including the process to allow homeowners to retrofit structures in order to reduce risk. Formalize the existing process, and also maintain current policy to waive permit fees for building permits to repair storm-damaged properties.

- Action Type: Planning, Pre-Disaster/Post Disaster

- Priority Score: 22
- Lead: Planning & Community Development Department/NFIP Coordinator
- Supporting: Building Official
- Time Frame: Medium Term
- Financing Options: N/A
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Improved resilience, accelerated recovery
- Vulnerable Area: Residential problems

Completed Yes or No: No, carry forward into 2023 plan update?

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

STRUCTURAL PROJECTS

Action #5

Replacement of Abbott St. Wastewater Pump Station

The Abbott Street Wastewater Pump Station was constructed and began service in 1993. This station serves approximately twenty residential households and one commercial customer. This facility is an underground pneumatic pumping system that receives and pumps wastewater to the existing sanitary sewer within Havens Street. This station is located in the Valley Falls section of Cumberland. Since 2005, the station has required multiple, periodic repairs and maintenance service calls as a result of various failures of the pneumatic (compressor) equipment in conjunction with the malfunctioning of instrumentation control. It is further noted that parts for this station's equipment are difficult to obtain, and some are no longer in production. As a result of the frequent maintenance history and the possibility of a total pump station failure in the future, the Sewer Department has recommended the replacement of this station.

- Action Type: Planning, Pre-Disaster
- Priority Score: 22
- Lead: DPW
- Supporting: Engineering
- Time Frame: Long Term
- Financing Options: Capital Improvement Sewer Bond
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure and improved maintenance/operation of sanitary facility
- Vulnerable Area: Sanitary sewers

Completed Yes or No: No, to be completed in 2023 Sewer Fund/ARPA funds (DPW)

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off.

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street. (e.g. address those roads that are part of the town evacuation route first, then main thoroughfares, etc.). If structural/replacement, identify general costs associated with each.

Streets/Properties Subject to Flooding

Maintenance (Included here to illustrate a comprehensive review of flooding issues, however, not applicable for funding under any hazard mitigation grant programs)

Abbott Run Valley Road...completed, move to 'Monitoring'

- Specific Flooding Area: Jenna Way
- Flooding Cause: Reduced detention basin due to heavy rates of sedimentation from upstream construction sites in conjunction with catch basin blockage. Ongoing accumulation of debris in culvert which requires periodic monitoring and clean-out.
 - Improved in 2017/2018
 - Ongoing monitoring for flooding

Angell Road (State road)...completed, move to 'Monitoring'

- Specific Flooding Area: Easterly end at Diamond Hill Road
- Flooding Cause: Blocked catch basins require periodic cleaning by RIDOT.
 - Repaired by RIDOT
 - Ongoing monitoring for flooding

Theater Drive...completed, move to 'Monitoring'

- Specific Flooding Area: Scott Road culvert
- Flooding Cause: Culvert was previously blocked and subsequently cleaned. Still requires periodic monitoring and maintenance, particularly due to ice dam blockage during winter months.
 - Ongoing monitoring required

Crestwood Court...not completed, move to 'Maintenance'

- Specific Flooding Area: Culvert location
- Flooding Cause: Continual maintenance and clean-out of debris to prevent entering drainage system.

Fairview Avenue...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Select driveways
- Flooding Cause: Debris or other extraneous matter clogs slotted pipes across driveways. Pipe jetted to restore drainage capability. Requires periodic monitoring and maintenance.

Highridge Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire street
- Flooding Cause: Continual clogging and blockage of drainage catch basins due to leaves in heavily-treed area. Periodic monitoring and clean-up maintenance required.

Laurel Lane...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Grandview
- Flooding Cause: Periodic clogging of slotted drain pipes during interim period of maintenance and cleaning.

Meadow Brook Drive...remove, completed

- Specific Flooding Area: End of street near rear gate to development for Chimney Hill Apartments
- Flooding Cause: Drain obstructions in the form of toys from a private property continue to accumulate in pipe requiring continual monitoring and clean-up and removal. Also, upland wooded area also periodically floods.
 - Improvements completed
 - Upland wooded area is now developed land. Stormwater is managed through stormwater management system of piping network and detention ponds.

Oakwood Drive...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Culvert location
- Flooding Cause: Catch basin and culvert blockage associated with debris and roots which have been removed periodically. Maintenance issue.

Ridgewood Drive...not completed, carry forward into 2023 plan update and move to 'Structural/Replacement'

- Specific Flooding Area: Entire street
- Flooding Cause: Blockage of drainage pipe as a result of persistent root growth during interim periods of maintenance and removal.
 - Need to replace drainage pipe to eliminate the roots entering the pipe.

Tower Hill Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Diamond Hill Road end
- Flooding Cause: Silt build-up. Requires dredging and clean-up.

Monitoring

Ann and Hope Way...not completed, move to 'Maintenance'

- Specific Flooding Area: Periodic surcharge and overflow of drains due to Blackstone River elevation during select heavy storm water events.
- Flooding Cause: Flood Plain area.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck.

Club Drive...completed, move to 'Monitoring'

- Specific Flooding Area: Lippitt Estates/Low Point of Club Drive
- Flooding Cause: No existing drainage system. Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Franklin Street...not completed, move to 'Maintenance'

- Specific Flooding Area: Dead-end section near Wildwood Drive
- Flooding Cause: Flood Plain area.
 - Need to perform ongoing maintenance.

Fredrick Lane...not completed, move to 'Maintenance'

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Grundy's Way...not completed, move to 'Maintenance'

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Hannah Drive...not completed, move to 'Maintenance'

- Specific Flooding Area: Dead end/cul de sac area
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Industrial Road...not completed, carry forward into 2023 plan update and move to 'Structural/Replacement'

- Specific Flooding Area: Lower and relatively flat section of roadway near Diamond Hill Road adjacent to Okonite commercial property
- Flooding Cause: Additional catch basins installed and drainage pipe modifications recently installed to improve drainage. New drainage modifications not in place long enough to subject to sufficient number of heavy storm events to confirm effectiveness. However, other measures will be required at upstream commercial and industrial areas where holding ponds will require maintenance and other onsite drainage improvements to mitigate probable additional flows to this area.
 - This area is under design and it is anticipated to be corrected Summer 2024.

Kings Row...not completed, carry forward into 2023 plan update

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Mendon Road...remove, completed

- Specific Flooding Area: Westerly end of Marshall Avenue (State road) and intersection of Old Mendon Road
- Flooding Cause: Surcharging of two catch basin structures in this area due to probable blockage of state-owned drainage system within Mendon Road. State (RIDOT) has been notified and is scheduled to investigate same for remediation of same.
 - Completed by RIDOT 2019.

Wildwood Drive...not completed, move to 'Maintenance'

- Specific Flooding Area: Dead-end section
- Flooding Cause: Existing Flood Plain area
 - Downstream maintenance of culverts on Mendon Rd. is important to reduce/prevent flooding.

Broad Street (State road)...remove, completed

- Specific Flooding Area: Lusitania Avenue/Town Hall area
- Flooding Cause: No existing drainage system between Colonial Bakery area (located north of Town Hall) and the area near the Blackstone River Bridge at the Cumberland/Central Falls line. State (RIDOT) has been contacted to investigate this section of the street, which floods and inundates the sidewalks during heavy rain events, specifically at the crosswalks to Town Hall.
 - RIDOT installed a drainage system in this area, project to be finalized in 2023.

Hilltop Road...not completed, carry forward into 2023 plan update and move to 'Structural/Replacement'

- Specific Flooding Area: Allens Avenue
- Flooding Cause: Undersized drainage pipes serve this area. However, there are physical restrictions preventing construction in this area due to the existence of NGRID diffuser facilities.
 - Need to install additional shallow culverts to fit under the RI Energy's system.

Structural/Replacement

Bear Hill Road...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Crestwood Court
- Flooding Cause: Deteriorated and undersized drainage pipes in conjunction with periodic blockage of pipes with debris.

Hines Road...not completed, carry for into 2023 plan update

- Specific Flooding Area: Northerly section at Miller's Brook
- Flooding Cause: Undersized drainage pipes.

Martin Street...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Blackstone River and railroad area
- Flooding Cause: Existing flood plain area associated with Blackstone River.
- Supplemental: Possible collapse or deterioration of drains below railroad crossing also contributing to flooding condition.
 - Need to upgrade piping.

Old Reservoir Road...completed, move to 'Monitoring'

- Specific Flooding Area: Jason's Grant
- Flooding Cause: Drainage system in this area requires upgrading.
 - An interconnected infiltrating system was installed 2022. Ongoing monitoring will be required (during significant storms).

New York Avenue...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Miller's Brook area
- Flooding Cause: Undersized drainage pipe.

Reservoir Road...remove, completed

- Specific Flooding Area: Old Reservoir Road
- Flooding Cause: Drainage system in this area requires upgrading.
 - Completed 2019.

Jason's Grant...remove, completed

- Specific Flooding Area: N/A
- Flooding Cause: Drainage system in this area requires upgrading.
 - Completed 2019.

Seneca Street...not completed, carry forward into 2023 plan update

Specific Flooding Area: Culvert location

- Flooding Cause: Undersized culvert pipe is considered the probable cause.
 - To be completed 2023.

Shirley Drive...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Swale associated with CVS property.
- Flooding Cause: Deterioration of drainage pipes. Replacement required.
 - To be completed by property owner 2023.

Ronald Avenue...not completed, move to 'Monitoring'

- Specific Flooding Area: North Brook area
- Flooding Cause: Undersized culvert and drainage pipes are the probable cause at this location.

- o Dams created by beavers appears to be the cause of flooding.

Pavement Management

Canning Street...remove, completed

- Specific Flooding Area: Easterly end of street
- Flooding Cause: Street pavement deterioration causing improper drainage and ponding. Re-paving and grading correction (restoration of crown of road) is required for proper drainage.
 - o Completed 2016/2017.

Dutchess Road...remove, completed

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.
 - o Completed 2017.

Follett Street...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.
 - o Completed 2021.

Maybury Street...not completed, carry forward into 2023 plan update

Specific Flooding Area: Entire Street (Meadowcrest subdivision)

- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Sneech Pond Road (State road)...not completed, carry forward into 2023 plan update

- Specific Flooding Area: Entire street
- Flooding Cause: Impeded drainage. Low points and ponding areas as a result of significantly deteriorated pavement. Requires complete rehabilitation.
 - o To be completed by RIDOT 2023/2024.

- Action Type: Mitigation, Pre-Disaster
- Priority Score: **24** (2011 Plan – No priority identified)
- Lead: DPW
- Supporting: Engineering
- Time Frame: Medium Term
- Financing Options: Capital Improvement Planning
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure, maintained access/evacuation, increased public safety, improved street drainage
- Vulnerable Area: Local Roads Subject to Flooding

Completed Yes or No: Partially...see individual streets for notes.

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

PLANNING AND PREVENTION

Action #7

Develop Emergency Action Plans (EAP's) for both High and Significant hazard dams (publicly-owned) within the Town of Cumberland, including:

- Diamond Hill Reservoir Dam
- Arnold Mills Reservoir Dam
- Happy Hollow Reservoir Dam
- Robin Hollow Dam

An EAP is a plan of action to reduce potential property damage and loss of life in an area affected by a dam failure. An EAP identifies the areas, structures, facilities and roads that could be affected by dam failure. It also establishes a monitoring system which can activate the plan. Lastly, it identifies the corresponding official(s), organizations, and agencies along with their responsibilities in regards to implementing the plan.

All high and significant hazard dams must have an EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both Rhode Island Emergency Management Agency (RIEMA) and Rhode Island Department of Environmental Management (RI DEM).

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Pawtucket Water Supply Board (PWSB)/Town of Cumberland
- Supporting: Planning & Community Development Department , Cumberland Emergency Management Agency (CEMA)/Citizen's Emergency Response Team (CERT)
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT
- Cost Estimate: Minimal/Moderate; \$4,000 - \$5,500 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure, uninterrupted services
- Vulnerable Area: Integrity of water supply/Residential problems/Businesses and Industry

Completed Yes or No: Yes...all need to be updated annually...keep and revise to read 'update'

Month/Year: 2019

Responsible Party: PWSB/Planning

Funding Mechanism/Amount: PWSB

Action #8

Develop Emergency Action Plans (EAP's) for both High and Significant hazard private dams (privately-owned), including:

- Miscoe Lake Dam
- Rawson Pond Dam

An EAP is a plan of action to reduce potential property damage and loss of life in an area affected by a dam failure. An EAP identifies the areas, structures, facilities and roads that could be affected by dam failure. It also establishes a monitoring system which can activate the plan. Lastly, it identifies the corresponding official(s), organizations, and agencies along with their responsibilities in regards to implementing the plan.

All high and significant hazard dams must have an EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both Rhode Island Emergency Management Agency (RIEMA) and Rhode Island Department of Environmental Management (RI DEM).

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Private Dam Owners, Town of Cumberland
- Supporting: Planning & Community Development Department, RI DEM
- Time Frame: Short Term
- Financing Options: Private Owner responsibility with assistance from Town
- Cost Estimate: Minimal/Moderate; \$3,500 - \$5,000 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential problems/Businesses and Industry

Completed Yes or No: Yes...all need to be updated annually...keep and revise to read 'update'

Month/Year: 2019

Responsible Party: Planning

Funding Mechanism/Amount: Municipal operating budget

Action #9

Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone.

Once EAPs have been developed for both High and Significant hazard dams (both public and private), it is important to conduct a public information session for residents and businesses within the various inundation areas regarding what they should do in the event of a dam breach. This could be completed in one general session, or individual sessions for each structure and affected neighborhood.

- Action Type: Planning, Pre-Disaster
- Priority Score: 26 (2011 Plan – High Priority)
- Lead: Pawtucket Water Supply Board (PWSB)/Private dam owners
- Supporting: Planning & Community Development Department, CEMA/ CERT

- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life/infrastructure, uninterrupted services
- Vulnerable Area: Residential problems/Businesses and Industry

Completed Yes or No: No, carry forward into 2023 plan update

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #10

Evaluate New Development/Projects for Drainage and Runoff Issues.

Establish procedures within the Land Development and Subdivision Regulations to review new developments/projects with respect to drainage and run-off issues. When new developments are proposed, establish a standard to review not just the proposed development, but the entire surrounding area to evaluate how the development will affect drainage and run-off in surrounding areas to make the community more resilient and in conjunction with continued NFIP compliance.

- Action Type: Planning, Pre-Disaster
- Priority Score: 27 (2011 Plan – High Priority)
- Lead: Planning & Community Development Department
- Supporting: Building Official, Department of Public Works
- Time Frame: Medium Term
- Financing Options: N/A
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of infrastructure
- Vulnerable Area: Residential problems

Completed Yes or No: Yes...remains ongoing, move to Capability Assessment (DPW reviews stormwater systems of every land development project.

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #11

Update Land Development and Subdivision Regulations regarding protocol for holding ponds.

Presently, holding ponds on private property are not being maintained, and thus, due to accumulation of debris and increased sedimentation and run-off which minimizes the carrying capacity of the pond, adjacent areas are being flooded.

In coordination with DPW, amend regulations (and distribute information to owners of holding ponds) to include:

- New developments to utilize Homeowner Associations to put holding ponds into joint ownership with fees assessed for periodic upkeep and maintenance.
 - For existing developments, DPW to develop one-page Fact Sheet for use by pre-existing and future owners of holding ponds with applicable information and schedule for cleaning and maintenance.
 - Incorporate Fact Sheet into Administrative Subdivision Checklist
 - Develop supplemental provisions and incorporate into deed restrictions
- Action Type: Mitigation, Pre-Disaster/Post Disaster
 - Priority Score: 28
 - Lead: Planning & Community Development Department
 - Supporting: DPW
 - Time Frame: Short Term
 - Financing Options: N/A
 - Cost Estimate: Minimal; Staff Time
 - Benefit: Protection of property and infrastructure
 - Vulnerable Area: Residential problems

Completed Yes or No: No, carry forward into 2023 plan update

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #12

Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the LNG site.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: 26
- Lead: Mayor's Office – Chief of Staff/ CEMA
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Staff/personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life, maintained access
- Vulnerable Area: Residential problems

Completed Yes or No: No, carry forward into 2023 plan update

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

Action #13

Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents

To determine if an alternate on or off-site location, or conversion to electronic records filing is the best course for the Town to undertake.

- Action Type: Planning, Pre-Disaster/Post-Disaster
- Priority Score: 22
- Lead: Mayor's Office
- Supporting: Town Council, Town Clerk
- Time Frame: Medium Term
- Financing Options: Town Budget
- Cost Estimate: Significant; Staff Time \$30,000 (dependent upon option selected)
- Benefit: Protection of critical Town records/documents
- Vulnerable Area: Public Facilities

Completed Yes or No: No, carry forward into 2023 plan update

Month/Year:

Responsible Party:

Funding Mechanism/Amount:

LHMC Meeting #1: January 5, 2023



Cumberland Hazard Mitigation Plan Update Local Hazard Mitigation Committee Meeting #1

January 5, 2023

2:00 – 3:00 PM

Agenda

1. Introductions
2. Scope of Work
3. Updated Schedule
4. December 12, 2022 Project Kickoff Follow-up
 - a. Project Webpage
 - b. Interdepartmental Email
 - c. HMP Update Layout
 - d. Capability Assessment
 - i. Comprehensive Plan: completed actions?
 - ii. Valley Falls EAP: update on activities?
 - iii. CERT Team: updates on activities/trainings?
 - iv. Coordination with Business Community/other flood prone areas?
 - v. GIS Upgrades?
 - vi. Warning Systems: EMSTARS site location?
 - vii. CEMP: scanned copy?
 - viii. FEMA Assistance/Funding
 1. RI Infrastructure Bank grants: description/summary?
 2. COVID Funds?
 3. Broad St. Infrastructure Work?
 - ix. 2017 Plan Report Card?
 - x. Dams Data
 1. Phase 1 Inspection Reports?
 2. O&Ms?
5. Hazard Index
 - a. Hazard Index 2017...vs 2023
 - i. Hazards included
 - ii. Ranking methodology
6. Next Steps
 - a. Public Workshop #1
 - b. Online Survey



Memorandum of Meeting

To: Local Hazard Mitigation Committee (LHMC) - Town of Cumberland

From: Craig Pereira

Date: January 5, 2023

Re: Cumberland Hazard Mitigation Plan (HMP) Update

In attendance:

Jonathan Stevens — Director, Planning and Community Development
Glenn Modica — Town Planner
John Pliakas — Chief, Emergency Medical Services
Joe Duarte — Director, Public Works
Matt Benson — Police Chief
Matt Alves — Deputy Police Chief
Chris Collins — Pawtucket Water Supply Board
Joe Luca — Conservation Commission
Nick Anderson — Fire Chief
Sarah King — Community Outreach Coordinator
Mike Crawley — Director, Senior Services/Parks and Recreation
Sara Brelsford — Chief of Staff, Mayor's Office
Frank Matta — Director, Cumberland Land Trust/Friends of the Blackstone

Consultant Team

Craig Pereira, Project Manager - Horsley Witten Group, Inc. (HW)

The LHMC was convened to conduct the first meeting for the HMP update. The following items were discussed:

1. Introductions.
2. Scope of Work.
 - a. Craig Pereira provided an overview of the tasks included in the Scope of Work. The Scope of Work submitted to the Town is included as an attachment.
3. Updated Schedule.
 - a. At the December 12, 2022 kickoff meeting with the Core Planning Team it was requested that an updated schedule be developed recognizing that some time had passed since the proposal submission and prior to selecting a consultant and getting a signed contract.
 - b. Craig provided an overview of the updated schedule with a target date of September 1, 2023 for a draft deliverable to RIEMA.
4. Kickoff Meeting (December 12, 2022) Follow-up.
 - a. Project Webpage. Craig provided draft language for a project webpage to be hosted on the Town's website. This will serve as a repository for project

meetings/presentations, the link for the Community Survey, and eventually the draft plan for public comment. Jonathan Stevens to work with Sarah King to get this up and running.

- b. Interdepartmental email. Jonathan sent this out December 14, 2022 to alert municipal officials that the project had been kicked off and that Craig and his staff may be reaching out as part of the data collection efforts.
- c. HMP Update Layout. It was decided that the 2017 Plan format will remain consistent for the 2023 update. This layout was redesigned to align with the Plan Review Tool that RIEMA/FEMA utilize when reviewing draft submissions.
- d. Capability Assessment. Craig stated that he has already started to update this section of the 2023 Plan. This section includes a review of existing planning documents, Zoning, Ordinances and 'capabilities' of the community. Several additional data points are needed:
 - i. Comprehensive Plan completed actions: received from Jonathan following the meeting.
 - ii. Valley Falls EAP (Rail incident): Chief Pliakas to provide Craig with the updated plan (2019).
 - iii. CERT Teams updates: Chief Pliakas to provide Craig with a summary of activities/trainings since the 2017 Plan.
 - iv. GIS upgrades: Glenn Modica stated that the Town's GIS is handled by an outside vendor now and they do all updates.
 - v. Warning Systems (EMSTARS location): at the new Public Safety Complex (EOC) at 1379 Diamond Hill Road. Chief Benson indicated that the tower is still located behind the former police station (across the street).
 - vi. FEMA Assistance Funding. Jonathan previously provided a list of funding received since the 2017 Plan.
 - 1. Craig requested any additional COVID funding received including Federal Declaration Number/Date/Amount/What the funds were used for. Chief Pliakas to provide to Craig.
 - 2. Craig requested a summary of the infrastructure improvements completed since the 2017 Plan along the Broad Street corridor. Joe Duarte to provide to Craig.
 - 3. Craig requested summaries for the two RI Infrastructure Bank grants the Town has received (\$250,000 Valley Falls/Urban Forestry Program and \$500,000 Industrial Road Drainage Project). Jonathan to provide to Craig.
 - 4. 2017 Plan Report Card. Craig provided a copy of the 2017 Plan Mitigation Strategy to the Core Planning Team at the kickoff meeting. This is not yet completed. This needs to be completed prior to the first Public Workshop. Jonathan, Joe and Glenn will work on completing this and will provide to Craig.
 - 5. Dams Data. Craig received the Emergency Action Plans completed in 2019 for the six high/significant hazard dams (completed by a planning intern, Pawtucket Water Supply Board (PWSB) paid for their four) including Diamond Hill

Reservoir Dam, Happy Hollow Pond Dam, Miscoe Lake Dam, Pawtucket Reservoir Dam, Rawson Pond Dam and Robin Hollow Pond Dam. Craig also requested copies (digital preferred) of the most recent Phase 1 Inspection Reports for these six dams. FEMA has recently changed their regulations (effective April 19, 2023) and now provides guidance and funding through their High Hazard Potential Dams Rehabilitation Grant Program (HHPD). Chris Collins stated that some work has been done to PWSB structures and some hazard classifications have changed as a result of these improvements. **Chris to provide any updated information on PWSB-owned structures to Craig.**

6. Dams Data. Craig stated there are an additional 15 'Low Hazard' dams located within the Town (four of which have shared responsibility with the Town of Lincoln on the Blackstone River). **Craig will work directly with Joe to obtain any data his department may have on these structures.** Craig will reach out to the RI Office of Dam Safety if no information is available through DPW.

5. Hazard Index.

- Craig provided an overview on the Scoring Criteria guidance provided by FEMA, the NOAA Severe Events Database (Data is reported County-wide unless otherwise noted) where information is obtained to inform the process, and the updated draft Hazard Index for the 2023 update (with the overall Hazard Index number from the 2017 Plan next to the 2023 updated number). Where numbers are indicated as higher, that is correlated to an increase in the number of events/impacts from the events since the 2017 Plan. Also, the 'Location' was included in the overall Hazard Index number calculations for the 2023 update, but not included in the 2017 Plan calculations (community's decision). There aren't any pros/cons when calculating the overall Hazard Index number, as they should be reflective of the best available data and historic experiences in the community. Craig indicated that the LHMC should review and provide input into the scoring since the community can adjust up/down as they see fit. Joe mentioned concerned for public perception if the majority of hazards rank as 'high' and that we should emphasize the hazards most significant/impactful to the community. Craig went back through the Hazard Index from the 2017 Plan and 2023 update, added all the score from the 2017 Plan and adjusted the 2023 update scoring based on best available data, not including the 'Location' scoring for consistency with the 2017 Plan's methodology and to allow the top/most significant hazards to surface. The result indicates the top hazards as Riverine/Flash Flooding and Heavy Rain, Blizzards/Snow/Nor'easters, Hurricanes/High Winds (consistent with the 2017 Plan and the Municipal Resilience Program process). It also indicates increases in Extreme Cold, Drought, and a new entry for Extreme Heat (also consistent with the 2017 Plan and the Municipal Resilience Program process). Chief Anderson commented that perhaps the Wildfire numbers should be increased due to increases in contributing factors including Drought and Extreme Heat. **All LHMC members should review the updated Hazard Index,**

FEMA Hazard Index Scoring Criteria, Severe Events Database and provide feedback as needed (all documents attached). Chief Anderson should complete the scoring for Wildfires.

6. Next Steps.
 - a. Public Workshop #1.
 - i. Craig stated that the 2017 Plan Report Card and Hazard Index update needs to be finalized prior to scheduling the workshop. Both topics will be the focus of this first workshop.
 - ii. The LHMC discussed a potential location and approach for this workshop to facilitate a strong turnout from the community. Craig stated that any public venue would work, but perhaps not Town Hall (residents are historically apprehensive of speaking out at public meetings with officials). In the past workshops have been held at more neutral locations such as the Library or schools. The LHMC also discussed providing incentives by way of food. Craig requested existing distribution lists from all LHMC members from past community engagement/outreach efforts/initiatives. Craig will work with the Core Planning Team to confirm the data needed to schedule this workshop. LHMC members are not required to attend the workshop but are welcome to attend and support the project.
 - iii. Craig will work with Sarah King on the advertising/marketing of this workshop to the public.
 - b. Online Survey.
 - i. Craig stated an online survey will be developed as part of the community engagement component of the 2023 update. HW has a contract with Survey Monkey and will develop the draft survey for review by the LHMC. This survey will be kicked off at the first public workshop and will likely remain open for several months, depending upon the response rate. Sarah asked about paper copies available in the community. Craig will provide the Word-version of the survey to Sarah for distribution in the community.

Horsley Witten Group

Sustainable Environmental Solutions

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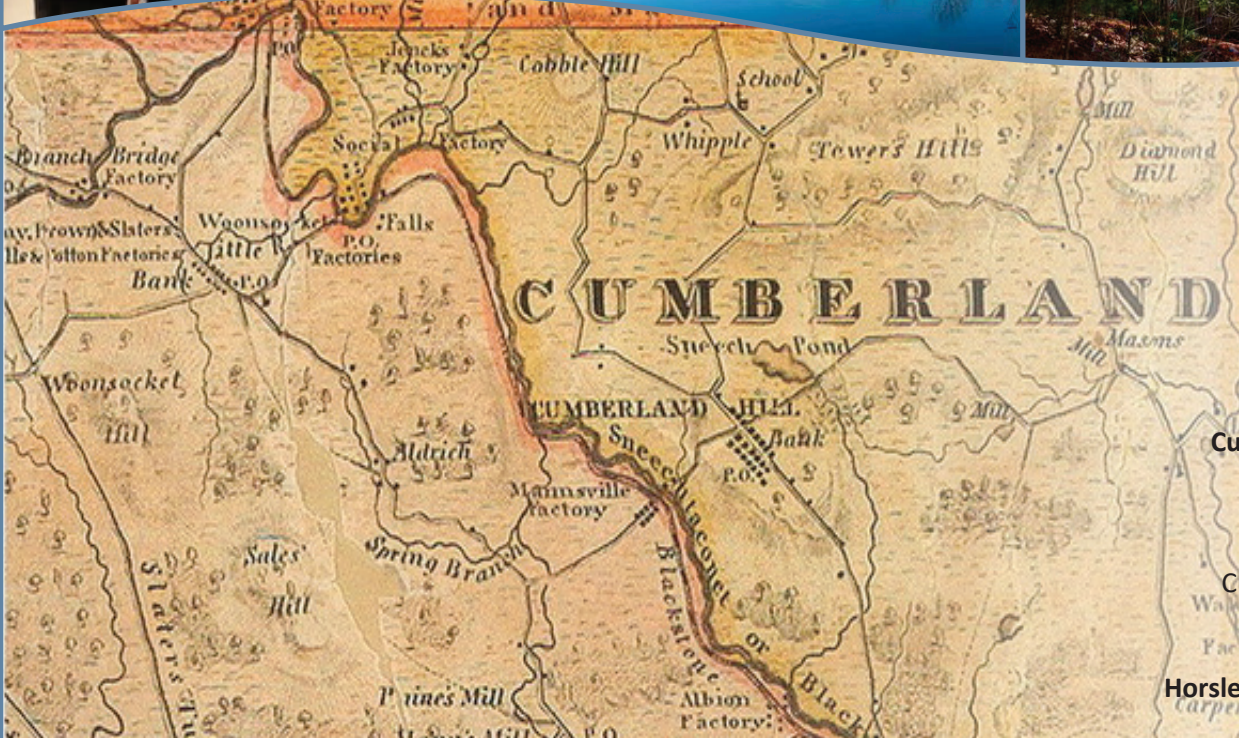
TECHNICAL PROPOSAL FOR:

Hazard Mitigation Plan Update

Bid # 2022-0819-01

Town of Cumberland, RI

August 19, 2022



Submitted to:
Cumberland Town Hall
Mayor's Office
Attn: Ms. Sarah King
45 Broad Street
Cumberland, RI 02864

Prepared by:
Horsley Witten Group, Inc.

B. Scope of Work – Hazard Mitigation Plan Update

Our proven approach is based on four elements, all geared toward meeting the requirements of the Disaster Mitigation Act (DMA) Public Law 106-390, October 10, 2000:

- Planning Process – *Outreach and Stakeholder Coordination*
- Risk Assessment – *Identifying Hazards and Estimating Losses*
- Mitigation Strategy – *Identifying Mitigation Actions and Implementation Strategies*
- Plan Maintenance – *Implementation, Evaluation and Revision/Update*

In addition to the four primary methods, HW acknowledges FEMA's requirements for plan content – *Local Mitigation Planning Policy Guide* (released April 19, 2022). This plan guidance is effective for all local multi-hazard mitigation plans submitted to FEMA, effective April 19, 2023.

HW provides the following Scope of Work in response to the required deliverables and schedule to develop the HMP.

Task 1: Convene and Coordinate with the Local Hazard Mitigation Committee (LHMC), Conduct Public Outreach, and Document the Hazard Mitigation Planning Process

HW assumes that the LHMC from the 2017 HMP will be brought together once again to serve on this HMP update process, including municipal officials and representatives from the Pawtucket Water Supply Board, businesses located in the floodplain, and Citizen's Emergency Response Team (CERT). HW suggests diversifying the LHMC by reaching out for representation from Environmental Justice/Disadvantaged populations, through coordination with Ms. Sarah King and/or consulting the Town of Cumberland's *Community Resources Manual*.

HW will coordinate with the Cumberland LHMC regularly to discuss the project status, answer questions, and assist with data gathering/distribution, schedule meetings and other tasks to keep the project on schedule. It is anticipated that this team will participate in plan development to ensure representation from a cross-section of the community. It is recommended that a Rhode Island Emergency Management Agency (RIEMA) representative be invited to participate in the development of the HMP update. Coordination with RIEMA personnel early on, and throughout the project, can facilitate a more expeditious review and approval of the draft plan. Four meetings with the LHMC, during regular workdays (or evenings, whichever is preferred), are anticipated. The following is an overview of proposed meeting topics:

- Meeting #1 – Initial Coordination
 - LHMC introduction and overview on plan development process, individual roles and responsibilities
 - Establish status report schedule
 - Project protocol, schedule, and document exchange
 - Logistics for Public Workshop #1

- Meeting #2 – Follow-up to Public Workshop
 - Summary of Public Workshop #1
 - Updated Risk Assessment/Capability Assessment
 - GIS Mapping/Critical Facilities
- Meeting #3 – Selection and Prioritization of Draft Mitigation Actions
 - Draft mission, goals, and objectives for mitigation strategy
 - Prioritization of mitigation actions
 - Logistics for Public Workshop #2/Public Hearing
- Meeting #4 – Review Final Plan
 - Summary of Public Workshop #2/Public Hearing
 - Revisions to Plan

Working drafts will be provided at project milestones to the LHMC for distribution to municipal officials/departments, as well as neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development for review and comment. HW assumes one draft review for each deliverable.

HW suggests the following list of potential engagement strategies as a starting point:

- Project Website. Coordinate with the Town to develop content for a project webpage hosted on the Town's website. This webpage will include information announcing the project, tips on how to get involved, and ways to view presentations and data presented at community forums. It will also serve to keep community members informed and engaged early on, during, and following plan adoption.
- Social Media. Work with the Town Planner to utilize the Town's existing Facebook page as another way to engage community members. Whether it is used for project meeting announcements, notifications on the availability of draft materials for public review and comment, or simply to generate community discussions centered on specific topics—social media can be a powerful tool to engage the public.
- Municipal/Stakeholder Interviews. Coordinate with municipal department representatives and stakeholders to round out a successful, comprehensive planning process. HW will coordinate with all municipal departments regarding development of the HMP update through virtual or telephone interviews (of those departments not already participating on the LHMC), as well as identified stakeholders.
- On-Line Survey. Utilize SurveyMonkey to design and implement an on-line survey as an additional tool to gauge the community's knowledge base on hazard mitigation planning, as well as residents' sentiment on how they prefer to receive new information as part of the plan's development. It is anticipated the survey will be a broad-brush snapshot of the community to provide another public outreach opportunity (in meeting FEMA's public engagement requirements), kicked-off at the first Public Workshop, and will remain open for at least one month.

- Printed Media/Eblasts. HW will develop a media strategy through local networks to publicize the project and direct community members to the webpage, Facebook page, and public workshops as an educational tool and a mechanism for feedback.

An open public involvement process during the drafting stage and prior to plan approval is essential to the development of a plan update. Two public workshops are anticipated:

- Public Workshop #1 – HW (in collaboration with the LHMC) will conduct a Public Workshop, at a date and time conducive to the public, to announce the project, report on plan development and receive comments from the general public relative to what should be included in the HMP update.
- Public Workshop #2/Public Hearing, Town Council – HW (in collaboration with the LHMC) will present the full draft plan where it is anticipated that the Town Council will support and recommend the HMP moving on to RIEMA and then FEMA for review and approval.

HW will document the planning process utilized to develop the HMP update, including how it was prepared, who was involved in the process, and how the public was integrated.

Deliverables: Four LHMC meetings; design and delivery of public process; two public meetings; project webpage setup; survey findings; coordination meeting with Town Council; and documentation of the process.

Task 2: Update/Perform Risk Assessment

HW will identify all potential hazards posing a risk to the Town. This list will include all hazards identified in the State of Rhode Island State Hazard Mitigation Plan (2018) as well as others identified at LHMC meetings and municipal coordination projects (2021 MRP initiative). HW will review hazard events, conduct a robust climate change review, and determine if there are new physical hazards that could affect the community (and what the impacts are). Climate change is one of the most pressing issues of our time and its effects are increasingly impacting communities across Rhode Island. Since climate change has both direct and indirect impacts on the range of natural hazards to which Cumberland is vulnerable, HW suggests it would be most appropriate to include a 'climate change impacts' section to each natural hazard profiled in this HMP update.

HW will also determine if recent or future development(s) in the project area have been checked for their effect on hazard areas so that mitigation options can be considered in future land use decisions. Information review will also include flood-related hazards based on new FEMA Flood Insurance Rate Maps (FIRMs), new repetitive flood loss properties and any municipal plans and/or projects completed to date.

Similar to the current plan (with the addition of invasive species-related hazards), it is suggested that hazards be organized into the following categories and listed in order of frequency and impact:

Natural Hazards:

- Flood-Related Hazards
- Winter-Related Hazards
- Wind-Related Hazards
- Fire-Related Hazards
- Geologic-Related Hazards
- Extreme Heat-Related Hazards
- Drought-Related Hazards
- Wildfire-Related Hazards
- Invasive Species-Related

The details of hazard events will be updated with input from the LHMC, although most general data will come from utilizing NOAA's National Centers for Environmental Information (NCEI) (<http://ncdc.noaa.gov/>). All events will be presented as countywide, unless otherwise noted, as provided by NOAA. The update of weather events will be from January 1, 2016 forward as this represents the period since the last data collection efforts during development of the 2017 HMP. HW will define the risks that the Town could face and follow up with an assessment of the vulnerability of the at-risk areas, and the implications of experiencing natural disasters (e.g., loss of life, damage to the natural environment, property damage, and economic losses).

New to this HMP update will be the incorporation of FEMA's High Hazard Potential Dams Rehabilitation Grant Program requirements (officially effective April 19, 2023). Plan guidance calls for coordination by the local community to coordinate with the dam owner and the state dam safety office to determine any issues or risks associated with the structure. As a matter of course, HW incorporates a thorough dam inventory and review into hazard mitigation planning efforts, including a description of the dam and appurtenances, review of recent Phase 1 Inspection Reports, and Emergency Operations Plans, and Operations and Maintenance Plans followed by the development of mitigation actions as applicable.

The result will be the development of a Risk Assessment Matrix that lists the vulnerable areas and the primary effects from an event in these areas. This matrix will then be used to develop mitigation strategies later in the process. HW, in collaboration with the LHMC will then collectively determine the likelihood of occurrence, locations affected, and potential impacts of each. This information will be used to establish a Hazard Index for each of the types of hazards.

HW's working knowledge of FEMA's Benefit Cost Analysis (BCA) software will support the prioritization process for mitigation actions and implementation strategies, which is most often guided by a project's cost effectiveness and ability to reduce future damages and losses.

Deliverables: Updated Risk Assessment/Matrix

Task 3: Facility Inventory and GIS Mapping

HW will work with the Town on the development of the necessary mapping to comprehensively portray the Town's risks and vulnerabilities. HW will review and revise (as necessary) the existing critical facilities dataset identified as part of the 2017 Plan. It is expected that the inventory of critical facilities will include, but not be limited to, the Town Hall and other offices, water treatment infrastructure (e.g., wells, pump stations), police and fire stations, schools, day-care facilities, nursing homes and elderly housing. This review will also address repetitive flood loss structures, developed land uses and vulnerable historic structures. HW will explain how these facilities and land use categories intersect with the known hazards in the community. HW will initiate this task through coordination with the LHMC and the RIGIS to reveal any additional datasets readily available, based on research of new information/recent events. HW will develop new, updated maps for both *Risks* and *Critical Facilities* utilizing ArcView 10.8.1.

Deliverables: GIS Mapping

Task 4: Update/Perform Hazard Vulnerability Assessment

Based on the improved Risk Assessment and GIS mapping, HW will conduct a Hazard Vulnerability Assessment to update all assets including existing and future buildings, infrastructure and critical facilities located in hazard areas (also identifying the population in high-risk areas), to understand the Town's risks and to estimate losses for natural hazard scenarios.

This section will examine the vulnerability of the built environment, such as structures, utilities, roads, and bridges, as well as social and environmental vulnerabilities. A vulnerability analysis also estimates the number of people including elderly populations, school-aged children and concentrated populations exposed to hazards. This also includes such issues as whether shelter capacity is sufficient for the affected population, and whether businesses are likely to face temporary closure due to natural disasters. Historical damages are often good indicators for current exposure and potential damage. A Vulnerability Chart, or Matrix, will be developed based on the identification and profile of the natural hazards that have occurred throughout Town over time. It will describe the expected frequency of occurrence, and the potential severity of the damage resulting from each individual hazard evaluated for this HMP update.

The vulnerability assessment also considers:

- Residential, commercial, and industrial development trends
- Economic vulnerabilities (e.g., NFIP-insured property damage, impacts of FEMA flood zones, sea level rise scenario projections and hurricane surge inundation area impacts)
- Social vulnerabilities (e.g., public infrastructure, emergency lifelines, and evacuation/population at risk)
- Environmental vulnerabilities

- Direct (e.g., loss of habitat and salinization of land/ groundwater) and indirect costs (e.g., widespread inland damage to built environment, threats to ecosystems/ species, and contamination of potable water supply).

HW will conduct Economic Analyses to determine the existing and future monetary risks associated with the various natural hazard data layers. Utilizing a current Computer Assisted Mass Appraisal (CAMA) data export from the Cumberland Tax Assessor's Office, merged with the parcels data layer, HW will quantify the number of parcels (based on land use classification) and total values (land and buildings) to better understand the economic impacts across the community.

Deliverables: Updated Vulnerability Analyses

Task 5: Develop Goals and Objectives

HW (in collaboration with the LHMC) will develop goals and objectives based on current conditions (as necessary). These will include the completion of mitigation actions, the Risk Assessment and state priorities, with particular attention to continued compliance with the NFIP.

Deliverables: Goals/Objectives

Task 6: Analyze Existing and Research New Hazard Mitigation Strategies

We will review the Town's pre- and post-disaster hazard mitigation management policies, programs, and capabilities, particularly the Town's policies related to development in hazard-prone areas, departmental structure (in terms of professional staff, availability to directly carry out mitigation actions, and/or provide technical assistance) and funding capabilities for hazard mitigation projects. Previous work identified from the MRP program and other hazard-related work/projects will be considered.

Deliverables: Capability Assessment

Task 7: Develop a Comprehensive Range of Mitigation Actions

It is anticipated the LHMC consider actions aligned to the following mitigation categories (per FEMA guidance):

- Public Education and Awareness
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services
- Planning and Prevention

Next, the community actions from the MRP process will be fully incorporated into the Mitigation Action Plan to ensure consistency across municipal documents.

It is required that each mitigation action incorporated into this HMP update will be measurable in terms of monitoring progress and implementation through plan maintenance. All mitigation actions will be bounded by a time frame, include cost estimates, and have responsible parties assigned. An emphasis on public/private partnerships will be encouraged. Upon submittal of this HMP update to RIEMA, the State Hazard Mitigation Committee (SHMC) is expected to review and approve these goals and objectives to ensure consistency with the statewide goals and objectives. Representative time frames and cost estimate ranges based on similar work are provided below for example.

Time Frames:

- Short Term = 0 to <6 Months
- Medium Term = 6 to <18 Months
- Long Term = 18 Months to 5 Years

Cost Ranges:

- Staff Time – municipal personnel time
- Minimal – less than \$5,000
- Moderate – more than \$5,000, but less than \$25,000
- Significant – over \$25,000

Primary responsible parties will be assigned through coordination with the Town and LHMC, as well as other relevant departments/agencies that can offer support to the action. Finally, possible finance options will be researched and included.

Due to budgetary constraints and other limitations, it is often impossible to implement all mitigation actions. HW, in coordination with the LHMC, will select the most cost-effective actions for priority implementation to use resources efficiently and develop a realistic approach toward remediating risks. The Disaster Mitigation Act (DMA) supports this principle of cost-effectiveness by requiring action plans to follow a prioritization process that emphasizes benefits over costs. DMA 2000 states:

“The mitigation strategy section shall include an action plan describing how the actions identified in section 1(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.”

To emphasize that a Benefit-Cost Review was employed when prioritizing actions (as required by FEMA), FEMA’s STAPLEE Method (or some version of it) will be used.

STAPLEE Criteria

1. **Social:** Is the action compatible with present and future local community needs and values?
2. **Technical:** Is the action feasible with available local resources (or as supplemented by outside resources as necessary)?

3. **Administrative:** Does the community have the administrative capacity to implement the action?
4. **Political:** Is there strong public support to implement and maintain the action?
5. **Legal:** Does the community have the legal authority to implement the action?
6. **Economic:** Is the action cost-effective?
7. **Environmental:** Does the action impact environmental resources, and is the impact positive, negative, or neutral?

Each of the mitigation actions should be scored against each of the STAPLEE criteria outlined above with a numerical score (along with the potential for use of weighted scores). These numbers will then be totaled and developed into an overall priority score. The ranking of the priority score will serve as a guideline for when the Town should begin acting on the identified strategies, or actions.

HW will utilize FEMA's *Cost-Benefit-Review* and *STAPLEE* methodology to prioritize actions and update the Mitigation Action Plan according to FEMA's guidelines, to include:

- Goals and Objectives
- Actions
- Lead Department/Personnel
- Support Department/Personnel
- Budget/Cost Estimate
- Funding Source
- Start/End Dates

Deliverables: Prioritized Mitigation Action Strategy

Task 8: Plan Maintenance and Implementation

HW (in collaboration with the LHMC) will identify the method and schedule to be used over the next five years to monitor, evaluate, and update the plan effectively and efficiently. At a minimum, quarterly meetings of the LHMC should be scheduled during the calendar year to ensure that mitigation actions are being carried out according to assigned time frames and to assess the effectiveness of completed actions. All LHMC meetings should be duly advertised and open to the public, to maintain resident and business owner engagement in the update process.

It is recommended that the LHMC chairperson (or another identified person) be responsible for ensuring that the Town of Cumberland HMP remains a living document. All proposed strategy revisions will be reviewed to ensure coordination and conformance with the Town's policies and regulations.

It is anticipated that discussions with the LHMC will serve to identify the Town's preference for monitoring, evaluating, and updating the plan.

Deliverables: Plan Maintenance/Implementation

Task 9: Review, Revision, Approval and Adoption of Plan

Following the close of the planning process and development of the full draft HMP update, HW (in collaboration with the LHMC) will release the draft HMP update for public comment through posting on the project web page and making hard copies available throughout the community. Following the close of the public comment period and completion of any necessary revisions, HW will present the draft plan at a public hearing before the Town Council where it is anticipated that they will support and recommend the HMP update moving on to RIEMA and then FEMA for review and approval.

Prior to submission to RIEMA/FEMA, HW will complete the Local Mitigation Plan Review Tool to ensure the HMP update rises above the minimum requirements for certain elements during the review process by Federal and State officials. The HMP update will then be submitted to RIEMA and then FEMA, for review and 'approval – pending adoption' by the Town of Cumberland. Once the HMP update receives FEMA's approval, HW (in collaboration with the LHMC) will present the final HMP update to the Town Council for adoption, post the adopted plan update on the project web page, and initiate post plan adoption outreach activities chosen by the LHMC from suggestions such as the following:

- Use of social media tools (e.g., Constant Contact)
- Piggy-back on a town-sponsored event (e.g., weekend festival)

Deliverables: Eight paper copies as a draft update for review at the end of the planning process. We will also deliver eight bound copies, plus one digital copy, suitable for reproduction.

All text, tables, graphs, charts and drawings will be provided in the latest software versions (or other format acceptable to the Town), as applicable. All digital ArcView GIS datasets obtained, modified and/or developed for mapping purposes will also be provided digitally for future use by the Town.

We will also remain available to the Town in the future to provide guidance and recount the experience.

Responsibilities of the Town of Cumberland

In preparing our scope of work, HW has assumed that the Town of Cumberland will provide sufficient staff time as needed to develop the HMP and assure completion of this during the expected timeframe. Staff time provided by the municipality will include the following activities:

- Asset Inventory
 - List of critical facilities
 - Updates of any new development
- Vulnerability Assessment
 - List of critical facilities in flood zones
 - Summary of vulnerable populations/infrastructure

- Catalog of existing hazard mitigation actions
 - Existing studies, plans, reports and additional technical information as needed to finalize the assessment of local capabilities in advance of mitigation strategy development tasks
 - Review and catalog of existing floodplain management activities, mapping updates, higher regulatory standards, etc.
- The Town's GIS data (accurate and current)
- List of Repetitive Loss Properties
- Support for LHMC meetings, including participant identification, invitations, materials, and facilities
- Host a project webpage on the Town's website
- Coordinate and assist the consultant in conducting outreach to community stakeholders
- All subsequent public meetings and requirements for plan adoption, including various Town boards, commissions, and Town Council review and approvals

Criteria for Frequency Categorization:

<i>Very low frequency (1):</i>	events that occur less frequently than once in 1,000 years (less than 0.1% per year).
<i>Low frequency (2):</i>	events that occur from once in 100 years to once in 1,000 years (0.1% to 1% per year).
<i>Medium frequency (3):</i>	events that occur from once in 10 years to once in 100 years (1% to 10% per year).
<i>High frequency (4):</i>	events that occur more frequently than once in 10 years (greater than 10% per year).

Criteria for Location Categorization:

<i>Small (1):</i>	10% or less of the total jurisdictional boundaries.
<i>Medium (2):</i>	10% to 40% of the total jurisdictional boundaries.
<i>Large (3):</i>	40% to 100% of the total jurisdictional boundaries.

Criteria for Severity Categorization (based on past hazard events):

<i>Minor (1):</i>	Limited and scattered property damage; no damage to public infrastructure; contained geographic area; essential services not interrupted; no injuries or fatalities.
<i>Serious (2):</i>	Scattered major property damage; some minor infrastructure damage; wider geographic area; essential services are briefly interrupted; some injuries/fatalities.
<i>Extensive (3):</i>	Consistent major property damage; major damage to public infrastructure; essential services are interrupted for several hours to several days; many injuries and fatalities.
<i>Catastrophic (4):</i>	Property and public infrastructure destroyed; essential services stopped; thousands of injuries and fatalities.

Table 2-2 Hazard Index Cumberland, Rhode Island (2023)

Natural Hazard	Frequency (i.e. Very Low, Low, Medium, High)	Location (i.e. small/local, medium/regional, large/multiple communities)	Severity (i.e. minor, serious, extensive, catastrophic)	Hazrd Index (i.e. ranked by combining frequency, location and severity)
Flood-Related Hazards				
- Riverine/Flash Flooding	3	2	3	(7) 8
- Inland/Urban Flooding/Heavy Rain	4	2	2	(7) 8
- Climate Change	2	2	1	(5) 5
- Dam Failures	1	2	2	(4) 5
Winter-Related Hazards				
- Blizzards/Snow/Nor' easter	4	3	2	(7) 9
- Ice	3	2	2	(6) 7
- Extreme Cold	1	2	2	(3) 5
Wind-Related Hazards				
- Hurricanes	4	3	2	(7) 9
- Tornadoes/High Winds	4	2	2	(6) 8
- Lightning/Thunderstorms	3	1	1	(5) 5
- Hail	3	1	1	(5) 5
Geologic-Related Hazards				
- Earthquakes	1	2	2	(5) 5
Drought				
- Drought	3	2	2	(3) 7
Extreme Heat				
- Extreme Heat	3	2	2	7
Wildfire				
- Wildfire	2	1	1	(4) _
Invasive species				
- Multiple	3	1	1	5

Task 1: Convene/Coordinate with LHMC, Conduct Public Outreach, Document Planning Process	December 12, 2022 - September 1, 2023
<i>Kickoff Meeting with Consultant and Town Meeting #1 - LHMC</i> - Project Webpage - 2017 Plan Report Card - Data Collection	Week of December 12, 2022 Week of January 10, 2023
Task 2: Update/Perform Risk Assessment - Hazard Identification/Profiles	January 16, 2023 - March 6, 2023
<i>Coordination with Town Departments/Personnel Public Workshop #1</i>	Week of January 23, 2023 Week of February 13, 2023
Task 3: Facility Inventory/GIS Mapping - Update Risks/Critical Fac./Vulnerable Pops. Mapping	January 16, 2023 - February 10, 2023
Task 4: Update/Perform Hazard Vulnerability Assessment	February 13, 2023 - March 24, 2023
<i>Meeting #2 - LHMC</i> - Vulnerability Analyses	Week of February 27, 2023
Task 5: Develop Goals and Objectives - Preliminary Mitigation Recommendations	March 20, 2023 - April 14, 2023
Task 6: Analyze Existing/Research New Strategies - Plans, Policies and Problems Examination	March 27, 2023 - April 21, 2023
Task 7: Develop Comprehensive Range of Actions	April 24, 2023 - June 2, 2023
<i>Meeting #3 - LHMC</i>	Week of May 1, 2023
Task 8: Plan Maintenance/Implementation	April 24, 2023 - June 2, 2023
Task 9: Review, Revision, Approval and Adoption of Plan	June 5, 2023 - June 12, 2023
<i>Meeting #4 - LHMC</i> - Cost Benefit Review/Prioritization	Week of July 10, 2023
Public Comment Period	July 24, 2023 - August 18, 2023
<i>Draft Plan Coordination with Planning Board</i>	Week of July 24, 2023
<i>Draft Plan Coordination with Conservation Commission</i>	Week of July 31, 2023
<i>Public Workshop #2/Town Council Public Hearing</i>	Week of August 7, 2023
<i>Final Deliverable to RIEMA</i>	By September 1, 2023

Cumberland Hazard Mitigation Plan Update

LHMC Meeting #1

Cumberland Town Hall

45 Broad Street

January 5, 2023 2:00 PM - 3:00 PM

<u>Name</u>	<u>Email Address</u>
Joseph Duarte	
Matt Benson	
Matt Alves	
Chris Collins	
Joe Luca	
Nicholas Anderson	
Glenn Modica	
Sarah King	
Mike Crawley	
Sara Bresford	
Jonathan Stevens	
Frank Matta	
Craig Pereira	

Public Workshop #1: April 24, 2023

Town of Cumberland, RI Hazard Mitigation Plan Update



Public Workshop #1

Monday, April 24, 2023
6:00—8:00 PM

Cumberland Town Hall, Council Chambers (2nd floor)
45 Broad Street
Cumberland, RI 02864

Come learn what the Town has accomplished
and contribute to preparing/planning for the future.

Online Community Survey Now Open!

Please take a few minutes to complete the survey to help us coordinate activities and identify future projects to address natural hazards and climate change impacts facing the community.

<https://www.surveymonkey.com/r/CumberlandHMP23>



About the Cumberland Hazard Mitigation Plan Update

The Town of Cumberland is currently updating the 2017 Hazard Mitigation Plan. This plan is important because it helps the Town plan and receive funding for projects that reduce the risk of injury or damage to property from natural hazard events such as flooding, winter storms, and hurricanes. The Disaster Mitigation Act of 2000 (DMA) places high priority on the continuation of the planning process after the initial submittal, requiring communities to seek and receive re-approval from FEMA in order to remain eligible for financial assistance.

For more information, please visit the project webpage at:
<https://www.cumberlandri.org/hazard-mitigation/>

Contacts

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Horsley Witten Group, Inc.
Project Manager
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(401) 263-6048

Town of Cumberland, RI Hazard Mitigation Plan Update Public Workshop #1



Craig Pereira, CFM
Project Manager – Horsley Witten Group

April 24, 2023 6:00 PM
Cumberland Town Hall – Council Chambers



1

WELCOME!



2

Town of Cumberland Local Hazard Mitigation Committee

- Jonathan Stevens, Director of Planning and Community Development
- Glenn Modica, Town Planner
- John Pliakas, Emergency Medical Services Chief
- Joe Duarte, Public Works Director
- Matt Benson, Police Chief
- Matt Alves, Deputy Police Chief
- Chris Collins, Pawtucket Water Supply Board
- Joe Luca, Conservation Commission
- Nick Anderson, Fire Chief
- Sarah King, Community Outreach Coordinator
- Mike Crawley, Senior Services/Parks and Recreation Director
- Sara Brelsford, Chief of Staff – Mayor's Office
- Frank Matta, Director – Cumberland Land Trust/Friends of the Blackstone
- Brad Dean, President – Dean Industries
- Kevin Joyce, Building Official



3

Why Hazard Mitigation Planning?

Disaster Mitigation Act of 2000, Interim Final Rule, 44 CFR Parts 201 and 206 states, "All communities must have an approved Multiple Hazards Mitigation Plan in order to qualify for future federal disaster mitigation grants".

Hazard Mitigation:

"Reduction or elimination of long-term risk to life, property, and the environment".



4

Mitigation Process

- **Assess Risks**
- Establish Goals
- Identify Projects/Actions
- Update/Maintain Plan



5

Assess Risks... Risk and Vulnerability Assessment

Natural Hazard:

"Any event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, and agricultural loss, damage to the environment, interruption of business, or other types of harm and/or loss".



6

Assess Risks... Natural Hazards Affecting Cumberland, RI

Flood-related hazards

- Riverine/Flash Flooding
- Inland/Urban Flooding/Heavy Rain
- Climate Change
- Dam Failures

Wind-related hazards

- Hurricanes
- Tornadoes/High Winds
- Lightning/Thunderstorms
- Hail

Winter-related hazards

- Blizzards/Snow/Nor'easters
- Ice
- Extreme Cold



7

Assess Risks... Natural Hazards Affecting Cumberland, RI

Geologic-related hazards

- Earthquakes

Drought-related hazards

- Drought

Extreme Heat-related hazards

- Extreme Heat

Invasive Species-related hazards

- Invasive Species

Wildfire-related hazards

- Wildfire



8

Assess Risks... Natural Hazard Profiles/Hazard Index

Flood-related hazards

- Riverine/Flash Flooding: High
- Inland/Urban Flooding/Heavy Rain: High
- Climate Change: Moderate
- Dam Failure: Moderate

Wind-related hazards

- Hurricanes: High
- Tornadoes/High Winds: High
- Lightning/Thunderstorms: Moderate
- Hail: Moderate

Winter-related hazards

- Blizzards/Snow/Nor'easters: High
- Ice: Moderate
- Extreme Cold: Moderate



9

Assess Risks... Natural Hazard Profiles/Hazard Index

Geologic-related hazards

- Earthquakes: Moderate

Drought-related hazards

- Drought: Moderate

Extreme Heat-related hazards

- Extreme Heat: Moderate

Invasive Species-related hazards

- Invasive Species: Moderate

Wildfire-related hazards

- Wildfire: Moderate



10

Assess Risks... Hazard Index: Top Hazards

Top Hazards Impacting Cumberland

- Flood-related hazards
 - Riverine/Flash Flooding
 - Inland Flooding/Heavy Rain
- Winter-related hazards
 - Snow/Blizzards/Nor'easters
- Wind-related hazards
 - Hurricanes
 - High Winds



11

Assess Risks... Hazard Index

Natural Hazard	Frequency (i.e. Very Low, Low, Medium, High)	Location (i.e. small/local, medium/regional, large/multiple communities)	Severity (i.e. minor, serious, extensive, catastrophic)	Hazard Index (i.e. ranked by combining frequency and severity)
Flood-Related Hazards				
- Riverine/Flash Flooding	4	2	3	7
- Inland Urban Flooding/Heavy Rain	4	2	3	7
- Climate Change	3	2	2	5
- Dam Failures	1	2	3	4
Winter-Related Hazards				
- Blizzards/Snow/Nor'easter	4	3	3	7
- Ice	4	2	2	6
- Extreme Cold	4	3	1	5
Wind-Related Hazards				
- Hurricanes	4	3	3	7
- Tornadoes/High Winds	4	2	3	7
- Lightning/Thunderstorms	4	1	2	6
- Hail	4	1	1	5
Geologic-Related Hazards				
- Earthquakes	4	2	1	5
Drought-Related Hazards				
- Drought	4	2	1	5
Extreme Heat-Related Hazards				
- Extreme Heat	4	2	2	6
Wildfire-Related Hazards				
- Wildfire	3	1	2	5
Invasive Species-Related Hazards				
- Multiple	3	1	1	4

Notes: 1. Scored by HMC/Fire Chief; 2. Location score not included in overall hazard ranking.

12

Assess Risks... Risk and Vulnerability Assessment - Assets

- **Economic Assets**
 - Businesses/Employers
 - Business interruptions
 - Tourist destinations
- **Social Assets**
 - Vulnerable Populations
 - Schools
 - Daycare Facilities
 - Senior/Congregate Care
 - Cultural locations
- **Natural Resources**
 - Wetlands
 - Conservation and recreation lands
- **Essential Services and Critical Facilities**
 - Government buildings
 - Hazardous facilities
 - Freight Rail
 - Roadways
 - Lifeline/Utility systems
 - Public Water Supply
 - Sanitary Sewer
 - Transportation Network



13

13

Mitigation Process

- Assess Risks
- **Establish Goals**
- Identify Projects/Actions
- Update/Maintain Plan



14

14

Establish Goals...Mitigation Goals

- Protect the public's health, safety, and welfare.
- Reduce property damages caused by hazard (s) impact.
- Minimize social distress and economic losses/business disruptions.
- Provide an ongoing forum for the education and awareness of natural hazard mitigation issues, programs, policies, and projects.



15

15

Mitigation Process

- Assess Risks
- Establish Goals
- **Identify Projects/Actions**
- Update/Maintain Plan



16

16

Mitigation Measures...Categories

- Planning and Prevention
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services, and
- Public Education and Awareness



17

17

Identify Projects/Actions... Identification of Mitigation Actions

Mitigation actions to be developed based on review of the Town's identified risks and vulnerabilities to natural hazards.

Each action incorporates a brief description of the intended action, who the responsible parties are, a proposed time frame for completion and potential funding sources.



18

18

Identify Projects/Actions... Prioritization of Actions...STAPLEE Method

- **Social**...is the action socially acceptable?
- **Technical**...is the action technically feasible and provide appropriate level of protection?
- **Administrative**...does the Town have the capability to complete the action?
- **Political**...will the Town support or oppose the project?
- **Legal**...does the Town have the legal authority to complete the action?
- **Economic**...is the action cost-effective?
- **Environmental**...will the action affect the natural environment?



19

Identify Projects/Actions... Implementation

- **Town's Capability**
 - Planning and Regulatory Capabilities
 - Administrative and Technical Capabilities
 - Financial Capabilities
- **Plan Adoption/Incorporation into Existing Plans**



20

Mitigation Process

- Assess Risks
- Establish Goals
- Identify Projects/Actions
- **Update/Maintain Plan**



21

Cumberland Municipal Resilience Program (July 2021)

- Approve a Town CIP to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on the budgets for Public Safety, Public Works, Highway, Fire, EMS, and Water Departments and ensure CIP is in place for future administrations.
- Incorporate resulting resilience actions from CRB workshop into future updates of Comprehensive Plan and Hazard Mitigation Plan.
- Create a comprehensive and robust framework for resident communication and engagement before, during, and after emergencies including:
 - Develop/consolidate procedures for emergency communication and alert systems for the Town, in preparation for, and in, emergency scenarios regarding evacuation routes, shelters, weather events, resources, etc. (real time build on Code Red and Special Needs Registry and preparation through different media including resident pamphlets).
 - Increase resident awareness and engagement with these issues, procedures, and foster buy-in through community engagement, outreach, and education.
 - Increase/diversify regular Town communications (website, social media, sign-up campaigns, etc.) focused on services offered, recreation and regular updates on needs and activities.



22

Cumberland Municipal Resilience Program (July 2021)

- Comprehensive flood mitigation along Blackstone River via projects for specific culverts, undersized drainage pipes, road grading corrections, and catch basins projects via the following actions:
 - Direct/relocate development to areas that are already watered/sewered and are above natural river level, surge, and floodplain to preserve open space and avoid inappropriate parcel development as well as encourage low impact development (LID).
 - Identify sites for flood mitigation projects including the removal of impervious surfaces, wetland restoration, and other natural solutions which would establish green spaces that can accommodate flooding, filter water and serve recreation and ecosystems.
 - Pursue grant opportunities to resume feasibility studies in the lower Martin St. area which currently have massive pumps due to development mistakes (excavated and graded too much material and are now below river level), in hopes of returning these areas to green space with relocation of occupants to higher ground.
 - Coordinate efforts with Blackstone River watershed towns, councils, and organizations.



23

Cumberland Municipal Resilience Program (July 2021)

- Develop and implement a comprehensive tree management plan which addresses tree maintenance particularly along power lines to prevent outages, and tree canopy expansion in more developed areas with inclusion of the following sections:
 - Determine schedule for tree maintenance in coordination with RI Energy (formerly National Grid).
 - Provide education and resources to property owners responsible for tree maintenance.
 - Develop pre/post storm event tree procedures to protect electricity infrastructure and prevent outages, limit addition of trees to rivers as projectiles, etc.
 - Increase tree canopy coverage in Valley Falls and Lonsdale areas where a decrease in tree canopy has contributed to rising temperatures, increased flooding, and threats to the health and well-being of vulnerable residents.
 - Build on social equity ties and integrate tree equity score information (lot level) into tree management plan.
 - Coordinate with existing tree planting initiatives (e.g. along roadways on private property, jobs program, etc.) which may not have an explicit resiliency lens but are geared towards economic development.



24

2017 Plan Report Card

PUBLIC EDUCATION AND AWARENESS

Action #1

Distribute Informational Natural Hazards Pamphlet

Develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten the community and describes steps they can take for each hazard to mitigate damages to their property. Include evacuation routes and shelter locations along with items that can and cannot be taken to the shelters as well as information regarding the risk to our community for brush/forest fires and how residents can help prevent them.

Not Completed...Carry forward into 2023 update

Action #2

Develop an Emergency Management Agency website for the Town

The website will include the Hazard Mitigation Plan, Emergency Operations Plan, as well as phone numbers and information on what to do in case of emergencies.

Completed...Fire Department/Emergency Medical Services web pages hosted on Town's site



25

2017 Plan Report Card

PROPERTY PROTECTION

Action #3

Acquire residential properties in the flood area

The Town will work with private homeowners in these areas to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property.

Not Completed...carry forward into 2023 update

Action #4

Prepare an "After the Storm Recovery" Plan for the Community

The Town should utilize the opportunity of a disaster to improve its' disaster resilience. Additional items for consideration as part of the Plan's development include the completion of Community Assessments, a Recovery and Reconstruction Ordinance and development of a Debris Management Plan.

Not Completed...carry forward into 2023 update



26

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #5

Replacement of Abbott St. Wastewater Pump Station

The Abbott Street Wastewater Pump Station was constructed and began service in 1993. Since 2005, the station has required multiple, periodic repairs and maintenance service calls as a result of various failures of the pneumatic (compressor) equipment in conjunction with the malfunctioning of instrumentation control. It is further noted that parts for this station's equipment are difficult to obtain, and some are no longer in production. As a result of the frequent maintenance history and the possibility of a total pump station failure in the future, the Sewer Department has recommended the replacement of this station.

Not Completed...to be completed in 2023 with Sewer/ARPA funds



27

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Maintenance.....

- Abbott Run Valley Road: completed
- Angell Road: completed
- Theater Drive: completed
- Crestwood Court: not completed, remains ongoing
- Fairview Avenue: not completed...carry forward into 2023 update



28

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Maintenance.....

- Highridge Road: not completed...carry forward into 2023 update
- Laurel Lane: not completed...carry forward into 2023 update
- Meadow Brook Drive: completed
- Oakwood Drive: not completed...carry forward into 2023 update
- Ridgewood Drive: not completed...carry forward into 2023 update



29

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Maintenance.....

- Tower Hill Road: not completed...carry forward into 2023 update

Monitoring.....

- Ann & Hope Way: not completed, remains ongoing
- Club Drive: completed
- Franklin Street: not completed, remains ongoing



30

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Monitoring.....

- Frederick Lane: not completed, remains ongoing
- Grundy's Way: not completed, remains ongoing
- Hannah's Drive: not completed, remains ongoing
- Industrial Road: not completed...carry forward into 2023 update
- King's Row: not completed...carry forward into 2023 update



31

31

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Monitoring.....

- Mendon Road: completed
- Wildwood Drive: not completed, remains ongoing
- Broad Street: completed
- Hilltop Road: not completed...carry forward into 2023 update



32

32

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Structural/Replacement.....

- Bear Hill Road: not completed...carry forward into 2023 update
- Hines Road: not completed...carry forward into 2023 update
- Martin Street: not completed...carry forward into 2023 update
- Old Reservoir Road: completed, remains ongoing
- New York Avenue: not completed...carry forward into 2023 update



33

33

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Structural/Replacement.....

- Reservoir Road: completed
- Jason's Grant: completed
- Seneca Street: not completed, carry forward into 2023 update
- Shirley Drive: not completed, remains ongoing (by homeowner)
- Ronald Avenue: not completed, remains ongoing



34

34

2017 Plan Report Card

STRUCTURAL PROJECTS

Action #6

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street.

Pavement Management.....

- Canning Street: completed
- Dutchess Road: completed
- Follett Street: not completed...carry forward into 2023 update
- Maybury Street: not completed...carry forward into 2023 update
- Sneece Pond Road: not completed...carry forward into 2023 update



35

35

2017 Plan Report Card

PLANNING AND PREVENTION

Action #7

Develop Emergency Action Plans (EAP's) for both High and Significant hazard dams (publicly-owned) within the Town of Cumberland, including:

- Diamond Hill Reservoir Dam, Arnold Mills Reservoir Dam, Happy Hollow Reservoir Dam, and Robin Hollow Dam

Completed...require annual updates...new action item to update annually

Action #8

Develop Emergency Action Plans (EAP's) for both High and Significant hazard private dams (privately-owned), including:

- Miscoe Lake Dam, Rawson Pond Dam

Completed...require annual updates...new action item to update annually



36

36

2017 Plan Report Card

PLANNING AND PREVENTION

Action #9

Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone. Once EAPs have been developed for both High and Significant hazard dams (both public and private), it is important to conduct a public information session for residents and businesses within the various inundation areas regarding what they should do in the event of a dam breach.

Not Completed...carry forward into 2023 update

Action #10

Evaluate New Development/Projects for Drainage and Runoff Issues

Establish procedures within the Land Development and Subdivision Regulations to review new developments/projects with respect to drainage and run-off issues.

Completed



37

2017 Plan Report Card

PLANNING AND PREVENTION

Action #11

Update Land Development and Subdivision Regulations regarding protocol for holding ponds. Presently, holding ponds on private property are not being maintained, and thus, due to accumulation of debris and increased sedimentation and run-off which minimizes the carrying capacity of the pond, adjacent areas are being flooded. In coordination with DPW, amend regulations (and distribute information to owners of holding ponds) to include:

- New developments to utilize Homeowner Associations to put holding ponds into joint ownership with fees assessed for periodic upkeep and maintenance.
- For existing developments, DPW to develop one-page Fact Sheet for use by pre-existing and future owners of holding ponds with applicable information and schedule for cleaning and maintenance.
- Incorporate Fact Sheet into Administrative Subdivision Checklist
- Develop supplemental provisions and incorporate into deed restrictions

Not Completed...carry forward into 2023 update



38

2017 Plan Report Card

PLANNING AND PREVENTION

Action #12

Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the LNG site

Not Completed...carry forward into 2023 update

Action #13

Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents

To determine if an alternate on- or off-site location, or conversion to electronic records filing is the best course for the Town to undertake.

Not Completed...carry forward into 2023 update



39

Online Public Survey

Online Community Survey Now Open!

<https://www.surveymonkey.com/r/CumberlandHMP23>



40

Project Schedule

Draft Update available for comment: **Late July 2023**

Draft Update to RIEMA: **September 1, 2023**



41

Contact Us...

Questions/Comments:

Jonathan Stevens
Director, Planning and Community Development
Town of Cumberland

jstevens@cumberlandri.org
Phone: (401) 728-2400 ext. 142

Craig Pereira—Project Manager
Senior Planner/CFM
Horsley Witten Group, Inc.

1 Turks Head Place, Suite 300
Providence, RI 02903
cpereira@horsleywitten.com
Phone: (401) 263-6048



42

THANK YOU!



43

Town of Cumberland, RI

Hazard Mitigation Plan Update - Public Workshop #1

Cumberland Town Hall - Council Chambers
45 Broad Street
Cumberland, RI

April 24, 2023
6:00 PM

<u>Name</u>	<u>Email Address</u>
Sarah King	
Craig Adams	
Glenn Modica	
Jonathan Stevens	
Joseph Duarte	
John Pliakas	
Eddy Sanderand	
Katie Maloney	
Donna Tessier	
Christian Torres	
Joe Luca	
Jim Metivier	
Michael Kinch	
Kellie King	
Craig Pereira	



Local Hazard Mitigation Committee Meeting #2: June 9, 2023



Cumberland Hazard Mitigation Plan Update Local Hazard Mitigation Committee Meeting #2

June 9, 2023

9:00 – 10:00 AM

https://us02web.zoom.us/j/86894339207?tk=uEKZ2i9kfe0NmERoHFZxXPt7ruP0O-AZ1e3G2FZG6sk.DQMAAAAU005khxYtTW56YmdodVJRLUJ0elkta183RWJnAAAAAAAAAAAAAAAAAAAA&pwd=OWhzdWZVaXBKaVZEZGJFWkc5N1JxZz09&uuid=WN_OhtHLWxQZ2x6E_06fFGcA

Passcode: 895415

Or One tap mobile:

+13052241968,,86894339207#,,,,*895415# US

+13092053325,,86894339207#,,,,*895415# US

Agenda

1. Mission Statement (see separate doc)
2. Goals (see separate doc)
3. Interviews
 - a. Jason Macari: Berkeley Business Center
 - b. Brenda Dexter: Hope Global
 - c. Lou Marandola: Ann & Hope Re-development project
4. Community Survey
 - a. 10 responses to date...need to push this out
5. Mapping
 - a. A-1: Flood Risks (still need Repetitive Flood Loss Data to be added)
 - b. A-2: Hurricane Tracks
 - c. A-3: Critical Facilities/Vulnerable Populations
6. Vulnerability Assessment (see separate doc)
 - a. FEMA 100 yr/500 yr Flood Zones
7. Brushfires/Wildfires
 - a. Need list of Brushfires/Wildfires since 2017. Should include mutual aid to adjacent communities.
8. Development Trends
 - a. From 2017 Plan:
 - i. Affordable Housing Production Plan references 'mill conversions' at Corning Site. Don't see this as data provided by Town. Should this come out?



- ii. Enterprise Zone Discussion (two designated zones: Central Falls/Valley Falls (historic mill villages) and Woonsocket/Cumberland (Highland Corporate Park). Locations still preferred for economic development?
 - iii. Industrial Activity (see separate doc)
9. Repetitive Flood Loss Data – FEMA Region 1...need to follow up



Memorandum of Meeting

To: Local Hazard Mitigation Committee (LHMC) - Town of Cumberland

From: Craig Pereira

Date: June 9, 2023

Re: Cumberland Hazard Mitigation Plan (HMP) Update

In attendance:

Jonathan Stevens — Director, Planning and Community Development
Glenn Modica — Town Planner
John Pliakas — Chief, Emergency Medical Services
Joe Duarte — Director, Public Works
Matt Alves — Deputy Police Chief
Joe Luca — Conservation Commission
Sarah King — Community Outreach Coordinator
Mike Crawley — Director, Senior Services/Parks and Recreation
Sara Brelsford — Chief of Staff, Mayor's Office
Brad Dean — Dean Industries

Consultant Team

Craig Pereira, Project Manager - Horsley Witten Group, Inc. (HW)

The LHMC was convened (virtually) to conduct the second meeting for the HMP update. The following items were discussed:

1. Mission Statement. The LHMC decided to maintain the 2017 mission statement (attached, see separate document).
2. Goals. The LHMC decided to maintain the 2017 goals (attached, see separate document).
3. Interviews. Craig commented that interviews need to be conducted and asked if there were additional stakeholders to interview:
 - a. Jason Macari: Berkeley Business Center
 - b. Brenda Dexter: Hope Global
 - c. Lou Marandola: Ann & Hope Redevelopment project
 - d. Brad Dean: Dean Industries (added)
 - e. Jeff Morgan: Stop & Shop (added)
4. Online Community Survey. Craig commented that there have only been 10 responses to the online survey and that the LHMC needs to push this out more.
 - a. Sara King sends out periodic updates via social media and will include the link and QR Code for the survey.
 - b. All LHMC members to please forward survey link and QR code to their networks.

<https://www.surveymonkey.com/r/CumberlandHMP23>



5. Mapping. Craig provided an overview of the completed mapping including Map A-1 Flood Risks (still needs repetitive flood loss data to be added once received) and Map A-3 Critical Facilities/Vulnerable Populations.
 - a. All LHMC members to review for accuracy.
6. Vulnerability Analyses. Craig provided an overview of the FEMA 100-yr./500-yr flood zone overlay analyses which included the number of parcels impacted, critical facilities, vulnerable populations, and critical infrastructure (intermittent roadway sections) for both layers. This analysis also quantified the financial/economic impacts of these layers (see separate document).
7. Brushfires/Wildfires. Craig requested a list of all brushfires/wildfires from 2017 to now (total for each year since 2017). This should include all mutual aid calls to other communities also.
 - a. Chief Anderson to provide to Craig.
8. Development Trends. Several sections of the 2017 Plan require updating...
 - a. The Affordable Housing Production Plan references 'mill conversions' at the Corning Site. Craig asked if this should remain? Jonathan Stevens commented that there is availability for intensification to the south of the Corning site in Ashton.
 - b. The Enterprise Zone discussion identifies two zones (Central Falls/Valley Falls and Woonsocket/Cumberland – Highland Corporate Park) as preferred locations for economic development. Craig asked if these should remain? Yes.
 - c. The 2017 Plan also references 8 sites for future industrial activity. Craig asked if these should remain. Yes.
9. Severe Repetitive Flood Loss Data Request.
 - a. Craig requested that Jonathan follow up with FEMA Region 1 on this data request.
10. Valley Falls and Lonsdale Economic Revitalization and Social Equity Plan. Jonathan mentioned the plan was recently completed and asked if Craig had a copy.
 - a. Jonathan to forward a copy to Craig electronically.
11. Next LHMC Meeting. TBD.

Mission Statement

The purpose of the Cumberland Hazard Mitigation Plan is to preserve and enhance the quality of life, property values, and resources by identifying all potential natural hazards in Cumberland and mitigating their effects to reduce the loss of life, as well as, losses of economic, historical, natural, and cultural resources.

Goals

1. Protect the public health, safety and welfare.
2. Reduce property damages caused by hazard impact.
3. Minimize social distress and economic losses/business disruption.
4. Provide an ongoing forum for the education and awareness of natural hazard mitigation issues, programs, policies, and projects.

Interviews

- Jason Macari: Berkeley Business Center
- Brenda Dexter: Hope Global
- Lou Marandola: Ann & Hope Re-development Project

Vulnerability Analyses

AE/100-Year Flood Zone

The AE zone or 100-year flood zone (has a 1% chance of flooding occurring each year) is a regulatory standard used by federal agencies and most states to administer floodplain management programs and is also used by the NFIP as the basis for insurance requirements nationwide.

Parcels affected: (825 Parcels Total)

- Mixed Use: 10
- Vacant: 94 (includes Residential, Commercial and Industrial Vacant Land)
- Commercial: 29 (includes Small and Large Business)
- Residential: 501 (includes Single-, Two-, Three-, Four-, Five-, Six-Family, Condominiums and Residential Apartments)
- Industrial: 13 (includes Industrial and Utility and Railroad)
- Municipal: 66 (includes Municipal Land/Commercial Sites/Residential Sites, Fire, Police, Library and Schools)
- State: 9 (includes State Land/Commercial Sites/Residential Sites)
- Farm/Forest/Open Space: 17
- Cemetery: 3
- Religious: 2
- Tax Sales: 12
- Vote of Town: 4
- Charitable Land: 1

Critical Facilities affected:

- Dams
 - Albion Dam
 - Ashton Dam
 - Diamond Hill Reservoir Dam
 - Pratt Dam
 - Happy Hollow Pond Dam
 - Howard Pond Dam
 - Manville Dam
 - Rawson Pond Dam
 - Robin Hollow Pond Dam
 - Duhallow Pond Dam
 - Ker-Anna Pond Dam
 - Cranberry Bog Dam
 - Miscoe Lake Dam
 - Valley Falls Pond Dam
 - Carl's Pond Dam
 - Catamint Dam
- Drinking Water
 - Manville 1 Well/Pump Station
 - Manville 2 Well/Pump Station

Critical Infrastructure affected:

- Silva Street
 - Rear of residential lots adjacent to flood zone
- Ann & Hope Way
 - Commercial businesses along east side of roadway
 - P & W Rail Yard/Rail Crossing
- Mendon Road/Ann & Hope Way intersection
 - Cumberland Manor senior housing
 - Stop & Shop/Commercial Plaza
- Wildwood Street/Franklin Street/Lenox Street/Dixon Street
- River Bank Lane
 - Rear of residential lots adjacent to flood zone
- Martin Street
 - Industrial businesses fronting along the Blackstone River
- Front Street
 - Residential development at Ashton Mill complex
- Blackstone River Bikeway – intermittent sections
- P & W Railroad – intermittent sections
- Albion Road/School Street intersection
- Manville Hill Road (at bridge)
- Monastery grounds – wooded portions
- Salvas Court
- Scott Road
 - Residences along Scott Brook

- Bruce Caldwell Drive
 - Cumberland High School Athletic complex along West Sneeck Brook
- Cozy Lane
 - Rear of residential lots adjacent to flood zone
- Highland Avenue/Morris Street/Williams Street/Amherst Street/Hilltop Road
 - Residential development
- Mill Street (at Happy Hollow Pond Dam)
- Dexter Street (at Robin Hollow Pond dam)
- Curran Road (at Millers River)
- Bonnie Brook Drive/Anna Mack Drive
 - Residences along Long Brook
- Sneeck Pond Road/Nate Whipple Highway (at Ash Swamp Brook)
- Pine Swamp Road
- West Wrentham Road/Deer Brook Way
- Summer Brown Road/Burnt Swamp Road/Reservoir Road (at Diamond Hill Reservoir)
- Rawson Road (at Abbot Run/Rawson Pond)

Table 2-17 Total Vulnerability FEMA 100-Year Flood Zone Summary

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate "Other" Value	Approximate Total Value
1% Annual Chance/100-Year Flood Zone					
Residential	501	\$132,484,741	\$347,304,000	\$52,695,712	\$532,484,453
Commercial	29	\$3,369,700	\$9,001,800	\$145,100	\$12,516,600
Industrial	69	\$8,302,800	\$44,891,000	\$327,100	\$53,520,900
Mixed Use	10	\$1,373,200	\$1,466,600	\$109,400	\$2,949,200
Cemetery	3	\$322,900	\$400,900	\$0	\$723,800
Religious	2	\$509,500	\$320,200	\$13,000	\$842,700
Charitable Land	1	\$30,500	\$0	\$0	\$30,500
Farm/Forest/ Open Space	17	\$0	\$5,483,300	\$0	\$5,483,300
Tax Sales	8	\$1,189,800	\$2,822,600	\$12,000	\$4,024,400
Vote of Town	4	\$537,500	\$1,642,700	\$0	\$2,180,200
Municipal	66	\$28,400	\$21,243,100	\$0	\$21,271,500
State	9	\$0	\$3,014,800	\$0	\$3,014,800
Vacant	94	\$16,610,300	\$18,149,700	\$821,600	\$35,581,600
Unclassified	12	\$1,534,100	\$1,527,500	\$56,500	\$3,118,100
Total	825	\$166,293,441	\$457,268,200	\$54,180,412	\$677,742,053

Note: The two data sets utilized to develop this table did not directly correlate due to the variance in effective dates – 4/7/2014 v. 3/24/2016 (discrepancy of 833 records).

Source: Cumberland Tax Assessor CAMA data, Rhode Island Property Tax Use Code (2003)

- 501 residential structures
- 29 commercial properties
- 66 municipally-owned properties

X/500-Year Flood Zone

The X zone or 500-year flood zone (has a 0.2% chance of flooding occurring each year) is a regulatory standard used by federal agencies and most states to administer and inform floodplain management programs.

Parcels affected: (292 Parcels Total)

- Mixed Use: 5
- Vacant: 15 (includes Residential, Commercial and Industrial Vacant Land)
- Commercial: 38 (includes Small and Large Businesses)
- Residential: 175 (includes Single-, Two-, Three-, Four-, Five-, Six-Family, Condominiums and Residential Apartments)
- Industrial: 23 (includes Industrial, Utility, and Railroad)
- Municipal: 9 (includes Municipal Land/Commercial Sites/Residential Sites, Fire, Police, Library and Schools)
- State: 3 (includes State Land/Commercial Sites/Residential Sites)
- Tax Sales: 2
- Vote of Town: 4
- Unclassified: 13
- Utility and Railroad: 7

Vulnerable Populations affected:

- Cumberland Manor

Critical Infrastructure affected:

- P & W Railroad – intermittent sections
- Albion Road west of Cumberland Plaza
- Route 116 (George Washington Highway) and P & W Railroad crossing
- Front Street
 - Residential development at Ashton Mill complex
- Martin Street and P & W Railroad crossing
 - Commercial developments along P & W Railroad
- Riverview Drive
 - Rear of residential lots adjacent to flood zone
- Lenox Street
 - Residences
- Mendon Road at P & W Railroad crossing
- Ann and Hope Way at P & W Railroad crossing
- Stop & Shop Plaza at Mendon Road
- Meeting Street
 - Rear of commercial parcels along Blackstone River
- Meeting Street/Broad Street intersection

Table 2-18 Total Vulnerability FEMA 500-Year Flood Zone Summary

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate "Other" Value	Approximate Total Value
0.2% Annual Chance/500-Year Flood Zone					
Residential	175	\$28,132,700	\$143,796,100	\$49,500	\$171,978,300
Commercial	38	\$17,310,200	\$39,532,600	\$2,556,200	\$59,399,000
Industrial	23	\$20,533,300	\$16,821,300	\$1,895,112	\$39,249,712
Mixed Use	5	\$767,100	\$2,909,600	\$27,000	\$3,703,700
Tax Sales	2	\$516,700	\$0	\$0	\$516,700
Vote of Town	2	\$2,958,000	\$15,183,400	\$1,090,400	\$19,231,800
Municipal	9	\$4,520,000	\$103,200	\$98,200	\$4,721,400
State	3	\$606,200	\$0	\$0	\$606,200
Vacant	15	\$982,027	\$0	\$84,000	\$1,066,027
Unclassified	13	\$0	\$0	\$0	\$0
Total	292	\$76,885,827	\$218,346,200	\$5,824,912	\$301,056,939

- 175 residential structures
- 38 commercial properties
- 9 municipally-owned properties

Development Trends/Industrial Activity

The Town also includes eight large sites currently used for industrial activity. These locations (as well as the smaller, scattered underutilized former textile mills) are the Town's preferred location for future economic development. These sites include:

Highland Corporate Park: 12 acres remain available for development.

Martin Street Industrial Area: Majority of remaining vacant land is located within the Blackstone River flood plain/floodway, although an existing gravel extraction (37 acres) could be converted to light manufacturing and/or a business park.

Cumberland Industrial Park. North of I-295...Although fully utilized currently, vacancies occur from time to time. South of I-295...same as the development north of I-295.

RI Energy (formerly National Grid) Site. In case of future consolidation, site could become available for re-use.

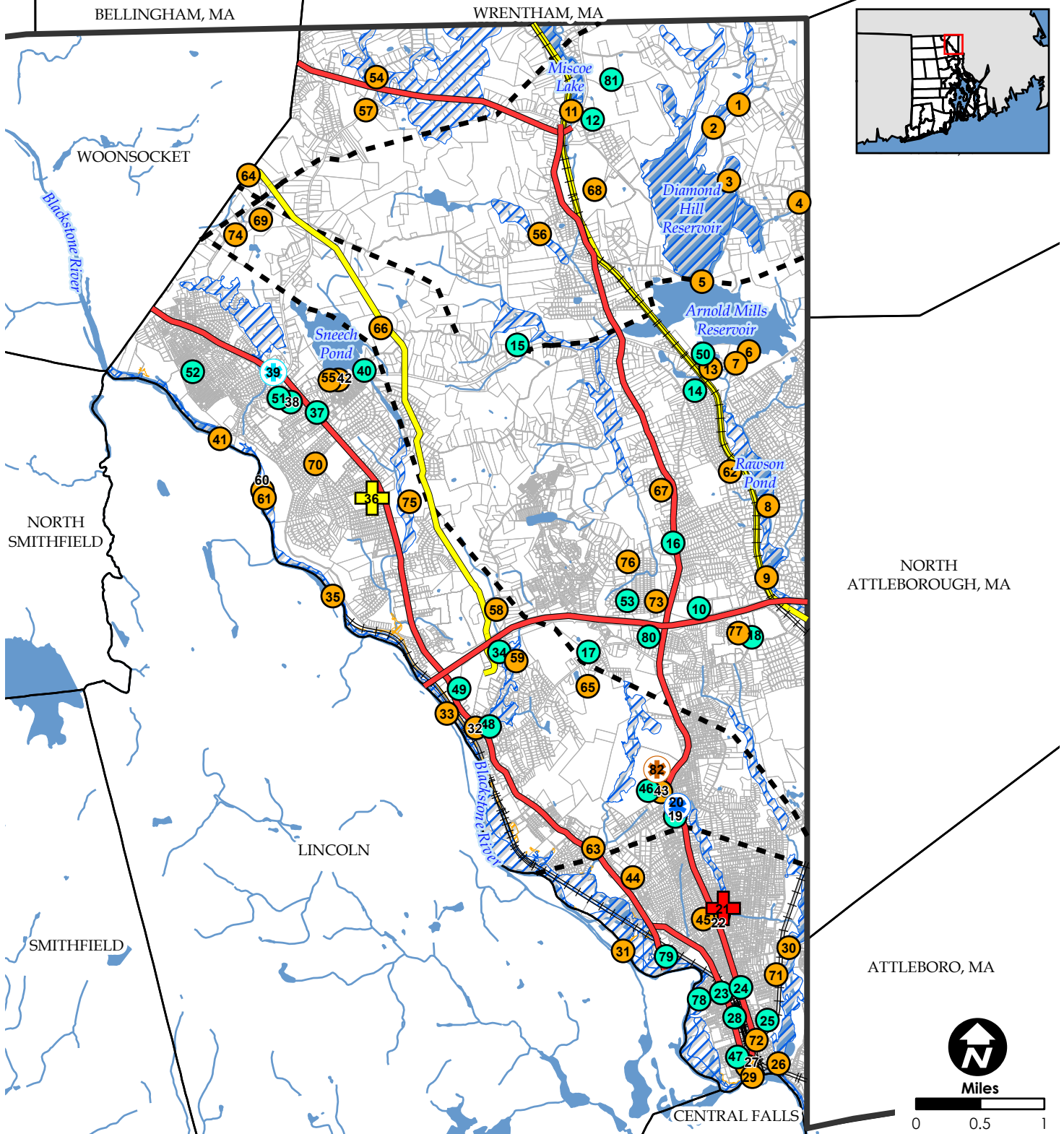
Lynch & Sons Inc.: If and when gravel operation ceases, site would become available for re-use.

Ann & Hope Way: A concern given its proximity to the Blackstone River, adjacency to the flood plain and past events of repetitive flooding.

Valley Falls Mill Corridor: A concern given its proximity to the Blackstone River, adjacency to the flood plain and past events of repetitive flooding.

Mill Citadel at River Bend: Again, a concern given its proximity to the Blackstone River, adjacency to the flood plain and past events of repetitive flooding.

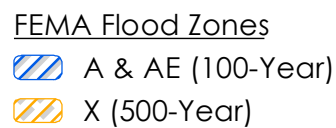
Path: H:\Projects\2022\22123 Cumberland HMP\GIS\Maps\CriticalFacilities_230331.mxd



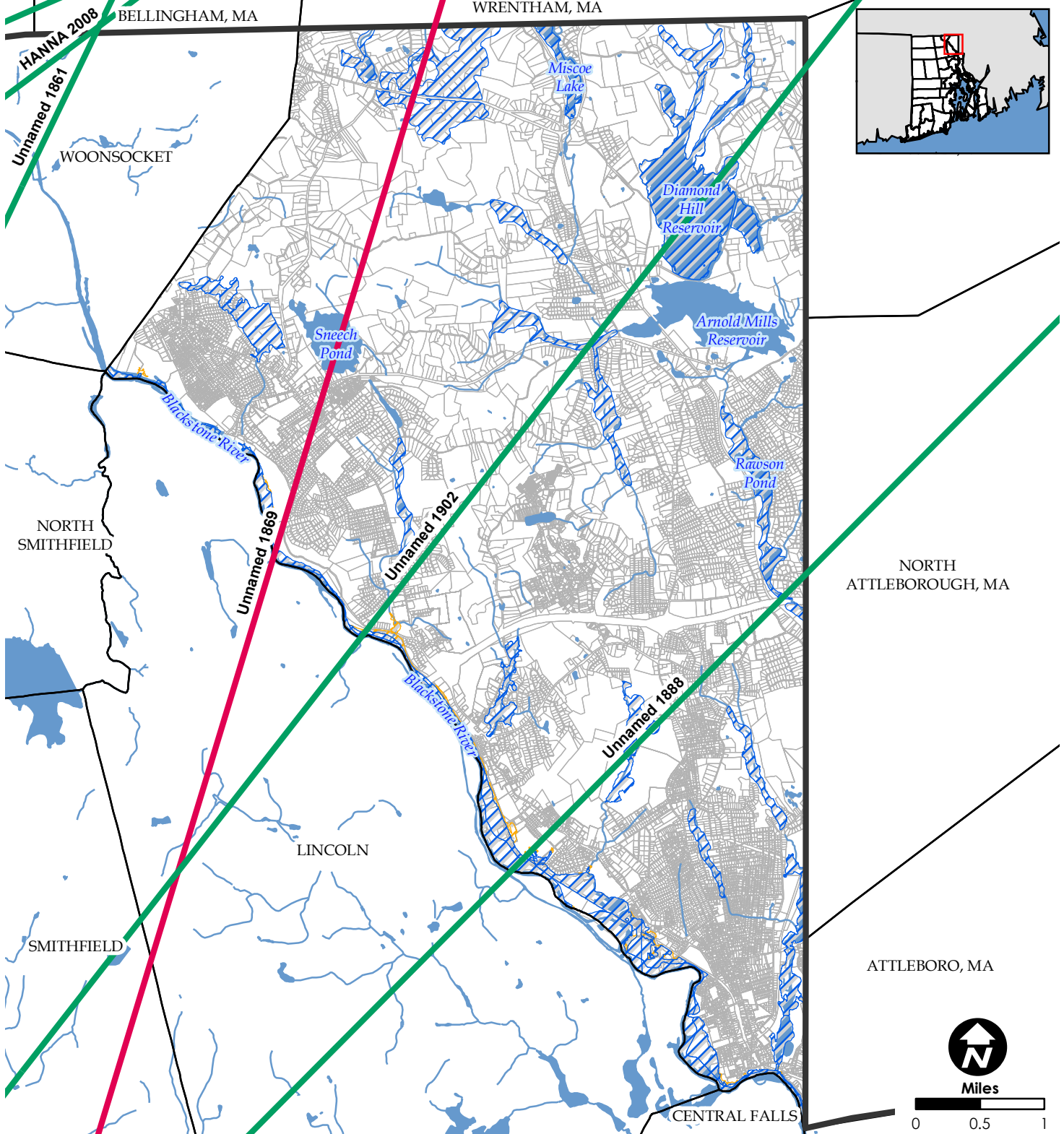
Date: 6/1/2023
Data Sources: Town of Cumberland, RIGIS, Bureau of Geographic Information (MassGIS), ESRI

This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

- | | | |
|------------------------|--------------------------------------|-------------------|
| Critical Facility | Primary EOC & Warming/Cooling Center | Gas Pipeline |
| Vulnerable Population | Secondary EOC | Rivers/Streams |
| Regional Shelter | Emergency Evacuation Route | Lakes/Ponds |
| Secondary Shelter | Rail Line | FEMA Flood Zones |
| Warming/Cooling Center | Electric Transmission Lines | A & AE (100-Year) |
| | | X (500-Year) |



Path: H:\Projects\2022\22123 Cumberland HMP\GIS\Maps\Hurricanes_230202.mxd



Date: 4/5/2023

Data Sources: Town of Cumberland, RIGIS, Bureau of Geographic Information (MassGIS), NOAA-NCEI IBTrACS, ESRI

This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

- Parcels
- Rivers/Streams
- Lakes/Ponds
- Hurricane Tracks
- Tropical Storm: 33-63 kt
- Category 3: 96-112 kt

FEMA Flood Zones

- A & AE (100-Year)
- X (500-Year)

Cumberland Hazard Mitigation Plan Update

LHMC Meeting #2

Virtual

https://us02web.zoom.us/j/86894339207?tk=ueKZ2i9kfe0NmERoHFZxXPt7ruP00-AZ1e3G2FZG6sk.DQMAAAAU005khxYtTW56YmdodVJRLUJ0elkta183RWJnAAAAAAAAAAAAAAAAAAAAAAAAAAAA&pwd=OWhzdWZVaXBKaVZEZGJFWkc5N1JxZz09&uuiid=WN_OhtHLWxQZ2x6E_06fFGcA
Passcode: 895415

Or One tap mobile:

+13052241968,,86894339207#,,,,*895415# US

+13092053325,,86894339207#,,,,*895415# US

June 9, 2023 9:00 AM - 10:00 AM

<u>Name</u>	<u>Email Address</u>
Jonathan Stevens	
Glenn Modica	
John Pliakas	
Joe Duarte	
Matt Alves	
Joe Luca	
Sarah King	
Mike Crawley	
Sara Brelsford	
Brad Dean	
Craig Pereira	



Local Hazard Mitigation Committee Meeting #3: October 3, 2023



**Cumberland Hazard Mitigation Plan Update
Local Hazard Mitigation Committee Meeting #3**

October 3, 2023

9:00 – 10:00 AM

<https://us02web.zoom.us/j/84515383200?tk=64WY6FedCUH09wK9bKbMgyTAAxoUdgoEJb9pONFIJfM.DQMAAAATrYJnoBZjcHhYX1Zod1I5S2FUWXINY2VQc3JnAAAAAAAAAAAAAAAAAAAAAA&pwd=R2M0YXpTE1aYXpFRjVBRFEweGpEdz09>

Passcode: 143926

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+13017158592, 13052241968

Agenda

1. Follow up LHMC Meeting #2
 - a. Interviews Conducted
 - b. Online Community Survey
 - c. Brushfires/Wildfires
2. Actions for Continued Compliance with NFIP (Table 3-2) Update
3. Mitigation Actions for Consideration (confirm)
4. Updated Schedule
5. Next Steps



Cumberland Hazard Mitigation Plan Update Local Hazard Mitigation Committee Meeting #3

October 3, 2023

9:00 – 10:00 AM

<https://us02web.zoom.us/j/84515383200?tk=64WY6FedCUH09wK9bKbMgyTAAxoUdgoEJb9pONFIJfM.DQMAAAATrYJnoBZicHhYX1Zod1I5S2FUWXINY2VQc3JnAAAAAAAAAAAAAAAAAAAAAA&pwd=R2M0YXpTE1aYXpFRjVBRFEweGpEdz09>

Passcode: 143926

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Agenda

1. Follow up LHMC Meeting #2
 - a. Interviews Conducted
 - i. Businesses
 1. Berkeley Business Center (Chris Grimo)
 - a. Currently updating stormwater management system: recommissioned inlet/outlet pipe
 - b. Basement floods occasionally, no flood events from Blackstone River
 - c. Does not anticipate any projects submitted for consideration
 2. Dean Industries (Brad Dean)
 - a. Martin St. site has experienced limited flooding
 - b. Does not anticipate any projects submitted for consideration
 3. Hope Global (Brenda Dexter/Jeff Agonia/James Butler/Jim Hanahan)
 - a. Front parking lot floods intermittently/rear materials storage floods intermittently
 - b. Possible site feasibility study for consideration
 4. Stop & Shop (Jeff Morgan/Jessica Phillips)
 - a. Southwest corner of building floods intermittently (loading dock/retail building) with damages to electrical/utilities
 - b. Possible project for consideration
 5. Ann & Hope Mill Redevelopment Project (Lou Marandola)
 - a. Has not returned requests to meet
 - b. Online Community Survey
 - i. 21 responses received (closed survey)



- ii. Most concerned with wind-related, flood related, then winter-related hazards
 - iii. Top choices to reduce vulnerabilities:
 - 1. Retrofit public infrastructure
 - 2. Work to improve utility resilience
 - 3. Resident education
 - c. Brushfires/Wildfires
 - i. Need data from 2017 – forward (including mutual aid to adjacent communities)
- 2. Actions for Continued Compliance with NFIP (Table 3-2) Update
- 3. Mitigation Actions for Consideration (confirm)
- 4. Updated Schedule
 - a. LHMC meeting #4 two weeks after (week of October 16, 2023).
 - b. Full draft ready by October 30, 2023 to the LHMC for review (1 week).
 - c. Public comment period to begin November 4 – November 17, 2023 (2 weeks).
 - i. Draft Plan gets posted on project webpage (Town)
 - ii. Draft Plan gets forwarded to municipal departments/Boards/Commissions (Town)
 - iii. Notice of availability gets forwarded to adjacent communities (Woonsocket/Lincoln/Central Falls/Wrentham/North Attleboro/Attleboro/Plainville (Craig)
 - d. Public Workshop #2 during the Public Comment Period (week of November 13, 2023)
 - e. Draft Plan/completed Plan Review Tool to RIEMA December 1, 2023
- 5. Next Steps
 - a. Schedule LHMC Meeting #4



Memorandum of Meeting

To: Local Hazard Mitigation Committee (LHMC) - Town of Cumberland

From: Craig Pereira

Date: October 3, 2023

Re: Cumberland Hazard Mitigation Plan (HMP) Update

In attendance:

Jonathan Stevens — Director, Planning and Community Development
Joe Duarte — Director, Public Works
Joe Luca — Conservation Commission
Sarah King — Community Outreach Coordinator
Mike Crawley — Director, Senior Services/Parks and Recreation
Brad Dean — Dean Industries
Chris Collins — Pawtucket Water Supply Board

Consultant Team

Craig Pereira, Project Manager - Horsley Witten Group, Inc. (HW)

The LHMC was convened (virtually) to conduct the third meeting for the HMP update. The following items were discussed:

1. Interviews with businesses located in/adjacent to floodplains.
 - a. Craig provided an overview of completed interviews with businesses intended to identify those interested in coordinating with the Town on a mitigation action for consideration related to flooding.
 - i. Berkeley Business Center. Currently updating onsite stormwater management system. No flood events from Blackstone River. Does not anticipate any projects submitted for consideration.
 - ii. Dean Industries. Martin St. site has experienced limited flooding. Does not anticipate any projects submitted for consideration.
 - iii. Hope Global. Front parking lot and rear materials storage area floods intermittently. Possible site feasibility study action for consideration.
 1. Craig will follow up with Brenda Dexter.
 - iv. Stop & Shop. Southwest corner of building (loading dock/retail space) floods intermittently. Possible project submission for consideration.
 1. Craig will follow up with Jeff Morgan/Jessica Phillips.
 - v. Ann & Hope ill Redevelopment. Craig stated that Lou Marandola has been non-responsive to outreach efforts.

1. Jonathan Stevens commented that the 9/11 storm event caused some erosion of a retaining wall onsite. He will follow up with Lou, and coordinate with Craig.
2. Online Community Survey.
 - a. The online survey has been closed. 21 responses were received in total.
 - i. Respondents are most concerned with wind-related, flood-related, and winter-related hazards.
 - ii. Top choice to reduce vulnerabilities included:
 1. Retrofit of public infrastructure
 2. Work to improve utility resilience
 3. Resident education
3. Brushfires/Wildfires. Craig received the requested background data on brushfires/wildfires necessary to complete the risk profile.
4. Actions for continued compliance with NFIP.
 - a. Craig provided an overview of Table 3-2 Continued Compliance with NFIP from the 2017 Plan to be updated (2017 table provided below).
 - i. Jonathan will review the table/actions and coordinate with Craig regarding the 'to be done' column.

Actions (Listed in order of priority)	Done/Ongoing	To be Done
Join the NFIP.	X	
Participate in NFIP training by State and/or FEMA.	X	
Establish mutual aid agreements with neighboring communities to address administering the NFIP following a major storm		X
Address NFIP monitoring and compliance	X	
Revise/adopt subdivision regulations and erosion control regulations to improve floodplain management in the community.	X	
Participate in the CRS.		X
Prepare, distribute, or make available NFIP, insurance and building code explanatory	X	
Identify and become knowledgeable on non-compliant structures in the community.		X
Identify and become knowledgeable of submit to rate structures.		X
Identify cause of submit to rate structure and analyze how to prevent non-compliant structures in the future.		X
Inspect foundations at time of completion before framing to determine if lowest floor is at or above	X	
Require use of elevation certificates.	X	
Report any changes in the Special Flood hazard Area to FEMA within 180 days of change.		X
Identify and keep track of LOMA/LOMR in the community.	X	
Gain familiarity with community's Flood Insurance Rate Maps.	X	
Address repetitive loss structures.	X	

5. Mitigation Actions for Consideration.
 - a. Craig provided a summary of the actions for consideration for inclusion in the 2024 HMP update (attached). Specific comments to individual actions are included below:
 - b. All LHMC members to review the full list of actions and ensure nothing is missing/inaccurate.
 - i. ...Conservation Management Plans
Support the implementation of recommended improvements/projects identified in the Town's various Conservation Management Plans.
 1. Jonathan mentioned some items have been completed (Heritage Park invasives removal) and will review/update this action.
 - ii. ...2023 HMP Update/Risk Assessment
Protect Drinking Water Infrastructure.
 1. Jonathan suggested having Romeo Mendes review this action. Craig will forward to Romeo.
 - iii. ...2017 Plan
Replacement of Abbott St. Wastewater Pump Station.
 1. Craig commented that this is supposed to be implemented in 2023 via the Sewer Fund/ARPA funding.
 2. Sarah commented that this is underway.
 3. Craig will flag this action for removal.
 - iv. ...2023 HMP Update/Risk Assessment
Create a Heat Emergency Action Plan.
 1. Jonathan mentioned the development of proposed zoning changes/ordinance to address landscaping requirements for parking lots. Jonathan to provide draft language/summary to Craig.
 - v. ...Municipal Resilience Program
Approve a CIP to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.
 1. Jonathan commented that the Town hasn't developed a CIP for several years.
 2. Sarah commented that Joe Duarte developed an informal CIP for infrastructure needs. Sarah to provide this document to Craig.
6. Updated Schedule.
 - a. Craig commented that at the request of the Town, the schedule has been expedited/updated to facilitate a draft plan update submitted to RIEMA by the end of the year. Jonathan will coordinate with Craig to finalize upcoming meeting needs regarding the schedule.
7. Next Steps.
 - a. LHMC Meeting #4. Anticipated within the next two weeks to facilitate the updated schedule. Scheduled for October 19, 2023, 9:30 am – 11:30 AM, in

October 3, 2023

person. Crag will provide an overview of FEMA's STAPLEE Prioritization Process. Emily to reserve space and send out meeting invitation.

2023 PLAN UPDATE

PUBLIC EDUCATION AND AWARENESS

Action #__

...2017 Plan (updated to incorporate content from Municipal Resilience Program)

Distribute Informational Natural Hazards Pamphlet.

Develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten the community and describes steps they can take for each hazard to mitigate damages to their property. Include evacuation routes and shelter locations along with items that can and cannot be taken to the shelters as well as information regarding the risk to our community for brush/forest fires and how residents can help prevent them.

- *Develop/consolidate procedures for emergency communication and alert systems for the Town, in preparation for, and in, emergency scenarios regarding evacuation routes, shelters, weather events, resources, etc. (real time build on Code Red and Special Needs Registry and preparation through different media including resident pamphlets).*
- *Increase resident awareness and engagement with these issues, procedures, and foster buy-in through community engagement, outreach, and education.*
- *Increase/diversify regular Town communications (website, social media, sign-up campaigns, etc.) focused on services offered, recreation and regular updates on needs and activities.*

- Action Type: Planning, Pre-Disaster
- Priority Score: __ (2017 Plan: 24)
- Lead: CERT
- Supporting: Cumberland Emergency Management Agency (CEMA)
- Time Frame: Short Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Minimal; \$3,000 for printing (personnel time to develop pamphlet)
- Benefit: Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities
- Vulnerable Area: Residents' safety

PROPERTY PROTECTION

Action #__

...2017 Plan

Acquire residential properties in the flood area.

The Town will work with private homeowners in these areas to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property. By purchasing these residential properties, the Town is utilizing an effective program designed to remove people and property from high-risk areas and reduce

disaster losses. The buildings are either demolished or relocated, and the land is then restricted to open space in perpetuity.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: __ (2017 Plan: 15/2011 Plan: Priority not identified)
- Lead: Planning & Community Development Department
- Supporting: Town Council, Building Official, Open Space Commission
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget, State/FEMA/RIDEM grants
- Cost Estimate: Significant
- Benefit: Protection of property, reduced damage claims
- Vulnerable Area: Residential flooding

Action #__

...2017 Plan

Prepare an “After the Storm Recovery” Plan for the Community.

The Town should utilize the opportunity of a disaster to improve its’ disaster resilience. Once critical life and safety issues and vital public services have been addressed and re-established, emphasis should be placed on the long-term recovery of the community, balancing the need to rebuild rapidly and return to normal against the objective of building back better and stronger.

Additional items for consideration as part of the Plan’s development include the completion of Community Assessments, a Recovery and Reconstruction Ordinance and development of a Debris Management Plan. The Town to coordinate with Statewide Planning to review the permitting processes, develop and adopt an ordinance to streamline the process in the aftermath of a hazard impact including the process to allow homeowners to retrofit structures in order to reduce risk. Formalize the existing process, and also maintain current policy to waive permit fees for building permits to repair storm-damaged properties.

- Action Type: Planning, Pre-Disaster/Post Disaster
- Priority Score: __ (2017 Plan: 22)
- Lead: Planning & Community Development Department/NFIP Coordinator
- Supporting: Building Official
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Improved resilience, accelerated recovery
- Vulnerable Area: Residential vulnerability

NATURAL RESOURCE PROTECTION

Action #__

...Municipal Resilience Program

Develop/Implement a comprehensive tree management plan to address tree maintenance (particularly along power lines to prevent outages), and tree canopy expansion in more developed areas that includes policies for the following:

- Determine schedule for tree maintenance in coordination with RI Energy (formerly National Grid).
- Provide education and resources to property owners responsible for tree maintenance.
- Develop pre/post storm event tree procedures to protect electricity infrastructure and prevent outages, limit addition of trees to rivers as projectiles, etc.
- Increase tree canopy coverage in Valley Falls and Lonsdale areas where a decrease in tree canopy has contributed to rising temperatures, increased flooding, and threats to the health and well-being of vulnerable residents.
- Build on social equity ties and integrate tree equity score information (lot level) into tree management plan.
- Coordinate with existing tree planting initiatives (e.g., along roadways on private property, jobs program, etc.) which may not have an explicit resiliency lens but are geared towards economic development.

- Action Type: Mitigation, Pre-Disaster
- Priority Score: __
- Lead: Conservation Commission
- Supporting: Planning and Community Development Department
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget/MRP program
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Protection of natural resources
- Vulnerable Area: Natural Resources

Action #__Jonathan to update

...Conservation Management Plans

Support the implementation of recommended improvements/projects identified in the Town's various Conservation management Plans :

- New Pond Park:
 - Install emergency vehicle access to Pratt Dam on the Nunes parcel.
 - Plant adjacent floodplain with native trees, bushes, plants, and grasses designed to address local riparian buffer and wildlife concerns.
 - Restore wetland and floodplain habitats.
- Monastery:
 - Support forest management efforts.
- Mercy Woods:
 - Ensure the conservation of contiguous forestland to ensure high quality drinking water.
 - Support the removal of invasive species.
- Heritage Park:

- *Support the removal of invasive species.*
 - *Conduct annual tree removal and vegetation control exercise.*
 - *Metcalf/Franklin Farm:*
 - *Support the removal of invasive species.*
 - *Diamond Hill:*
 - *Support the removal of invasive species.*
 - *Albion Town Landfill:*
 - *Support the feasibility of converting the landfill to a solar farm.*
- Action Type: Mitigation, Pre-Disaster
 - Priority Score: ____
 - Lead: Conservation Commission/Cumberland Land Trust
 - Supporting: Planning and Community Development Department/Planning Board/Town Council
 - Time Frame: Long Term
 - Financing Options:
 - Cost Estimate:
 - Benefit: Protection of natural resources
 - Vulnerable Area: Natural Resources

STRUCTURAL PROJECTS

Action #__ Romeo Mendes to review/confirm

...2023 HMP Update/Risk Assessment

Protect Drinking Water Infrastructure.

- *Ensure that Manville 1, 2 Wells/Pump Stations are adequately protected against flooding (100-year flood zone).*

- Action Type: Planning, Pre-Disaster
- Priority Score: ____
- Lead: DPW
- Supporting: Engineering
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget, RIEMA/FEMA grants
- Cost Estimate: Significant
- Benefit: Continuity of municipal services/Minimized Potential for contamination
- Vulnerable Area: Municipal Drinking Water Infrastructure
-

Action #__ underway...remove?

...2017 Plan

Replacement of Abbott St. Wastewater Pump Station

The Abbott Street Wastewater Pump Station was constructed and began service in 1993. This station serves approximately twenty residential households and one commercial customer. This facility is an underground pneumatic pumping system that

receives and pumps wastewater to the existing sanitary sewer within Havens Street. This station is located in the Valley Falls section of Cumberland. Since 2005, the station has required multiple, periodic repairs and maintenance service calls as a result of various failures of the pneumatic (compressor) equipment in conjunction with the malfunctioning of instrumentation control. It is further noted that parts for this station's equipment are difficult to obtain, and some are no longer in production. As a result of the frequent maintenance history and the possibility of a total pump station failure in the future, the Sewer Department has recommended the replacement of this station.

- Action Type: Planning, Pre-Disaster
- Priority Score: __ (2017 Plan: 22)
- Lead: DPW
- Supporting: Engineering
- Time Frame: Long Term
- Financing Options: Capital Improvement Sewer Bond
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure and improved maintenance/operation of sanitary facility
- Vulnerable Area: Sanitary sewers

To be completed in 2023 Sewer Fund/ARPA funds (DPW)

Action #__

...2017 Plan

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off.

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street. (e.g., address those roads that are part of the town evacuation route first, then main thoroughfares, etc.).

Streets/Properties Subject to Flooding

Maintenance

(Included here to illustrate a comprehensive review of flooding issues, however, not applicable for funding under any hazard mitigation grant programs)

Ann and Hope Way

- Specific Flooding Area: Periodic surcharge and overflow of drains due to Blackstone River elevation during select heavy storm water events.
- Flooding Cause: Flood Plain area.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck.

Crestwood Court

- Specific Flooding Area: Culvert location
- Flooding Cause: Continual maintenance and clean-out of debris to prevent entering drainage system.

Fairview Avenue

- Specific Flooding Area: Select driveways
- Flooding Cause: Debris or other extraneous matter clogs slotted pipes across driveways. Pipe jetted to restore drainage capability. Requires periodic monitoring and maintenance.

Franklin Street

- Specific Flooding Area: Dead-end section near Wildwood Drive
- Flooding Cause: Flood Plain area.
 - Need to perform ongoing maintenance.

Fredrick Lane

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Grundy's Way

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Hannah Drive

- Specific Flooding Area: Dead end/cul de sac area
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Highridge Road

- Specific Flooding Area: Entire street

- Flooding Cause: Continual clogging and blockage of drainage catch basins due to leaves in heavily treed area. Periodic monitoring and clean-up maintenance required.

Kings Row

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Laurel Lane

- Specific Flooding Area: Grandview
- Flooding Cause: Periodic clogging of slotted drain pipes during interim period of maintenance and cleaning.

Oakwood Drive

- Specific Flooding Area: Culvert location
- Flooding Cause: Catch basin and culvert blockage associated with debris and roots which have been removed periodically. Maintenance issue.

Tower Hill Road

- Specific Flooding Area: Diamond Hill Road end
- Flooding Cause: Silt build-up. Requires dredging and clean-up.

Wildwood Drive

- Specific Flooding Area: Dead-end section
- Flooding Cause: Existing Flood Plain area
 - Downstream maintenance of culverts on Mendon Rd. is important to reduce/prevent flooding.

Monitoring

Abbott Run Valley Road

- Specific Flooding Area: Jenna Way
- Flooding Cause: Reduced detention basin due to heavy rates of sedimentation from upstream construction sites in conjunction with catch basin blockage. Ongoing accumulation of debris in culvert which requires periodic monitoring and clean-out.
 - Improved in 2017/2018
 - Ongoing monitoring for flooding

Angell Road (State road)

- Specific Flooding Area: Easterly end at Diamond Hill Road

- Flooding Cause: Blocked catch basins require periodic cleaning by RIDOT.
 - Repaired by RIDOT
 - Ongoing monitoring for flooding

Club Drive

- Specific Flooding Area: Lippitt Estates/Low Point of Club Drive
- Flooding Cause: No existing drainage system. Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Old Reservoir Road

- Specific Flooding Area: Jason's Grant
- Flooding Cause: Drainage system in this area requires upgrading.
 - An interconnected infiltrating system was installed 2022. Ongoing monitoring will be required (during significant storms).

Ronald Avenue

- Specific Flooding Area: North Brook area
- Flooding Cause: Undersized culvert and drainage pipes are the probable cause at this location.
 - Dams created by beavers appears to be the cause of flooding.

Theater Drive

- Specific Flooding Area: Scott Road culvert
- Flooding Cause: Culvert was previously blocked and subsequently cleaned. Still requires periodic monitoring and maintenance, particularly due to ice dam blockage during winter months.
 - Ongoing monitoring required

Structural/Replacement

Bear Hill Road

- Specific Flooding Area: Crestwood Court
- Flooding Cause: Deteriorated and undersized drainage pipes in conjunction with periodic blockage of pipes with debris.

Hines Road

- Specific Flooding Area: Northerly section at Miller's Brook
- Flooding Cause: Undersized drainage pipes.

Hilltop Road

- Specific Flooding Area: Allens Avenue
- Flooding Cause: Undersized drainage pipes serve this area. However, there are physical restrictions preventing construction in this area due to the existence of NGRID diffuser facilities.

- Need to install additional shallow culverts to fit under the RI Energy's system.

Industrial Road

- Specific Flooding Area: Lower and relatively flat section of roadway near Diamond Hill Road adjacent to Okonite commercial property
- Flooding Cause: Additional catch basins installed, and drainage pipe modifications recently installed to improve drainage. New drainage modifications not in place long enough to subject to sufficient number of heavy storm events to confirm effectiveness. However, other measures will be required at upstream commercial and industrial areas where holding ponds will require maintenance and other onsite drainage improvements to mitigate probable additional flows to this area.
 - This area is under design, and it is anticipated to be corrected Summer 2024.

Martin Street

- Specific Flooding Area: Blackstone River and railroad area
- Flooding Cause: Existing flood plain area associated with Blackstone River.
- Supplemental: Possible collapse or deterioration of drains below railroad crossing also contributing to flooding condition.
 - Need to upgrade piping.

New York Avenue

- Specific Flooding Area: Miller's Brook area
- Flooding Cause: Undersized drainage pipe.

Ridgewood Drive

- Specific Flooding Area: Entire street
- Flooding Cause: Blockage of drainage pipe as a result of persistent root growth during interim periods of maintenance and removal.
 - Need to replace drainage pipe to eliminate the roots entering the pipe.

Seneca Street

Specific Flooding Area: Culvert location

- Flooding Cause: Undersized culvert pipe is considered the probable cause.
 - To be completed 2023.

Shirley Drive

- Specific Flooding Area: Swale associated with CVS property.
- Flooding Cause: Deterioration of drainage pipes. Replacement required.
 - To be completed by property owner 2023.

Pavement Management

Follett Street

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Maybury Street

Specific Flooding Area: Entire Street (Meadowcrest subdivision)

- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Sneech Pond Road (State road)

- Specific Flooding Area: Entire street
- Flooding Cause: Impeded drainage. Low points and ponding areas as a result of significantly deteriorated pavement. Requires complete rehabilitation.
 - To be completed by RIDOT 2023/2024.

- Action Type: Mitigation, Pre-Disaster
- Priority Score: ____ (2017 Plan: 24/2011 Plan – No priority identified)
- Lead: DPW
- Supporting: Engineering
- Time Frame: Medium Term
- Financing Options: Capital Improvement Planning
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure, maintained access/evacuation, increased public safety, improved street drainage
- Vulnerable Area: Local Roads Subject to Flooding

EMERGENCY SERVICES

Action #____

...2023 HMP Update/Capability Assessment

Update the Town's Comprehensive Emergency Management Plan.

- Action Type: Planning, Pre-Disaster
- Priority Score: ____
- Lead: Emergency Management Agency
- Supporting: Town Council
- Time Frame: Short Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Moderate
- Benefit: Coordinated emergency response, Improved public safety
- Vulnerable Area: Emergency Response/Evacuation

Action #__ Jonathan to provide draft ordinance language under development (City of Providence)

...2023 HMP Update/Risk Assessment

Create a Heat Emergency Action Plan.

- *Prioritize creating cooling centers for those most vulnerable to heat, systematic communications strategies, and back-up energy plans.*
- *Stress the importance of tree canopy for cooling buildings (reduce clear-cutting) and anticipate heat damage to roads.*

- Action Type: Planning, Pre-Disaster
- Priority Score: __
- Lead: Emergency Management Agency
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget, RIEMA/FEMA grants
- Cost Estimate: Moderate
- Benefit: Continuity of emergency response/Improved public health, safety and welfare
- Vulnerable Area: Emergency Response

PLANNING AND PREVENTION

Action #__

...Municipal Resilience Program

Pursue a comprehensive flood mitigation study/evaluation of properties along the Blackstone River via the following project actions:

- *Direct/relocate development to areas that are already watered/sewered and are above natural river level, surge, and floodplain to preserve open space and avoid inappropriate parcel development as well as encourage low impact development (LID).*
- *Identify sites for flood mitigation projects including the removal of impervious surfaces, wetland restoration, and other natural solutions which would establish green spaces that can accommodate flooding, filter water and serve recreation and ecosystems.*
- *Pursue grant opportunities to resume feasibility studies in the lower Martin St. area which currently have massive pumps due to development mistakes (excavated and graded too much material and are now below river level)., in hopes of returning these areas to green space with relocation of occupants to higher ground.*
- *Coordinate efforts with Blackstone River watershed towns, councils, and organizations.*

- Action Type: Planning, Pre-Disaster
- Priority Score: __
- Lead: DPW/Planning and Community Development Department
- Supporting: Private Business Owners

- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget/CIP
- Cost Estimate:
- Benefit: Improved resilience
- Vulnerable Area: Repetitive flood loss properties

Action #__ Sarah to provide copy of Joe Duarte's informal CIP for infrastructure needs.

...Municipal Resilience Program

Approve a Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.

- Action Type: Planning, Pre-Disaster
- Priority Score: __
- Lead: Mayor/Department Directors
- Supporting: Town Council
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget/CIP
- Cost Estimate: Staff Time
- Benefit: Improved resilience
- Vulnerable Area: Municipal infrastructure/capabilities

Action #__

...RIEMA Community Assistance Visit, May 26, 2021

Strengthen the Town's participation in the NFIP.

- *The Town must continue to track development in the floodplain for new structures and improvements to existing structures (to ensure those improving their home 50% or greater of structural value are brought into/or maintain compliance with NFIP regulations). Physically writing permit dates, type of work, and costs on the inside folder of a permit file (s).*
- *The Town should continue to keep permits digitally and consider adding a formal question/identifier regarding whether a property is or is not in the Special Flood Hazard Area (SFHA).*
- *The Town should continue to coordinate with RIEMA to organize training opportunities and develop a set of best practices for other local officials and contractors in the Town.*
- *The Town should continue to develop a relationship with State agencies, such as RI Department of Environmental Management (RIDEM) and RI Department of Transportation (RIDOT) to ensure the Town is aware of projects occurring within the Town that could potentially impact the SFHA.*
- *The Town should continue to work with RIEMA staff to address the severe repetitive loss properties and submit to rate properties in the Town.*
- *The Town should continue to work with the RIEMA State Hazard Mitigation Officer to work on any items identified in their local HMP.*

- *An additional staff person should attend the L273 course (Managing Development through the NFIP) for a comprehensive training on floodplain management requirements and higher standards.*

- Action Type: Planning, Pre-Disaster
- Priority Score: ____
- Lead: Building Official
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Staff Time
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Development/redevelopment within the SFHA

Action #__

...2017 Plan (modified)

Annually update Emergency Action Plans (EAP's) for both High and Significant hazard dams (publicly-owned) within the Town of Cumberland, including:

- *Diamond Hill Reservoir Dam (most recent EAP: August 2019)*
- *Arnold Mills Reservoir Dam (most recent EAP: August 2019)*
- *Happy Hollow Reservoir Dam (most recent EAP: August 2019)*
- *Robin Hollow Dam (most recent EAP: August 2019)*

An EAP is a plan of action to reduce potential property damage and loss of life in an area affected by a dam failure. An EAP identifies the areas, structures, facilities and roads that could be affected by dam failure. It also establishes a monitoring system which can activate the plan. Lastly, it identifies the corresponding official(s), organizations, and agencies along with their responsibilities in regards to implementing the plan.

All high and significant hazard dams must have a current EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both Rhode Island Emergency Management Agency (RIEMA) and Rhode Island Department of Environmental Management (RI DEM).

- Action Type: Planning, Pre-Disaster
- Priority Score: ____ (2017 Plan: **28**)
- Lead: Pawtucket Water Supply Board (PWSB)/Town of Cumberland
- Supporting: Planning & Community Development Department , Cumberland Emergency Management Agency (CEMA)/Citizen's Emergency Response Team (CERT)
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT

- Cost Estimate: Minimal/Moderate; \$4,000 - \$5,500 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #__

...2017 Plan (modified)

Annually Update Emergency Action Plans (EAP's) for both High and Significant hazard private dams (privately-owned), including:

- *Miscoe Lake Dam (most recent EAP: August 2019)*
- *Rawson Pond Dam (most recent EAP: August 2019)*

All high and significant hazard dams must have a current EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both Rhode Island Emergency Management Agency (RIEMA) and Rhode Island Department of Environmental Management (RI DEM).

- Action Type: Planning, Pre-Disaster
- Priority Score: __ (2017 Plan: 28)
- Lead: Private Dam Owners, Town of Cumberland
- Supporting: Planning & Community Development Department, RI DEM
- Time Frame: Short Term
- Financing Options: Private Owner responsibility with assistance from Town
- Cost Estimate: Minimal/Moderate; \$3,500 - \$5,000 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #__

...2023 HMP Update/Risk Assessment

Coordinate with the Pawtucket Water Supply Board to complete a current Phase 1 Inspection Report (where applicable), then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dams:

- *Arnold Mills (Pawtucket) Reservoir Dam (most recent Phase 1: September 14, 2020/every two years)*
- *Diamond Hill Reservoir Dam (most recent Phase 1: September 8, 2020/every two years)*
- *Happy Hollow Pond Dam (most recent Phase 1: September 14, 2020/every five years)*
- *Robin Hollow Pond Dam (most recent Phase 1: September 8, 2020/every five years)*

- Action Type: Planning, Pre-Disaster

- Priority Score: ____
- Lead: Pawtucket Water Supply Board (PWSB)
- Supporting: Planning & Community Development Department
- Time Frame: Short Term
- Financing Options: PWSB, FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #__

...2023 HMP Update/Risk Assessment

Coordinate with private dam owners to complete a current Phase 1 Inspection Report, then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dams:

- *Miscoe lake Dam (most recent Phase 1: August 20, 2014/every two years)*
- *Rawson Pond Dam (most recent Phase 1: July 13, 2012/every five years)*

- Action Type: Planning, Pre-Disaster
- Priority Score: ____
- Lead: Private dam owners
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Private Dam Owner's, FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #__

...2023 HMP Update/Risk Assessment

Develop Operations and Maintenance Manual for Rawson Pond Dam as per the Rawson Pond Dam Purchase Agreement and February 27, 2017, correspondence from former Mayor Bill Murray.

- Action Type: Planning, Pre-Disaster
- Priority Score: ____
- Lead: Cumberland Water District
- Supporting: Planning & Community Development Department
- Time Frame: Long Term
- Financing Options:
- Cost Estimate:
- Benefit:
- Vulnerable Area:

Action #__

...2017 Plan

Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone.

Once EAPs have been developed for both High and Significant hazard dams (both public and private), it is important to conduct a public information session for residents and businesses within the various inundation areas regarding what they should do in the event of a dam breach. This could be completed in one general session, or individual sessions for each structure and affected neighborhood.

- Action Type: Planning, Pre-Disaster
- Priority Score: __ (2017 Plan: **26**/2011 Plan – High Priority)
- Lead: Pawtucket Water Supply Board (PWSB)/Private dam owners
- Supporting: Planning & Community Development Department , CEMA/ CERT
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life/infrastructure, uninterrupted services
- Vulnerable Area: Residential problems/Businesses and Industry

Action #__

...2017 Plan

Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the LNG site.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: __ (2017 Plan: 26)
- Lead: Mayor's Office – Chief of Staff/ CEMA
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Staff/personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life, maintained access
- Vulnerable Area: Residents' safety

Action #__

...2017 Plan

Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents .

To determine if an alternate on or off-site location, or conversion to electronic records filing is the best course for the Town to undertake.

- Action Type: Planning, Pre-Disaster/Post-Disaster
- Priority Score: __ (2017 Plan: 22)
- Lead: Mayor's Office

- Supporting: Town Council, Town Clerk
- Time Frame: Medium Term
- Financing Options: Town Budget
- Cost Estimate: Significant; Staff Time \$30,000 (dependent upon option selected)
- Benefit: Protection of critical Town records/documents
- Vulnerable Area: Public Facilities

Action #__

...2023 HMP Update/Risk Assessment/FEMA Planning for Drought Resistance

Develop a comprehensive, town-wide Climate Action Plan that balances both mitigation and adaptation. Develop a Drought Management Plan/element in advance of a crisis stage for chronic drought. The plan should consider a re-evaluation of all Zoning, Bylaws and Land Use Regulations in support of drought resilience:

- *Landscaping ordinances that dictate conserving and recycling potable water and the use of drought-tolerant plant species to help reduce water demand.*
- *Stormwater management plans that support a comprehensive approach to collecting, treating, and even reusing water to help mitigate drought.*
- *Capital Improvement Plans that emphasize investment in efficient water systems that prevent loss of water during transmission.*

- Action Type: Planning, Pre-Disaster
- Priority Score: __
- Lead: Planning & Community Development Department
- Supporting: Planning Board/Town Council
- Time Frame: Long Term
- Financing Options: FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Improved resiliency, Improved public health/safety/welfare/Protection of natural resources, Minimized socio-economic impacts, Increased resiliency
- Vulnerable Area: All

Task 1: Convene/Coordinate with LHMC, Conduct Public Outreach, Document Planning Process <i>Kickoff Meeting with Consultant and Town Meeting #1 - LHMC</i> - Project Webpage - 2017 Plan Report Card - Data Collection	December 12, 2022 - December 1, 2023 Week of December 12, 2022 January 5, 2023
Task 2: Update/Perform Risk Assessment - Hazard Identification/Profiles <i>Coordination with Town Departments/Personnel Public Workshop #1</i>	January 16, 2023 - October 2023 Week of January 23, 2023 April 24, 2023
Task 3: Facility Inventory/GIS Mapping - Update Risks/Critical Fac./Vulnerable Pops. Mapping	January 16, 2023 - February 10, 2023
Task 4: Update/Perform Hazard Vulnerability Assessment <i>Meeting #2 - LHMC</i> - Vulnerability Analyses	February 13, 2023 - March 24, 2023 Week of February 27, 2023
Task 5: Develop Goals and Objectives - Preliminary Mitigation Recommendations	March 20, 2023 - April 14, 2023
Task 6: Analyze Existing/Research New Strategies - Plans, Policies and Problems Examination	March 27, 2023 - April 21, 2023
Task 7: Develop Comprehensive Range of Actions <i>Meeting #3 - LHMC</i>	August 2023 - October 2023 October 3, 2023
Task 8: Plan Maintenance/Implementation	August 2023 - October 2023
Task 9: Review, Revision, Approval and Adoption of Plan <i>Meeting #4 - LHMC</i> - Cost Benefit Review/Prioritization Public Comment Period <i>Draft Plan Coordination with Planning Board</i> <i>Draft Plan Coordination with Conservation Commission</i> <i>Public Workshop #2/Town Council Public Hearing</i> Final Deliverable to RIEMA	October 2023 - December 1, 2023 Week of October 16, 2023 November 6, 2023 - November 17, 2023 November 6, 2023 - November 17, 2023 November 6, 2023 - November 17, 2023 Week of November 13, 2023 By December 1, 2023

Cumberland Hazard Mitigation Plan Update

LHMC Meeting #3

Virtual

<https://us02web.zoom.us/j/84515383200?tk=64WY6FedCUH09wK9bKbMgyTAAxoUdqeEJb9pONFIJfM.DQMAAAATrYJnoBZjcHhYX1Zod1I5S2FUWXINY2VQc3JnAAAAAAAAAAAAAAAAAAAAAAAAAAAA&pwd=R2M0YXplTE1aYXpFRjVBRFEweGpEdz09> Pass Code: 143926

October 3, 2023 9:00 AM - 10:00 AM

Name

Email Address

Jonathan Stevens

Chris Collins

Brad Dean

Joe Duarte

Craig Pereira

Joe Luca

Sarah King

Mike Crawley

Local Hazard Mitigation Committee Meeting #4: October 19, 2023



**Cumberland Hazard Mitigation Plan Update
Local Hazard Mitigation Committee Meeting #4**

October 19, 2023

9:30 – 11:30 AM

Cumberland Public Safety Complex – Community Room
1379n Diamond Hill Road
Cumberland, RI

Agenda

1. STAPLEE Prioritization of Mitigation Actions
2. Updated Schedule
3. Public Workshop/Hearing
4. Next Steps/Draft 2023 Update Submission



Memorandum of Meeting

To: Local Hazard Mitigation Committee (LHMC) - Town of Cumberland

From: Craig Pereira

Date: October 25, 2023

Re: Cumberland Hazard Mitigation Plan (HMP) Update, LHMC Meeting #4

In attendance:

Jonathan Stevens — Director, Planning and Community Development
Joe Duarte — Director, Public Works
Joe Luca — Conservation Commission
Mike Crawley — Director, Senior Services/Parks and Recreation
Matt Benson — Police Chief

Consultant Team

Craig Pereira, Project Manager - Horsley Witten Group, Inc. (HW)

The LHMC was convened (in-person) to conduct the fourth and final meeting for the HMP update. The following items were discussed:

1. Mitigation actions for consideration.
 - a. Craig presented the final list of mitigation actions for consideration to the LHMC. This list was developed from a number of resources:
 - i. 2017 Plan Report Card
 - ii. Capability Assessment (HW's review of existing plans, studies, and reports)
 - iii. The 2023 Risk/Vulnerability Assessment
 - iv. HW's experience working in other communities
 - v. Priority actions from the Town's Municipal Resilience Program study
 - b. Craig provided an overview of FEMA's STAPLEE prioritization method to the LHMC and reviewed the draft mitigation actions for consideration.
 - i. LHMC members requested the following:
 1. Action #7: (replacement of Abbott St. wastewater pump station) was removed as it is already in progress (funded).
 2. Action #22: (develop townwide Climate Action Plan) was removed.
 3. Chief Benson requested an action be added regarding a comprehensive overhaul of the Town's communications system. Chief Benson worked with Craig outside of this meeting to develop the action and supporting text for inclusion in the Social Vulnerability section of the 2023 Update.
 - ii. Craig commented that three of the five local businesses interviewed had not provided information regarding an action for consideration

related to onsite flooding concerns. Jonathan coordinated with the three business representatives with a deadline of October 23, 2023, for requested information.

- iii. Craig calculated the scores and developed a table of actions/rankings (attached). The LHMC to review the scores and provide input to Craig no later than Friday, October 27, 2023.

2. Updated Schedule.

- a. Craig provided an updated schedule to wrap up the project.
 - i. Draft 2023 Update to the LHMC by October 30, 2023, for one-week review (comments due November 3, 2023).
 - ii. Public comment period to run November 6, 2023 – November 17, 2023.
 - 1. Jonathan will post the draft 2023 Update to the project webpage by November 6, 2023, with text regarding public comment period.
 - 2. Jonathan to email municipal departments, Boards, and Commissions regarding the availability of the draft 2023 Update (and copy Craig on this email...needed for Appendices).
 - 3. Craig to email adjacent communities (Woonsocket, Central Falls, Pawtucket, Lincoln, Wrentham, North Attleboro, Attleboro, and Plainville) regarding availability of the draft 2023 Update (and copy Jonathan on this email...needed for Appendices).
 - 4. Public Workshop #2/Public Hearing with Town Council on November 15, 2023: to seek approval of the draft 2023 Update to be forwarded to RIEMA/FEMA for review and approval, following the end of the public comment period. Jonathan to get the project onto the agenda and electronic copy of the 2023 Update to Town Council members by November 8, 2023. Craig to develop flyer and PPT presentation in advance of workshop/Hearing.
 - 5. Following the close of the public comment period, Craig will provide comments received from the public for consideration to the LHMC. Edits/revisions will be made accordingly.
 - 6. Craig will complete the Plan Review Tool (required) and submit this, along with the draft 2023 Update to RIEMA by December 1, 2023.

2023 PLAN UPDATE

PUBLIC EDUCATION AND AWARENESS

Action #1

...2017 Plan (updated to incorporate content from Municipal Resilience Program)

Develop/Distribute Informational Natural Hazards Pamphlet.

Develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten the community and describes steps they can take for each hazard to mitigate damages to their property. Include evacuation routes and shelter locations along with items that can and cannot be taken to the shelters as well as information regarding the risk to our community for brush/forest fires and how residents can help prevent them.

- *Develop/consolidate procedures for emergency communication and alert systems for the Town, in preparation for, and in, emergency scenarios regarding evacuation routes, shelters, weather events, resources, etc. (real time build on Code Red and Special Needs Registry and preparation through different media including resident pamphlets).*
- *Increase resident awareness and engagement with these issues, procedures, and foster buy-in through community engagement, outreach, and education.*
- *Increase/diversify regular Town communications (website, social media, sign-up campaigns, etc.) focused on services offered, recreation and regular updates on needs and activities.*

- Action Type: Planning, Pre-Disaster
- Priority Score: 26 (2017 Plan: 24)
- Lead: CERT
- Supporting: Cumberland Emergency Management Agency (CEMA)
- Time Frame: Short Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Minimal; \$3,000 for printing (personnel time to develop pamphlet)
- Benefit: Protection of property, protection of life/infrastructure, increased awareness of vulnerabilities
- Vulnerable Area: Residents' safety

PROPERTY PROTECTION

Action #2

...2017 Plan

Acquire residential properties in the special flood hazard area.

The Town will work with private homeowners in these areas to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property. By purchasing these residential properties, the Town is utilizing an effective program designed to remove people and property from high-risk areas and reduce

disaster losses. The buildings are either demolished or relocated, and the land is then restricted to open space in perpetuity.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: 15 (2017 Plan: 15/2011 Plan: Priority not identified)
- Lead: Planning & Community Development Department
- Supporting: Town Council, Building Official, Open Space Commission
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Protection of property, reduced damage claims
- Vulnerable Area: Residential flooding

Action #3

...2017 Plan

Prepare an “After the Storm Recovery” Plan for the Community.

The Town should utilize the opportunity of a disaster to improve its’ disaster resilience. Once critical life and safety issues and vital public services have been addressed and re-established, emphasis should be placed on the long-term recovery of the community, balancing the need to rebuild rapidly and return to normal against the objective of building back better and stronger.

Additional items for consideration as part of the Plan’s development include the completion of Community Assessments, a Recovery and Reconstruction Ordinance and development of a Debris Management Plan. The Town to coordinate with Statewide Planning to review the permitting processes, develop and adopt an ordinance to streamline the process in the aftermath of a hazard impact including the process to allow homeowners to retrofit structures in order to reduce risk. Formalize the existing process, and also maintain current policy to waive permit fees for building permits to repair storm-damaged properties.

- Action Type: Planning, Pre-Disaster/Post Disaster
- Priority Score: 23 (2017 Plan: 22)
- Lead: Planning & Community Development Department/NFIP Coordinator
- Supporting: Building Official
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/HMGP funds
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Improved resilience, accelerated recovery
- Vulnerable Area: Residential vulnerability

NATURAL RESOURCE PROTECTION

Action #4

...Municipal Resilience Program

Develop/Implement a comprehensive tree management plan to address tree maintenance (particularly along power lines to prevent outages), and tree canopy expansion in more developed areas that includes policies for the following:

- *Determine schedule for tree maintenance in coordination with RI Energy (formerly National Grid).*
- *Provide education and resources to property owners responsible for tree maintenance.*
- *Develop pre/post storm event tree procedures to protect electricity infrastructure and prevent outages, limit addition of trees to rivers as projectiles, etc.*
- *Increase tree canopy coverage in Valley Falls and Lonsdale areas where a decrease in tree canopy has contributed to rising temperatures, increased flooding, and threats to the health and well-being of vulnerable residents.*
- *Build on social equity ties and integrate tree equity score information (lot level) into tree management plan.*
- *Coordinate with existing tree planting initiatives (e.g., along roadways on private property, jobs program, etc.) which may not have an explicit resiliency lens but are geared towards economic development.*

- Action Type: Mitigation, Pre-Disaster
- Priority Score: 18
- Lead: Conservation Commission
- Supporting: Planning and Community Development Department
- Time Frame: Long Term
- Financing Options: Municipal Operating Budget/MRP program/ FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Moderate; Staff Time (or Consultant time to develop Plan and language for regulatory amendments)
- Benefit: Protection of natural resources
- Vulnerable Area: Natural Resources

Action #5

...Conservation Management Plans

Support the implementation of recommended improvements/projects identified in the Town's various Conservation and Management Plans :

- *New Pond Park:*
 - *Plant adjacent floodplain with native trees, bushes, plants, and grasses designed to address local riparian buffer and wildlife concerns.*
 - *Restore wetland and floodplain habitats.*
- *Monastery:*
 - *Support forest management efforts.*
- *Mercy Woods:*
 - *Ensure the conservation of contiguous forestland to ensure high quality drinking water.*
 - *Support the removal of invasive species.*

- *Heritage Park:*
 - *Conduct annual tree removal and vegetation control exercise.*
 - *Support final redevelopment phase which includes a new direct access pathway into the park from the Amaral Building and sculpting of the sloped area to create an amphitheater for education and cultural engagement.*
 - *Metcalf/Franklin Farm:*
 - *Support the removal of invasive species.*
 - *Diamond Hill:*
 - *Support the removal of invasive species.*
 - *Support the reconstruction of the parking area with new access/egress alignments, circulation pattern, and landscaping.*
 - *Albion Town Landfill:*
 - *Support the ongoing gas and groundwater testing.*
- Action Type: Mitigation, Pre-Disaster
 - Priority Score: 19
 - Lead: Conservation Commission/Cumberland Land Trust
 - Supporting: Planning and Community Development Department/Planning Board/Town Council
 - Time Frame: Long Term
 - Financing Options: Municipal Operating Budget/Cumberland Land Trust funds
 - Cost Estimate: Minimal to Significant (varies)
 - Benefit: Protection of natural resources
 - Vulnerable Area: Natural Resources

STRUCTURAL PROJECTS

Action #6

...2023 HMP Update/Risk Assessment

Protect Drinking Water Infrastructure.

- *Ensure that Manville 1, 2 Wells/Pump Stations are adequately protected against flooding (100-year flood zone).*
- Action Type: Planning, Pre-Disaster
 - Priority Score: 21
 - Lead: DPW
 - Supporting: Engineering
 - Time Frame: Long Term
 - Financing Options: Municipal Operating Budget, FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Continuity of municipal services/Minimized Potential for contamination
 - Vulnerable Area: Municipal Drinking Water Infrastructure

Action #7...DELETED, ALREADY UNDERWAY/FUNDED

...2017 Plan

Replacement of Abbott St. Wastewater Pump Station

The Abbott Street Wastewater Pump Station was constructed and began service in 1993. This station serves approximately twenty residential households and one commercial customer. This facility is an underground pneumatic pumping system that receives and pumps wastewater to the existing sanitary sewer within Havens Street. This station is located in the Valley Falls section of Cumberland. Since 2005, the station has required multiple, periodic repairs and maintenance service calls as a result of various failures of the pneumatic (compressor) equipment in conjunction with the malfunctioning of instrumentation control. It is further noted that parts for this station's equipment are difficult to obtain, and some are no longer in production. As a result of the frequent maintenance history and the possibility of a total pump station failure in the future, the Sewer Department has recommended the replacement of this station.

- Action Type: Planning, Pre-Disaster
- Priority Score: __ (2017 Plan: 22)
- Lead: DPW
- Supporting: Engineering
- Time Frame: Long Term
- Financing Options: Capital Improvement Sewer Bond
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure and improved maintenance/operation of sanitary facility
- Vulnerable Area: Sanitary sewers

Action #8

...2017 Plan

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off.

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street. (e.g., address those roads that are part of the town evacuation route first, then main thoroughfares, etc.).

Streets/Properties Subject to Flooding

Maintenance

(Included here to illustrate a comprehensive review of flooding issues, however, not applicable for funding under any hazard mitigation grant programs)

Ann and Hope Way

- Specific Flooding Area: Periodic surcharge and overflow of drains due to Blackstone River elevation during select heavy storm water events.
- Flooding Cause: Flood Plain area.

- Need to perform annual sediment removal from infiltration system by the use of VAC truck.

Crestwood Court

- Specific Flooding Area: Culvert location
- Flooding Cause: Continual maintenance and clean-out of debris to prevent entering drainage system.

Fairview Avenue

- Specific Flooding Area: Select driveways
- Flooding Cause: Debris or other extraneous matter clogs slotted pipes across driveways. Pipe jetted to restore drainage capability. Requires periodic monitoring and maintenance.

Franklin Street

- Specific Flooding Area: Dead-end section near Wildwood Drive
- Flooding Cause: Flood Plain area.
 - Need to perform ongoing maintenance.

Fredrick Lane

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Grundy's Way

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Hannah Drive

- Specific Flooding Area: Dead end/cul de sac area
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Highridge Road

- Specific Flooding Area: Entire street
- Flooding Cause: Continual clogging and blockage of drainage catch basins due to leaves in heavily treed area. Periodic monitoring and clean-up maintenance required.

Kings Row

- Specific Flooding Area: N/A
- Flooding Cause: Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.
 - Need to perform annual sediment removal from infiltration system by the use of VAC truck. Additional interconnection of the infiltration galleys will provide benefits to the infiltration rates.

Laurel Lane

- Specific Flooding Area: Grandview
- Flooding Cause: Periodic clogging of slotted drain pipes during interim period of maintenance and cleaning.

Oakwood Drive

- Specific Flooding Area: Culvert location
- Flooding Cause: Catch basin and culvert blockage associated with debris and roots which have been removed periodically. Maintenance issue.

Tower Hill Road

- Specific Flooding Area: Diamond Hill Road end
- Flooding Cause: Silt build-up. Requires dredging and clean-up.

Wildwood Drive

- Specific Flooding Area: Dead-end section
- Flooding Cause: Existing Flood Plain area
 - Downstream maintenance of culverts on Mendon Rd. is important to reduce/prevent flooding.

Monitoring

Abbott Run Valley Road

- Specific Flooding Area: Jenna Way
- Flooding Cause: Reduced detention basin due to heavy rates of sedimentation from upstream construction sites in conjunction with catch basin blockage. Ongoing accumulation of debris in culvert which requires periodic monitoring and clean-out.
 - Improved in 2017/2018
 - Ongoing monitoring for flooding

Angell Road (State road)

- Specific Flooding Area: Easterly end at Diamond Hill Road
- Flooding Cause: Blocked catch basins require periodic cleaning by RIDOT.
 - Repaired by RIDOT
 - Ongoing monitoring for flooding

Club Drive

- Specific Flooding Area: Lippitt Estates/Low Point of Club Drive
- Flooding Cause: No existing drainage system. Underground infiltration galleys installed to address, but drainage and time for stormwater to recede is delayed due to slow infiltration rate.

Old Reservoir Road

- Specific Flooding Area: Jason's Grant
- Flooding Cause: Drainage system in this area requires upgrading.
 - An interconnected infiltrating system was installed 2022. Ongoing monitoring will be required (during significant storms).

Ronald Avenue

- Specific Flooding Area: North Brook area
- Flooding Cause: Undersized culvert and drainage pipes are the probable cause at this location.
 - Dams created by beavers appears to be the cause of flooding.

Theater Drive

- Specific Flooding Area: Scott Road culvert
- Flooding Cause: Culvert was previously blocked and subsequently cleaned. Still requires periodic monitoring and maintenance, particularly due to ice dam blockage during winter months.
 - Ongoing monitoring required

Structural/Replacement

Bear Hill Road

- Specific Flooding Area: Crestwood Court
- Flooding Cause: Deteriorated and undersized drainage pipes in conjunction with periodic blockage of pipes with debris.

Hines Road

- Specific Flooding Area: Northerly section at Miller's Brook
- Flooding Cause: Undersized drainage pipes.

Hilltop Road

- Specific Flooding Area: Allens Avenue

- Flooding Cause: Undersized drainage pipes serve this area. However, there are physical restrictions preventing construction in this area due to the existence of NGRID diffuser facilities.
 - Need to install additional shallow culverts to fit under the RI Energy's system.

Industrial Road

- Specific Flooding Area: Lower and relatively flat section of roadway near Diamond Hill Road adjacent to Okonite commercial property
- Flooding Cause: Additional catch basins installed, and drainage pipe modifications recently installed to improve drainage. New drainage modifications not in place long enough to subject to sufficient number of heavy storm events to confirm effectiveness. However, other measures will be required at upstream commercial and industrial areas where holding ponds will require maintenance and other onsite drainage improvements to mitigate probable additional flows to this area.
 - This area is under design, and it is anticipated to be corrected Summer 2024.

Martin Street

- Specific Flooding Area: Blackstone River and railroad area
- Flooding Cause: Existing flood plain area associated with Blackstone River.
- Supplemental: Possible collapse or deterioration of drains below railroad crossing also contributing to flooding condition.
 - Need to upgrade piping.

New York Avenue

- Specific Flooding Area: Miller's Brook area
- Flooding Cause: Undersized drainage pipe.

Ridgewood Drive

- Specific Flooding Area: Entire street
- Flooding Cause: Blockage of drainage pipe as a result of persistent root growth during interim periods of maintenance and removal.
 - Need to replace drainage pipe to eliminate the roots entering the pipe.

Seneca Street

Specific Flooding Area: Culvert location

- Flooding Cause: Undersized culvert pipe is considered the probable cause.
 - To be completed 2023.

Shirley Drive

- Specific Flooding Area: Swale associated with CVS property.
- Flooding Cause: Deterioration of drainage pipes. Replacement required.
 - To be completed by property owner 2023.

Pavement Management

Follett Street

- Specific Flooding Area: Entire street
- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Maybury Street

Specific Flooding Area: Entire Street (Meadowcrest subdivision)

- Flooding Cause: Deteriorated street pavement causing low points and ponding areas. Re-paving and grading correction required for proper drainage.

Sneech Pond Road (State road)

- Specific Flooding Area: Entire street
- Flooding Cause: Impeded drainage. Low points and ponding areas as a result of significantly deteriorated pavement. Requires complete rehabilitation.
 - To be completed by RIDOT 2023/2024.
- Action Type: Mitigation, Pre-Disaster
- Priority Score: 24 (2017 Plan: 24/2011 Plan – No priority identified)
- Lead: DPW
- Supporting: Engineering
- Time Frame: Medium Term
- Financing Options: Capital Improvement Planning
- Cost Estimate: Significant
- Benefit: Protection of property, protection of infrastructure, maintained access/evacuation, increased public safety, improved street drainage
- Vulnerable Area: Local Roads Subject to Flooding

EMERGENCY SERVICES

Action #9

...2023 HMP Update/Capability Assessment

Update the Town's Comprehensive Emergency Management Plan.

- Action Type: Planning, Pre-Disaster
- Priority Score: 22
- Lead: Emergency Management Agency
- Supporting: Town Council
- Time Frame: Short Term
- Financing Options: Municipal Operating Budget, FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Moderate

- Benefit: Coordinated emergency response, Improved public safety
- Vulnerable Area: Emergency Response/Evacuation

Action #10

...2023 HMP Update/Risk Assessment

Create a Heat Emergency Action Plan.

- *Prioritize creating cooling centers for those most vulnerable to heat, systematic communications strategies, and back-up energy plans.*
 - *Stress the importance of tree canopy for cooling buildings (reduce clear-cutting) and anticipate heat damage to roads. The Town is working on a proposed landscape ordinance (modeled after the City of Providence) that will make vegetation specifications much more clear and will require the preservation of more natural features during development projects.*
- Action Type: Planning, Pre-Disaster
 - Priority Score: 19
 - Lead: Emergency Management Agency
 - Supporting: Planning & Community Development Department
 - Time Frame: Medium Term
 - Financing Options: Municipal Operating Budget, FEMA BRIC/HMGP funds
 - Cost Estimate: Moderate
 - Benefit: Continuity of emergency response/Improved public health, safety and welfare
 - Vulnerable Area: Emergency Response

PLANNING AND PREVENTION

Action #11

...Municipal Resilience Program

Pursue a comprehensive flood mitigation study/evaluation of properties along the Blackstone River via the following project actions:

- *Direct/relocate development to areas that are already watered/sewered and are above natural river level, surge, and floodplain to preserve open space and avoid inappropriate parcel development as well as encourage low impact development (LID).*
- *Identify sites for flood mitigation projects including the removal of impervious surfaces, wetland restoration, and other natural solutions which would establish green spaces that can accommodate flooding, filter water and serve recreation and ecosystems.*
- *Pursue grant opportunities to resume feasibility studies in the lower Martin St. area which currently have massive pumps due to development mistakes (excavated and graded too much material and are now below river level)., in hopes of returning these areas to green space with relocation of occupants to higher ground.*
- *Coordinate efforts with Blackstone River watershed towns, councils, and organizations.*

- Action Type: Planning, Pre-Disaster
- Priority Score: 21
- Lead: DPW/Planning and Community Development Department
- Supporting: Private Business Owners
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget/CIP/ FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Improved resilience
- Vulnerable Area: Repetitive flood loss properties

Action #12

...Municipal Resilience Program

Approve a Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.

- Action Type: Planning, Pre-Disaster
- Priority Score: 24
- Lead: Mayor/Department Directors
- Supporting: Town Council
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget/CIP
- Cost Estimate: Staff Time
- Benefit: Improved resilience
- Vulnerable Area: Municipal infrastructure/capabilities

Action #13

...RIEMA Community Assistance Visit, May 26, 2021

Strengthen the Town's participation in the NFIP.

- *The Town must continue to track development in the floodplain for new structures and improvements to existing structures (to ensure those improving their home 50% or greater of structural value are brought into/or maintain compliance with NFIP regulations). Physically writing permit dates, type of work, and costs on the inside folder of a permit file (s).*
- *The Town should continue to keep permits digitally and consider adding a formal question/identifier regarding whether a property is or is not in the Special Flood Hazard Area (SFHA).*
- *The Town should continue to coordinate with RIEMA to organize training opportunities and develop a set of best practices for other local officials and contractors in the Town.*
- *The Town should continue to develop a relationship with State agencies, such as RI Department of Environmental Management (RIDEM) and RI Department of*

Transportation (RIDOT) to ensure the Town is aware of projects occurring within the Town that could potentially impact the SFHA.

- *The Town should continue to work with RIEMA staff to address the severe repetitive loss properties and submit to rate properties in the Town.*
- *The Town should continue to work with the RIEMA State Hazard Mitigation Officer to work on any items identified in their local HMP.*
- *An additional staff person should attend the L273 course (Managing Development through the NFIP) for a comprehensive training on floodplain management requirements and higher standards.*

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Building Official
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Municipal Operating Budget
- Cost Estimate: Staff Time
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Development/redevelopment within the SFHA

Action #14

...2017 Plan (modified)

Annually update Emergency Action Plans (EAP's) for both High and Significant hazard dams (publicly-owned) within the Town of Cumberland, including:

- *Diamond Hill Reservoir Dam (most recent EAP: August 2019)*
- *Arnold Mills Reservoir Dam (most recent EAP: August 2019)*
- *Happy Hollow Reservoir Dam (most recent EAP: August 2019)*
- *Robin Hollow Dam (most recent EAP: August 2019)*

An EAP is a plan of action to reduce potential property damage and loss of life in an area affected by a dam failure. An EAP identifies the areas, structures, facilities and roads that could be affected by dam failure. It also establishes a monitoring system which can activate the plan. Lastly, it identifies the corresponding official(s), organizations, and agencies along with their responsibilities in regards to implementing the plan.

All high and significant hazard dams must have a current EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both Rhode Island Emergency Management Agency (RIEMA) and Rhode Island Department of Environmental Management (RI DEM).

- Action Type: Planning, Pre-Disaster
- Priority Score: 28 (2017 Plan: 28)
- Lead: Town of Cumberland/Pawtucket Water Supply Board (PWSB)

- Supporting: Planning & Community Development Department , Cumberland Emergency Management Agency (CEMA)/Citizen's Emergency Response Team (CERT)
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT
- Cost Estimate: Minimal/Moderate; \$4,000 - \$5,500 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #15

...2017 Plan (modified)

Annually Update Emergency Action Plans (EAP's) for both High and Significant hazard private dams (privately-owned), including:

- *Miscoe Lake Dam (most recent EAP: August 2019)*
- *Rawson Pond Dam (most recent EAP: August 2019)*

All high and significant hazard dams must have a current EAP - it's the law (RIGL § 46-19-9 <http://webserver.rilin.state.ri.us/Statutes/TITLE46/46-19/46-19-9.HTM>.) An EAP is not considered complete until it is approved by both Rhode Island Emergency Management Agency (RIEMA) and Rhode Island Department of Environmental Management (RI DEM).

- Action Type: Planning, Pre-Disaster
- Priority Score: 28 (2017 Plan: 28)
- Lead: Town of Cumberland/Private Dam Owners
- Supporting: Planning & Community Development Department, RI DEM
- Time Frame: Short Term
- Financing Options: CEMA/CERT
- Cost Estimate: Minimal/Moderate; \$3,500 - \$5,000 (dependent upon size of structure/inundation zone)
- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #16

...2023 HMP Update/Risk Assessment

Coordinate with the Pawtucket Water Supply Board to complete a current Phase 1 Inspection Report (where applicable), then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dams:

- *Arnold Mills (Pawtucket) Reservoir Dam (most recent Phase 1: September 14, 2020/every two years)*
- *Diamond Hill Reservoir Dam (most recent Phase 1: September 8, 2020/every two years)*
- *Happy Hollow Pond Dam (most recent Phase 1: September 14, 2020/every five years)*

- years)
- *Robin Hollow Pond Dam (most recent Phase 1: September 8, 2020/every five years)*
 - Action Type: Planning, Pre-Disaster
 - Priority Score: 27
 - Lead: Pawtucket Water Supply Board (PWSB)
 - Supporting: Planning & Community Development Department
 - Time Frame: Short Term
 - Financing Options: PWSB, FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Protection of property, protection of life/infrastructure
 - Vulnerable Area: Residential, Business and Industrial areas

Action #17

...2023 HMP Update/Risk Assessment

Coordinate with private dam owners to complete a current Phase 1 Inspection Report, then ensure the completion of recommended improvements identified in the updated Phase 1 Inspection Reports for the following dams:

- *Miscoe lake Dam (most recent Phase 1: August 20, 2014/every two years)*
- *Rawson Pond Dam (most recent Phase 1: July 13, 2012/every five years)*
 - Action Type: Planning, Pre-Disaster
 - Priority Score: 27
 - Lead: Private dam owners
 - Supporting: Planning & Community Development Department
 - Time Frame: Medium Term
 - Financing Options: Private Dam Owner's, FEMA BRIC/FMA/HMGP funds
 - Cost Estimate: Significant
 - Benefit: Protection of property, protection of life/infrastructure
 - Vulnerable Area: Residential, Business and Industrial areas

Action #18

...2023 HMP Update/Risk Assessment

Develop Operations and Maintenance Manual for Rawson Pond Dam as per the Rawson Pond Dam Purchase Agreement and February 27, 2017, correspondence from former Mayor Bill Murray.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Cumberland Water District
- Supporting: Planning & Community Development Department
- Time Frame: Long Term
- Financing Options: CEMA
- Cost Estimate: Moderate

- Benefit: Protection of property, protection of life/infrastructure
- Vulnerable Area: Residential, Business and Industrial areas

Action #19

...2017 Plan

Implement Public Outreach Campaign for residents/businesses located within a dam inundation zone.

Once EAPs have been developed for both High and Significant hazard dams (both public and private), it is important to conduct a public information session for residents and businesses within the various inundation areas regarding what they should do in the event of a dam breach. This could be completed in one general session, or individual sessions for each structure and affected neighborhood.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28 (2017 Plan: 26/2011 Plan – High Priority)
- Lead: Pawtucket Water Supply Board (PWSB)/Private dam owners
- Supporting: Planning & Community Development Department , CEMA/ CERT
- Time Frame: Short Term
- Financing Options: PWSB/CEMA/CERT personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life/infrastructure, uninterrupted services
- Vulnerable Area: Residential problems/Businesses and Industry

Action #20

...2017 Plan

Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the LNG site.

- Action Type: Mitigation, Pre-Disaster/Post-Disaster
- Priority Score: 28 (2017 Plan: 26)
- Lead: Mayor's Office – Chief of Staff/ CEMA
- Supporting: Planning & Community Development Department
- Time Frame: Medium Term
- Financing Options: Staff/personnel time
- Cost Estimate: Minimal; Staff Time
- Benefit: Protection of property, protection of life, maintained access
- Vulnerable Area: Residents' safety

Action #21

...2017 Plan

Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents .

To determine if an alternate on or off-site location, or conversion to electronic records filing is the best course for the Town to undertake.

- Action Type: Planning, Pre-Disaster/Post-Disaster
- Priority Score: 27 (2017 Plan: 22)
- Lead: Mayor's Office
- Supporting: Town Council, Town Clerk
- Time Frame: Medium Term
- Financing Options: Town Budget
- Cost Estimate: Significant; Staff Time \$30,000 (dependent upon option selected)
- Benefit: Protection of critical Town records/documents
- Vulnerable Area: Public Facilities

Action #22...DELETED AS PER LHMC

...2023 HMP Update/Risk Assessment/FEMA Planning for Drought Resistance

Develop a comprehensive, town-wide Climate Action Plan that balances both mitigation and adaptation. Develop a Drought Management Plan/element in advance of a crisis stage for chronic drought. The plan should consider a re-evaluation of all Zoning, Bylaws and Land Use Regulations in support of drought resilience:

- *Landscaping ordinances that dictate conserving and recycling potable water and the use of drought-tolerant plant species to help reduce water demand.*
- *Stormwater management plans that support a comprehensive approach to collecting, treating, and even reusing water to help mitigate drought.*
- *Capital Improvement Plans that emphasize investment in efficient water systems that prevent loss of water during transmission.*

- Action Type: Planning, Pre-Disaster
- Priority Score: ____
- Lead: Planning & Community Development Department
- Supporting: Planning Board/Town Council
- Time Frame: Long Term
- Financing Options: FEMA BRIC/FMA/HMGP funds
- Cost Estimate: Significant
- Benefit: Improved resiliency, Improved public health/safety/welfare/Protection of natural resources, Minimized socio-economic impacts, Increased resiliency
- Vulnerable Area: All

ADDITIONAL ACTIONS ADDED AFTER THE LHMC MEETING ON OCTOBER 19, 2023:

EMERGENCY SERVICES

Fund and implement a comprehensive overhaul of the Town's existing analog radio communications system to a modern 800 MHz digital radio strategy.

- Action Type: Emergency Services, Pre-Disaster
- Priority Score: 28
- Lead: Public Safety Departments (Police/Fire/EMS)
- Supporting: Mayor's Office/Town Council
- Time Frame: Short Term
- Financing Options: Capital Improvement Planning, RIEMA/FEMA grants
- Cost Estimate: Significant
- Benefit: Enhanced public safety, mutual aid, and communications
- Vulnerable Area: Public Safety/Emergency Response

PROPERTY PROTECTION

The Town will partner with Hope Global representatives to build on previous flood mitigation efforts (as detailed in the 2017 Cumberland Hazard Mitigation Plan) and seek funding to complete a Flood Mitigation Study to evaluate the cause of intermittent flooding of the front and rear parking lots (where approximately 200 employees park daily).

- Action Type: Property Protection, Pre-Disaster
- Priority Score: 14
- Lead: Hope Global representatives
- Supporting: Town of Cumberland
- Time Frame: Long Term
- Financing Options: RIEMA/FEMA grants
- Cost Estimate: Significant
- Benefit: Protection of public safety/property/tax base, reduced damage claims, improved resilience
- Vulnerable Area: Public Safety/Repetitive Loss Properties

The Town will partner with Premier Land Development representatives (Ann & Hope Mill Redevelopment Project) to evaluate drainage infrastructure along the Broad Street corridor causing flooding impacts to the site's access/entrance and building.

- Action Type: Property Protection, Pre-Disaster
- Priority Score: 19
- Lead: Premier Land Development representatives
- Supporting: Town of Cumberland
- Time Frame: Short Term
- Financing Options: RIEMA/FEMA grants
- Cost Estimate: Significant
- Benefit: Protection of public safety/property/tax base, reduced damage claims, improved resilience
- Vulnerable Area: Public Safety/Residential (future) Flooding

The Town will partner with Stop & Shop representatives to seek funding to complete a Flood Mitigation Study to evaluate mitigation measures to alleviate intermittent flooding of the Utility Room and retail space.

- Action Type: Property Protection, Pre-Disaster
- Priority Score: 17
- Lead: Stop & Shop representatives
- Supporting: Town of Cumberland
- Time Frame: Long Term
- Financing Options: RIEMA/FEMA grants
- Cost Estimate: Significant
- Benefit: Protection of public safety/property/tax base, reduced damage claims, improved resilience
- Vulnerable Area: Public Safety/Repetitive Loss Properties

Task 1: Convene/Coordinate with LHMC, Conduct Public Outreach, Document Planning Process <i>Kickoff Meeting with Consultant and Town Meeting #1 - LHMC</i> - Project Webpage - 2017 Plan Report Card - Data Collection	December 12, 2022 - December 1, 2023 Week of December 12, 2022 January 5, 2023
Task 2: Update/Perform Risk Assessment - Hazard Identification/Profiles <i>Coordination with Town Departments/Personnel</i> <i>Public Workshop #1</i>	January 16, 2023 - October 2023 Week of January 23, 2023 April 24, 2023
Task 3: Facility Inventory/GIS Mapping - Update Risks/Critical Fac./Vulnerable Pops. Mapping	January 16, 2023 - February 10, 2023
Task 4: Update/Perform Hazard Vulnerability Assessment <i>Meeting #2 - LHMC</i> - Vulnerability Analyses	February 13, 2023 - March 24, 2023 Week of February 27, 2023
Task 5: Develop Goals and Objectives - Preliminary Mitigation Recommendations	March 20, 2023 - April 14, 2023
Task 6: Analyze Existing/Research New Strategies - Plans, Policies and Problems Examination	March 27, 2023 - April 21, 2023
Task 7: Develop Comprehensive Range of Actions <i>Meeting #3 - LHMC</i>	August 2023 - October 2023 October 3, 2023
Task 8: Plan Maintenance/Implementation	August 2023 - October 2023
Task 9: Review, Revision, Approval and Adoption of Plan <i>Meeting #4 - LHMC</i> - Cost Benefit Review/Prioritization Public Comment Period <i>Draft Plan Coordination with Planning Board</i> <i>Draft Plan Coordination with Conservation Commission</i> <i>Public Workshop #2/Town Council Public Hearing</i> Final Deliverable to RIEMA	October 2023 - December 1, 2023 October 19, 2023..... November 6, 2023 - November 17, 2023 November 6, 2023 - November 17, 2023 November 6, 2023 - November 17, 2023 November 15, 2023..... By December 1, 2023

Part 2: Prioritize Actions – Quantitative Method
Method C – Simple Score

Criterion:	Cost	Benefit
Social: Is the action compatible with present and future local community needs and values? <ul style="list-style-type: none"> - Is the proposed action socially acceptable to the community? - Are there equity issues involved that would mean that one segment of a community is treated unfairly? - Will the action cause social disruption? 		
Technical: Is the action feasible with available local resources (or as supplement by outside resources as necessary)? <ul style="list-style-type: none"> - Will the proposed action work? - Will it create more problems than it solves? - Does it solve a problem or a symptom? - Is it the most useful action in light of other community goals? 		
Administrative: Does the community have the administrative capacity to implement the action? <ul style="list-style-type: none"> - Can the community implement the action? - Is there someone to coordinate and lead the effort? - Is there sufficient funding, staff, and technical support available? - Are there ongoing administrative requirements that need to be met? 		
Political: Is there strong public support to implement and maintain the action? <ul style="list-style-type: none"> - Is the action politically acceptable? - Is there public support both to implement and to maintain the project? 		
Legal: Does the community have the legal authority to implement the action? <ul style="list-style-type: none"> - Are there legal side effects (taking)? - Is the action allowed via Comprehensive Plan, or does it need to be amended? - Will the community be liable for the action? - Will the activity be challenged? 		
Economic: Is the action cost-effective? <ul style="list-style-type: none"> - What are the costs and benefit of the action? - Do the benefits exceed the costs? - Are initial, maintenance, and administrative costs taken into account? - Has funding been secured for the proposed action? - What burden will this action place on the tax base of local economy? - Does the action contribute to other community goals? 		
Environmental: Does the action impact environmental resources, and is the impact positive, negative, or neutral? <ul style="list-style-type: none"> - Will the action need environmental regulatory approvals? - Will it meet local and state regulatory requirements? 		
Sub-total		
Priority/Total Score		
Ranking Descriptions:		
Very Beneficial: 2		
Favorable: 1		
Not Applicable: 0		
Not Favorable: -1		

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PUBLIC EDUCATION AND AWARENESS											
2023 - 1	Develop/Distribute informational natural hazards pamphlet to residents/businesses that describes natural hazards threatening the community, steps to take to prevent/mitigate damages, awareness of evacuation routes and shelter locations, and increase resident awareness/communications.	Cost	2	2	2	2	2	2	0	12	26
		Benefit	2	2	2	2	2	2	2	14	
PROPERTY PROTECTION											
2023 - 2	Acquire residential properties in the special flood hazard area.	Cost	-1	0	2	2	-1	-1	0	1	15
		Benefit	2	2	2	2	2	2	2	14	
2023 - 3	Prepare an 'After the Storm Recovery Plan' for the community.	Cost	2	2	-1	2	2	2	0	9	23
		Benefit	2	2	2	2	2	2	2	14	
2023 - 4	Partner with Hope Global representatives to complete a Flood Mitigation Study to evaluate the cause of flooding on the front/rear parking areas.	Cost	1	1	1	1	1	1	1	7	14
		Benefit	1	1	1	1	1	1	1	7	
2023 - 5	Partner with Premier Land Development representatives (Ann & Hope Mill redevelopment project) to evaluate drainage infrastructure along the Broad St. corridor impacting the site's access/entrance and building.	Cost	1	1	1	1	1	1	1	7	19
		Benefit	2	2	2	2	1	2	1	12	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PROPERTY PROTECTION											
2023 - 6	Partner with Stop & Shop representatives to complete a Flood Mitigation Study to evaluate mitigation measures to alleviate flooding of the parking lot, Utility Room and retail space.	Cost	1	1	1	1	1	1	1	7	17
		Benefit	2	1	1	2	1	2	1	10	
2023 - 7	Develop/Implement a comprehensive tree management plan to address tree maintenance (particularly along power lines to prevent outages), and tree canopy expansion in more developed areas that includes policies for maintenance with RI Energy, pre/post storm event procedures to protect utility infrastructure, increasing tree canopy, build social equity into the conversation, and coordinate with other tree planting initiatives.	Cost	2	-1	-1	2	2	-1	0	4	18
		Benefit	2	2	2	2	2	2	2	14	
NATURAL RESOURCE PROTECTION											
2023 - 8	Support the implementation of recommended improvements/projects identified in the Town's various Conservation and Management Plans.	Cost	2	-1	1	2	2	-1	0	5	19
		Benefit	2	2	2	2	2	2	2	14	
STRUCTURAL PROJECTS											
2023 - 9	Protect drinking water infrastructure (floodproofing of Manville 1/2 pump stations).	Cost	2	0	2	2	0	2	2	10	21
		Benefit	2	2	2	2	-1	2	2	11	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
STRUCTURAL PROJECTS											
2023 - 10	Develop an implementation strategy to address property and streets subject to flooding from poor drainage and run-off.	Cost	2	1	2	2	1	2	0	10	24
		Benefit	2	2	2	2	2	2	2	14	
EMERGENCY SERVICES											
2023 - 11	Update the Town's Comprehensive Emergency Management Plan.	Cost	2	0	2	2	0	2	0	8	22
		Benefit	2	2	2	2	2	2	2	14	
2023 - 12	Create a Heat Emergency Action Plan.	Cost	2	0	2	2	0	-1	0	5	19
		Benefit	2	2	2	2	2	2	2	14	
2023 - 13	Fund and implement a comprehensive overhaul of the Town's existing analog radio communications system to a modern 800 MHz digital radio strategy.	Cost	2	2	2	2	2	2	2	2	28
		Benefit	2	2	2	2	2	2	2	2	
PLANNING AND PREVENTION											
2023 - 14	Pursue a comprehensive flood mitigation study/evaluation of properties along the Blackstone River via a range of actions.	Cost	2	0	2	2	-1	2	0	7	21
		Benefit	2	2	2	2	2	2	2	14	
2023 - 15	Approve a Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.	Cost	2	2	2	2	2	2	2	14	24
		Benefit	2	2	2	2	2	2	2	14	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PLANNING AND PREVENTION											
2023 - 16	Strengthen the Town's participation in the National Flood Insurance Program (NFIP).	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 17	Annually update Emergency Action Plans (EAPs) for both high and significant hazard dams (publicly-owned) within the Town of Cumberland including: Diamond Hill Reservoir Dam, Arnold Mills Reservoir Dam, Happy Hollow Reservoir Dam, and Robin Hollow Dam.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 18	Annually update Emergency Action Plans (EAPs) for both high and significant hazard dams (privately-owned) within the Town of Cumberland including: Miscoe Lake Dam and Rawson Pond Dam.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 19	Coordinate with the Pawtucket Water Supply Board to complete a Phase 1 Inspection Report (where applicable), then ensure the completion of recommended improvements identified in the updated Reports for the following dams: Arnold Mills (Pawtucket) Reservoir Dam (overdue), Diamond Hill Reservoir Dam (overdue), Happy Hollow Pond Dam (due 9/14/2025), and Robin Hollow Pond Dam (due 9/8/2025).	Cost	2	2	2	2	-1	2	2	13	27
		Benefit	2	2	2	2	2	2	2	14	

2023 Action Number	Title	Cost/ Benefit	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Prioritization
PLANNING AND PREVENTION											
2023 - 20	Coordinate with private dam owners to complete a Phase 1 Inspection Report, then ensure completion of recommended improvements identified in the updated Reports for the following dams: Miscoe Lake Dam (overdue) and Rawson Pond Dam (overdue).	Cost	2	2	2	2	-1	2	2	13	27
		Benefit	2	2	2	2	2	2	2	14	
2023 - 21	Develop Operations & Maintenance Manual for Rawson Pond Dam as per the Rawson Pond Dam Purchase Agreement and February 27, 2017 correspondence from former Mayor Bill Murray.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 22	Implement public outreach campaign for residents/businesses location within a dam inundation zone.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 23	Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Road neighborhood in the event of an emergency at the LNG site.	Cost	2	2	2	2	2	2	2	14	28
		Benefit	2	2	2	2	2	2	2	14	
2023 - 24	Identify alternative storage location and/or strategy for critical town records/documents.	Cost	2	2	2	2	2	1	2	13	27
		Benefit	2	2	2	2	2	2	2	14	

Cumberland Hazard Mitigation Plan Update

LHMC Meeting #4

Cumberland Town Hall

45 Broad Street

October 19, 2023 9:30 AM - 11:30 AM

[illegible]

Public Workshop #2: November 15, 2023



Frequently Asked Questions (FAQs)

PUBLIC WORKSHOP #2

Cumberland, RI 02864

The Town of Cumberland has been working over the past year to update the 2017 Hazard Mitigation Plan. This plan is important because it helps the Town plan and receive funding for projects that reduce the risk of injury or damage to property from natural hazard events such as flooding, winter storms, and hurricanes. The Disaster Mitigation Act of 2000 (DMA) places high priority on the continuation of the planning process after the initial submittal, requiring

Town of Cumberland, RI Hazard Mitigation Plan Update



Public Workshop #2

Wednesday, November 15, 2023
7:30 PM

Cumberland Town Hall, Council Chambers (2nd floor)
45 Broad Street
Cumberland, RI 02864

About the Cumberland Hazard Mitigation Plan Update

The Town of Cumberland has been working over the past year to update the 2017 Hazard Mitigation Plan. This plan is important because it helps the Town plan and receive funding for projects that reduce the risk of injury or damage to property from natural hazard events such as flooding, winter storms, and hurricanes. The Disaster Mitigation Act of 2000 (DMA) places high priority on the continuation of the planning process after the initial submittal, requiring communities to seek and receive re-approval from FEMA in order to remain eligible for financial assistance.

For more information, please visit the project webpage at:
<https://www.cumberlandri.org/hazard-mitigation/>

Contacts

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Director, Planning and Community Development
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Craig Pereira
Horsley Witten Group, Inc.
Project Manager
cpereira@horsleywitten.com
(401) 263-6048



Town of Cumberland, RI Hazard Mitigation Plan Update Public Workshop #2

Craig Pereira, CFM
Project Manager – Horsley Witten Group

November 15, 2023 7:30 PM
Cumberland Town Hall – Council Chambers



1

WELCOME!



2

Town of Cumberland Local Hazard Mitigation Committee

- Jonathan Stevens, Director of Planning and Community Development
- Glenn Modica, Town Planner
- John Pliakas, Emergency Medical Services Chief
- Joe Duarte, Public Works Director
- Matt Benson, Police Chief
- Matt Alves, Deputy Police Chief
- Chris Collins, Pawtucket Water Supply Board
- Joe Luca, Conservation Commission
- Nick Anderson, Fire Chief
- Sarah King, Community Outreach Coordinator
- Mike Crawley, Senior Services/Parks and Recreation Director
- Sara Brelsford, Chief of Staff – Mayor's Office
- Frank Matta, Director – Cumberland Land Trust/Friends of the Blackstone
- Brad Dean, President – Dean Industries
- Kevin Joyce, Building Official




3

Why Hazard Mitigation Planning?

Disaster Mitigation Act of 2000, Interim Final Rule, 44 CFR Parts 201 and 206 states, "All communities must have an approved Multiple Hazards Mitigation Plan in order to qualify for future federal disaster mitigation grants".

Hazard Mitigation:
"Reduction or elimination of long-term risk to life, property, and the environment".




4

Mission Statement & Goals

The purpose of the Cumberland Hazard Mitigation Plan is to preserve and enhance the quality of life, property values, and resources by identifying all potential natural hazards in Cumberland and mitigating their effects to reduce the loss of life, as well as losses of economic, historical, natural, and cultural resources.


1. Protect the public's health, safety and welfare.
2. Reduce property damages caused by hazard impact.
3. Minimize social distress and economic losses/business disruption.
4. Provide an ongoing forum for the education and awareness of natural hazard mitigation issues, programs, policies, and projects.



5

Mitigation Process

- Assess Risks
- Establish Goals
- Identify Projects/Actions
- Update/Maintain Plan



6

Outreach and Coordination

Project Webpage

Local Hazard Mitigation Committee

- January 5, 2023
- June 9, 2023
- October 3, 2023
- October 19, 2023

Public Workshop #1

- April 24, 2023

Community Survey

- 21 responses

Interviews – Local Businesses

- Berkeley Business Center
- Hope Global
- Stop & Shop
- Dean Industries
- Ann & Hope Mill Redevelopment



7

Assess Risks... Hazard Index

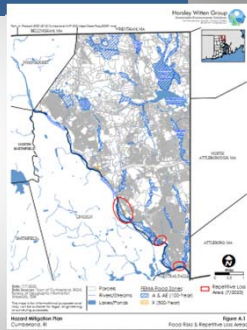
Natural Hazard	Frequency (i.e. Very Low, Low, Medium, High)	Location (i.e. small/local, medium/regional, larger/multiple communities)	Severity (i.e. minor, serious, extensive, catastrophic)	Hazard Index (i.e. ranked by combining frequency and severity)
Flood-Related Hazards				
Nonrenewable Flooding	4	2	3	7
Inland Urban Flooding/Heavy Rain	4	2	3	7
Climate Change	3	2	2	5
Dam Failures	1	2	3	4
Winter-Related Hazards				
Blizzards/Snow/Ice	4	3	3	7
Ice	4	2	2	6
Extreme Cold	4	3	1	5
Wind-Related Hazards				
Hurricanes	4	3	3	7
Tornadoes/High Winds	4	2	3	7
Lightning/Thunderstorms	4	1	2	6
Hail	4	1	1	5
Geologic-Related Hazards				
Earthquakes	4	2	1	5
Drought-Related Hazards				
Drought	4	2	1	5
Extreme Heat-Related Hazards				
Extreme Heat	4	2	2	6
Wildfire-Related Hazards				
Wildfire	3	1	2	5
Invasive Species-Related Hazards				
Multiple	3	1	1	4

Notes: 1. Scored by HMCFire Chart; 2. Location score not included in overall hazard ranking

8

Economic Vulnerability Analysis

- NFIP-insured properties
- Impacts of FEMA Flood Zones
 - 100 year: 825 parcels/\$677.7 million
 - 500 year: 292 parcels/\$301 million



9

Social Vulnerability

Public Infrastructure/Emergency Lifelines

- Drinking Water System
 - Manville wells (#1 and #2) and pump station within FEMA 100-year flood zone
- Wastewater System
 - Abbott St. wastewater pump station replacement
- Transportation Systems
 - Various segments
- Communications System
 - Existing analog radio system antiquated/insufficient



10

Mitigation Strategy

Mitigation Actions identified from:

- Carry over from 2017 Plan
- RI Infrastructure Bank summary
- LHMC Coordination
- Various plans, studies, and reports
- HWG/Consultant



11

Mitigation Measures...Categories

- Planning and Prevention
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services, and
- Public Education and Awareness



12

Prioritization of Actions...STAPLEE Method

- **Social**...is the action socially acceptable?
- **Technical**...is the action technically feasible and provide appropriate level of protection?
- **Administrative**...does the Town have the capability to complete the action?
- **Political**...will the Town support or oppose the project?
- **Legal**...does the Town have the legal authority to complete the action?
- **Economic**...is the action cost-effective?
- **Environmental**...will the action affect the natural environment?



13

13

Mitigation Actions

Time Frames

- Short Term: 0 – < 6 months
- Medium Term: > 6 – < 18 months
- Long Term: 18 months – 5 years

Cost Ranges

- Staff Time: Municipal personnel time
- Minimal: < \$5,000
- Moderate: > \$5,000 but < \$25,000
- Significant: > \$25,000



14

14

2023 Mitigation Strategy

PUBLIC EDUCATION AND AWARENESS

Action #1

...2017 Plan (updated to incorporate content from Municipal Resilience Program)

Develop/Distribute Informational Natural Hazards Pamphlet.

Develop a pamphlet to be distributed to all residents and business owners that describes the natural hazards that threaten the community and describes steps they can take for each hazard to mitigate damages to their property. Include evacuation routes and shelter locations along with items that can and cannot be taken to the shelters as well as information regarding the risk to our community for brush/forest fires and how residents can help prevent them.

PROPERTY PROTECTION

Action #2

...2017 Plan

Acquire residential properties in the special flood hazard area.

The Town will work with private homeowners in these areas to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property. By purchasing these residential properties, the Town is utilizing an effective program designed to remove people and property from high-risk areas and reduce disaster losses. The buildings are either demolished or relocated, and the land is then restricted to open space in perpetuity.



15

15

2023 Mitigation Strategy

PROPERTY PROTECTION

Action #3

...2017 Plan

Prepare an "After the Storm Recovery" Plan for the Community.

The Town should utilize the opportunity of a disaster to improve its' disaster resilience.

- Community Assessments
- Recovery and Reconstruction Ordinance
- Debris Management Plan

Action #4

...Interview with Business representative

The Town will partner with Hope Global representatives to build on previous flood mitigation efforts (as detailed in the 2017 Cumberland Hazard Mitigation Plan) and seek funding to complete a Flood Mitigation Study to evaluate the cause of intermittent flooding of the front and rear parking lots (where approximately 200 employees park daily).



16

16

2023 Mitigation Strategy

PROPERTY PROTECTION

Action #5

...Interview with Business representative

The Town will partner with Premier Land Development representatives (Ann & Hope Mill Redevelopment Project) to evaluate drainage infrastructure along the Broad Street corridor causing flooding impacts to the site's access/entrance and building.

Action #6

...Interview with Business representative

The Town will partner with Stop & Shop representatives to seek funding to complete a Flood Mitigation Study to evaluate mitigation measures to alleviate intermittent flooding of the parking lot, Utility Room, and retail space.



17

17

2023 Mitigation Strategy

NATURAL RESOURCE PROTECTION

Action #7

...Municipal Resilience Program

Develop/Implement a comprehensive tree management plan to address tree maintenance (particularly along power lines to prevent outages), and tree canopy expansion in more developed areas that includes policies for implementation/management.

Action #8

...Conservation and Management Plans

Support the implementation of recommended improvements/projects identified in the Town's various Conservation and Management Plans:

New Pond Park/Monastery/Mercy Woods/Heritage Park/Metcalf-Franklin Farm/Diamond Hill/Albion Town Landfill



18

18

2023 Mitigation Strategy

STRUCTURAL PROJECTS

Action #9

...2023 HMP Update/Risk Assessment

Protect Drinking Water Infrastructure.

Ensure that Manville 1, 2 Wells/Pump Stations are adequately protected against flooding (100-year flood zone).

Action #10

...2017 Plan

Develop an implementation strategy to address Property and Streets Subject to Flooding from Poor Drainage and Run-Off.

Determine what mitigation activities...maintenance (catch basin cleaning) v. monitoring (State road) v. structural/replacement (undersized pipes) v. pavement management (roadway crown/ponding) can alleviate the problem while creating the most benefit to the community for each street. (e.g., address those roads that are part of the town evacuation route first, then main thoroughfares, etc.).



19

2023 Mitigation Strategy

EMERGENCY SERVICES

Action #11

...2023 HMP Update/Capability Assessment

Update the Town's Comprehensive Emergency Management Plan.

Action #12

...2023 HMP Update/Risk Assessment

Create a Heat Emergency Action Plan.

- Prioritize creating cooling centers for those most vulnerable to heat, systematic communications strategies, and back-up energy plans.
- Stress the importance of tree canopy for cooling buildings (reduce clear-cutting) and anticipate heat damage to roads.

Action #13

...2023 HMP Update/Risk Assessment

Fund and implement a comprehensive overhaul of the Town's existing analog radio communications system to a modern 800 MHz digital radio strategy.



20

2023 Mitigation Strategy

PLANNING AND PREVENTION

Action #14

...Municipal Resilience Program

Pursue a comprehensive flood mitigation study/evaluation of properties along the Blackstone River via various projects.

Action #15

...Municipal Resilience Program

Approve a Capital Improvement Plan (CIP) to address Cumberland's aging water and dam infrastructure, roadways, insufficient drainage, and equipment which would have a positive effect on departmental budgets.

Action #16

...RIEMA Community Assistance Visit, May 26, 2021

Strengthen the Town's participation in the NFIP.



21

2023 Mitigation Strategy

PLANNING AND PREVENTION

Action #17

...2017 Plan (modified)

Annually update Emergency Action Plans for both high/significant hazard dams (publicly-owned).

- Diamond Hill Reservoir Dam (most recent EAP: August 2019)
- Arnold Mills Reservoir Dam (most recent EAP: August 2019)
- Happy Hollow Reservoir Dam (most recent EAP: August 2019)
- Robin Hollow Dam (most recent EAP: August 2019)

Action #18

...2017 Plan (modified)

Annually Update Emergency Action Plans for both high/significant hazard dams (privately-owned).

- Miscoe Lake Dam (most recent EAP: August 2019)
- Rawson Pond Dam (most recent EAP: August 2019)



22

2023 Mitigation Strategy

PLANNING AND PREVENTION

Action #19

...2023 HMP Update/Risk Assessment

Coordinate with the Pawtucket Water Supply Board to complete a Phase 1 Inspection Report, then ensure the completion of recommended improvements identified in the updated Reports for the following:

- Arnold Mills (Pawtucket) Reservoir Dam (most recent Phase 1: September 14, 2020/every two years)
- Diamond Hill Reservoir Dam (most recent Phase 1: September 8, 2020/every two years)
- Happy Hollow Pond Dam (most recent Phase 1: September 14, 2020/every five years)
- Robin Hollow Pond Dam (most recent Phase 1: September 8, 2020/every five years)

Action #20

...2023 HMP Update/Risk Assessment

Coordinate with private dam owners to complete a Phase 1 Inspection Report, then ensure the completion of recommended improvements identified in the updated Reports for the following:

- Miscoe Lake Dam (most recent Phase 1: August 20, 2014/every two years)
- Rawson Pond Dam (most recent Phase 1: July 13, 2012/every five years)



23

2023 Mitigation Strategy

PLANNING AND PREVENTION

Action #21

...2023 HMP Update/Risk Assessment

Develop Operations and Maintenance Manual for Rawson Pond Dam as per the 'Rawson Pond Dam Purchase Agreement' and February 27, 2017, correspondence from former Mayor Bill Murray.

Action #22

...2017 Plan

Implement Public Outreach campaign for residents/businesses located within a dam inundation zone.

Action #23

...2017 Plan

Coordinate with RI Energy (formerly National Grid) to develop and distribute SOPs for residents within the Scott Rd. neighborhood in the event of an emergency at the LNG site.

Action #24

...2017 Plan

Identify Alternative Storage Location and/or Strategy for Critical Town Records/Documents.



24

Project Schedule

Draft Update available for public comment through **November 17, 2023**

Draft Update to RIEMA **December 1, 2023**



25

Contact Us...

Questions/Comments:

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Craig Pereira—Project Manager
Senior Planner/CFM
Horsley Witten Group, Inc.

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Providence, RI 02903
cpereira@horsleywitten.com
Phone: (401) 263-6048



26

THANK YOU!



27

Town of Cumberland, RI

Hazard Mitigation Plan Update - Public Workshop #2

Cumberland Town Hall - Council Chambers

45 Broad Street

Cumberland, RI

November 15, 2023

7:30 PM

<u>Name</u>	<u>Email Address</u>
Phillip Koutsogiane	
Scott Dessert	
Matthew Alves	
Meghan Zaperedesrochers	
Marion Juskuv	
Maria Juskuv	
Corey Blais	
Joseph Duarte	
Nicholas Anderson	
Jim Scozzer	
Denis Collins	
Kelly Morris-Salvatore	
Jeff Mutter	
Ray Lane	
Jonathan Stevens	
Michael Kinch	
Peter Bradley	
Scott Schmitt	
James Metivier	
Tim Magill	
Lisa Beaulieu	
Robert Shaw	
Craig Pereira	



Interviews: Local Businesses

Memorandum of Meeting

To: Jonathan Stevens/Cumberland LHM
From: Craig Pereira
Date: August 30, 2023
Re: Coordination with Businesses – Berkeley Business Center

In attendance:

Chris Grimo – Berkeley Business Center
Craig Pereira – Horsley Witten Group (HW), Project Manager

Craig Pereira conducted an interview with representatives from Berkeley Business Center regarding flooding impacts to the property to better understand potential coordination opportunities for increased resilience through the Cumberland Hazard Mitigation Plan Update process. The following items were discussed:

1. Business is located on Martin Street and located primarily in the 500-year flood zone with the southwest corner of the building and parts of the parking lot located within the 100-year flood zone.



2. Business has not been impacted by any previous flood events (emanating from the river). The basement does flood occasionally during periods of heavy rain, as well as the parking lot.
3. The businesses is currently updating their stormwater management system. Due to the limited, remaining area of the site (majority of open area sold off prior to purchase) the business has been grandfathered to utilize/recommission an existing inlet/outlet pipe for stormwater management. A holding tank is going in onsite with overflow being directed to the inlet/outlet pipe exiting to the Blackstone River. This inlet/outlet pipe is approx.. 200 years old and flows underground/adjacent

businesses to the River. If there were a significant event, and this inlet/outlet pipe collapsed, there would be significant flooding issues on the site.

4. Representative stated that no Business Continuity Plans/Emergency Response Plans are in place
5. Representative to discuss potential for a mitigation project for consideration, however, do not anticipate any alternatives due to limited open space/area at the site.

Memorandum of Meeting

To: Jonathan Stevens/Cumberland LPMC
From: Craig Pereira
Date: August 30, 2023
Re: Coordination with Businesses – Hope Global

In attendance:

Brenda Dexter – Hope Global
Jeff Agonia – Hope Global
James Butler – Hope Global
Jim Hanahan – Hope Global
Craig Pereira – Horsley Witten Group (HW), Project Manager

Craig Pereira conducted an interview with representatives from Hope Global regarding flooding impacts to the property to better understand potential coordination opportunities for increased resilience through the Cumberland Hazard Mitigation Plan Update process. The following items were discussed:

1. Business is located on Martin Street along the Blackstone River. Located primarily in the 100-year flood zone.



2. Business has benefitted in the past from previous FEMA grant (s) to elevate utilities above flood levels.
3. Representatives cited broken/cracked locks and overgrown drainage areas as potential issues. Craig indicated that typically, maintenance efforts are not allowable/funded through FEMA grants.



4. Two potential areas for project consideration as a complete site feasibility study:
 - a. Front parking lot floods intermittently
 - b. Rear materials storage area floods intermittently



5. Representatives continue to maintain their Business Continuity Plan Updates (2021) and coordination with municipal officials (and provided copies to HW) including:
 - Contact lists for suppliers, vendors, customers and active employees
 - Business Unit Recovery Plan

- Crisis Management Plan
 - IT Recovery Plan
 - Emergency Preparedness Plan
 - *Flood Emergency Response Plan: Flood Emergency Quick Guide/Flood Recovery Plan*
6. Representatives to provide damage assessments and draft language for a mitigation project for consideration.

Memorandum of Meeting

To: Jonathan Stevens/Cumberland LHMC
From: Craig Pereira
Date: August 30, 2023
Re: Coordination with Businesses – Stop n Shop

In attendance:

Jeff Morgan – Property Manager
Jessica Phillips – Third Party Property Manager
Jonathan Stevens – Director, Planning and Community Development
Glenn Modica – Town Planner
Craig Pereira – Horsley Witten Group (HW), Project Manager

Craig Pereira conducted an interview with representatives from Stop n Shop regarding flooding impacts to the property to better understand potential coordination opportunities for increased resilience through the Cumberland Hazard Mitigation Plan Update process. The following items were discussed:

1. Property is located primarily in the 100-year flood zone with several areas in the 500-year flood zone (center of parking lot) on Mendon Road in the southern part of town.



2. Site has been impacted by flooding to the southwest corner of the building (loading dock/retail building) requiring sand bags with damage to electrical/utilities.
3. Property has Di Prete Engineering as consultant for improvements.
4. Craig requested copies of the following:
 - a. SOPs
 - b. Business Continuity Plans/Emergency Response Plans
 - c. Damage assessments from previous events
5. Representatives to discuss if there may be a project for consideration partnering with the Town.

Memorandum of Meeting

To: Jonathan Stevens/Cumberland LHMC
From: Craig Pereira
Date: August 30, 2023
Re: Coordination with Businesses – Dean Industries

In attendance:

Brad Dean – Dean Industries
Craig Pereira – Horsley Witten Group (HW), Project Manager

Craig Pereira conducted an interview with representatives from Dean Industries regarding flooding impacts to the property to better understand potential coordination opportunities for increased resilience through the Cumberland Hazard Mitigation Plan Update process. The following items were discussed:

1. Business has two locations in Cumberland:
 - o Martin Street: Located primarily in 100-year flood zone.



2. Site has been impacted by two previous flooding events (not significantly). Centralized catch basin for area businesses directs flow to the river, via a pump to keep water out of parking lot. Backflow preventors used to keep water from backing up into site from the Blackstone River.
3. Existing berm (Narragansett Bay sewer line easement) along the Blackstone River prevents majority of river flooding entering the site. Without the berm, would be inundated significantly.
4. Craig asked if any of the following exists (none):
 - a. SOPs
 - b. Business Continuity Plans/Emergency Response Plans
 - c. Damage assessments from previous events
5. Representative indicated there aren't any potential projects on the horizon at the moment to consider.
6. Business has two locations in Cumberland:
 - o Industrial Road: Located outside any flood zone designation.
7. Representative was unaware of Town project (RI Infrastructure Bank MFP \$500,000 grant to remediate significant drainage issues impacting businesses and access.



Memorandum of Meeting

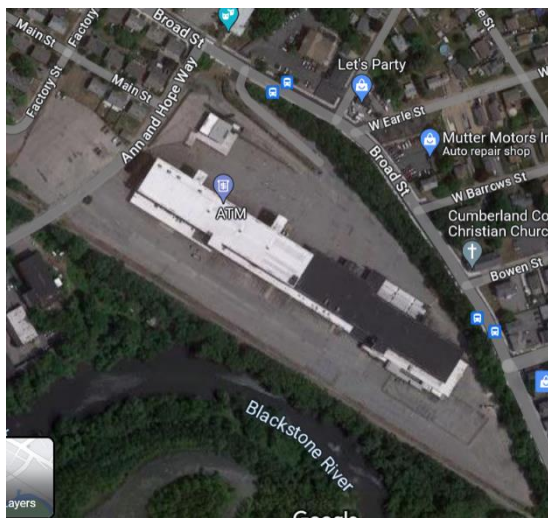
To: Jonathan Stevens/Cumberland LHMC
From: Craig Pereira
Date: October 12, 2023
Re: Coordination with Businesses – Ann & Hope Mill Redevelopment Project

In attendance:

Lou Marandola – Developer (Premier Land Development)
Craig Pereira – Horsley Witten Group (HW), Project Manager

Craig Pereira conducted an interview with representatives from Premier Land Development regarding the ongoing Ann & Hope Mill Redevelopment project on Broad Street regarding recent flooding impacts to the property to better understand potential coordination opportunities for increased resilience through the Cumberland Hazard Mitigation Plan Update process. The following items were discussed:

1. Property is not located within any FEMA flood zone, along Broad Street in the southern part of town.

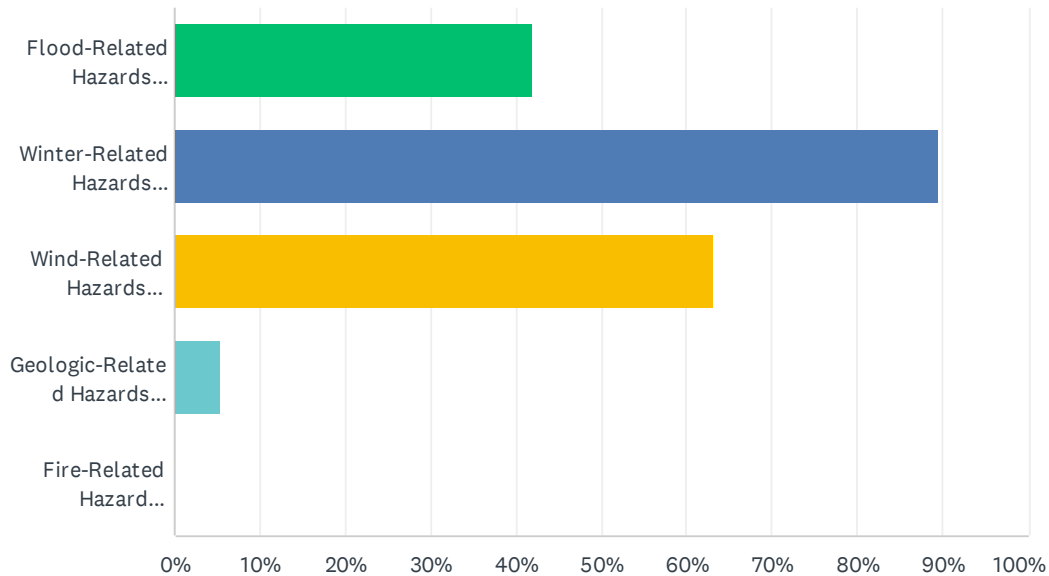


2. September 11, 2023 heavy precipitation event resulted in significant drainage (runoff and scour) damages to the site's access/entrance coupled with flood damage to the building and parking lot. At this time, it is understood that the existing drainage infrastructure along the Broad Street corridor and adjacent to the site is inadequate. The Developer is currently working with RIDOT to evaluate the cause(s).
3. Representatives to discuss if there may be a project for consideration partnering with the Town.

On-Line Survey

Q1 Which of the following hazard events have you or has anyone in your household and/or business experienced in the past 20 years within the Town of Cumberland? (Check all that apply)

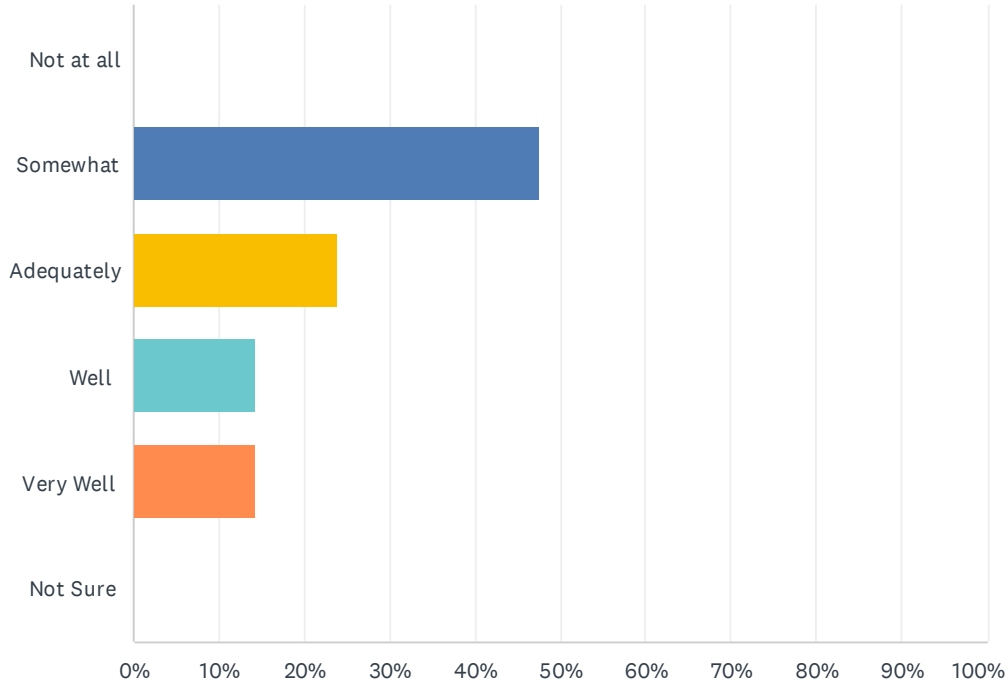
Answered: 19 Skipped: 2



ANSWER CHOICES	RESPONSES	
Flood-Related Hazards (Riverine/Flash Flooding, Inland/Urban Flooding)	42.11%	8
Winter-Related Hazards (Blizzards, Heavy Snow)	89.47%	17
Wind-Related Hazards (Tornadoes, High Winds, Hurricanes, Lightning/Thunderstorms, Hail)	63.16%	12
Geologic-Related Hazards (Earthquakes)	5.26%	1
Fire-Related Hazard (Wildfire)	0.00%	0
Total Respondents: 19		

Q2 In your opinion, how prepared is your household and/or business to deal with a natural hazard event?

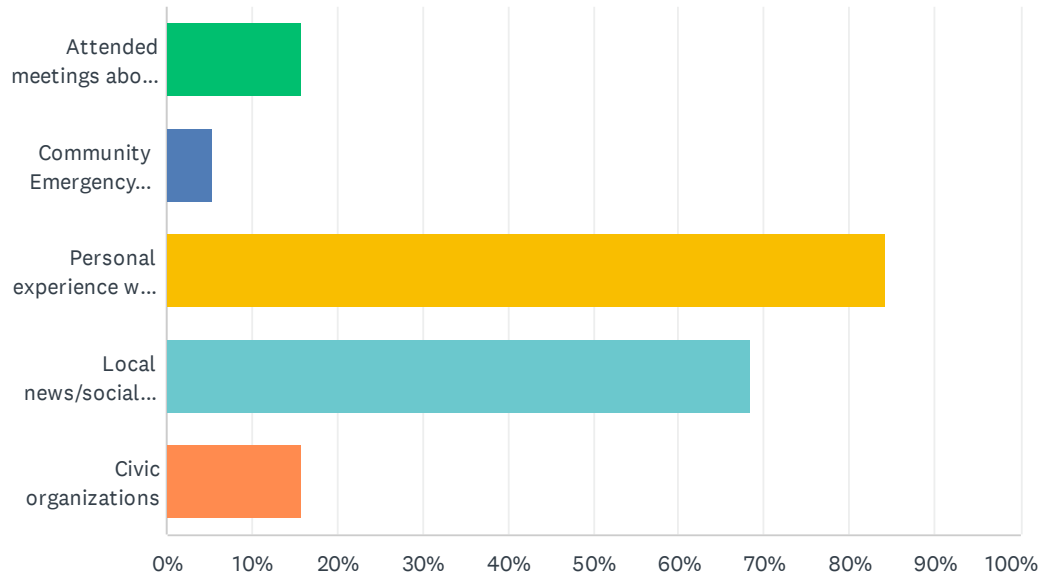
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Not at all	0.00%	0
Somewhat	47.62%	10
Adequately	23.81%	5
Well	14.29%	3
Very Well	14.29%	3
Not Sure	0.00%	0
TOTAL		21

Q3 Which of the following steps has provided you with useful information to help you prepare for a hazard event? (Check all that apply)

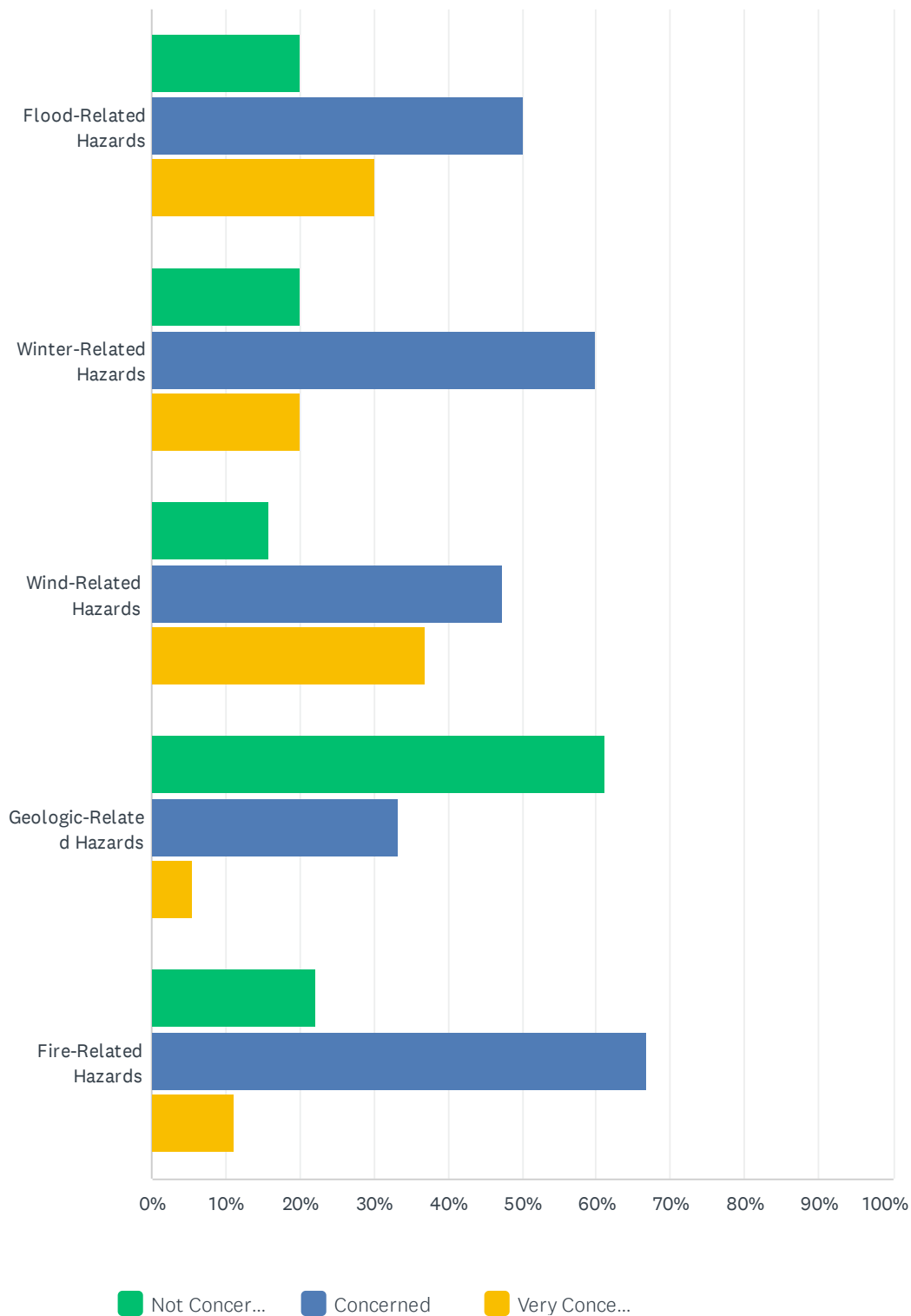
Answered: 19 Skipped: 2



ANSWER CHOICES	RESPONSES	
Attended meetings about disaster preparedness	15.79%	3
Community Emergency Response Training (CERT)	5.26%	1
Personal experience with one or more natural hazards/disasters	84.21%	16
Local news/social media	68.42%	13
Civic organizations	15.79%	3
Total Respondents: 19		

Q4 How concerned are you about the following hazards in the Town of Cumberland? (Check one response for each hazard)

Answered: 20 Skipped: 1

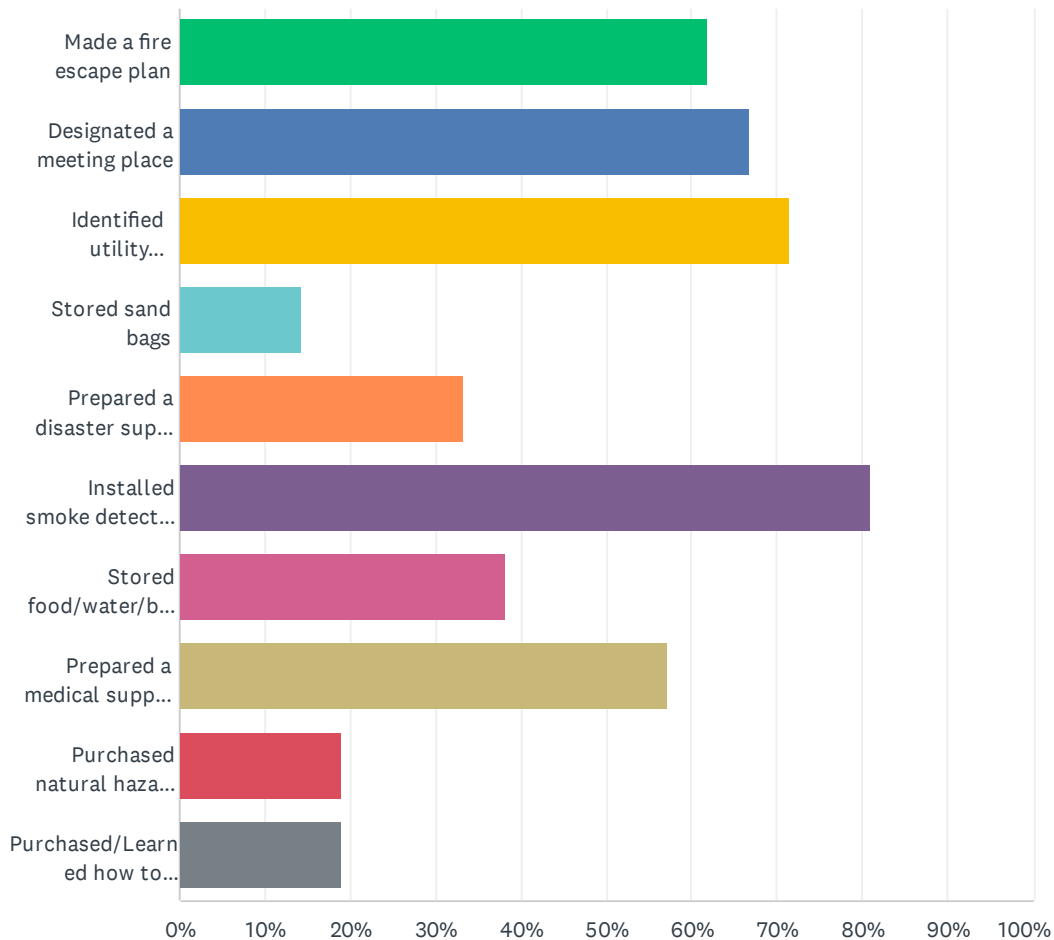


Town of Cumberland, RI Hazard Mitigation Plan Update

	NOT CONCERNED	CONCERNED	VERY CONCERNED	TOTAL
Flood-Related Hazards	20.00% 4	50.00% 10	30.00% 6	20
Winter-Related Hazards	20.00% 4	60.00% 12	20.00% 4	20
Wind-Related Hazards	15.79% 3	47.37% 9	36.84% 7	19
Geologic-Related Hazards	61.11% 11	33.33% 6	5.56% 1	18
Fire-Related Hazards	22.22% 4	66.67% 12	11.11% 2	18

Q5 Which of the following steps has your household and/or business taken to prepare for a hazard event? (Check all that apply)

Answered: 21 Skipped: 0

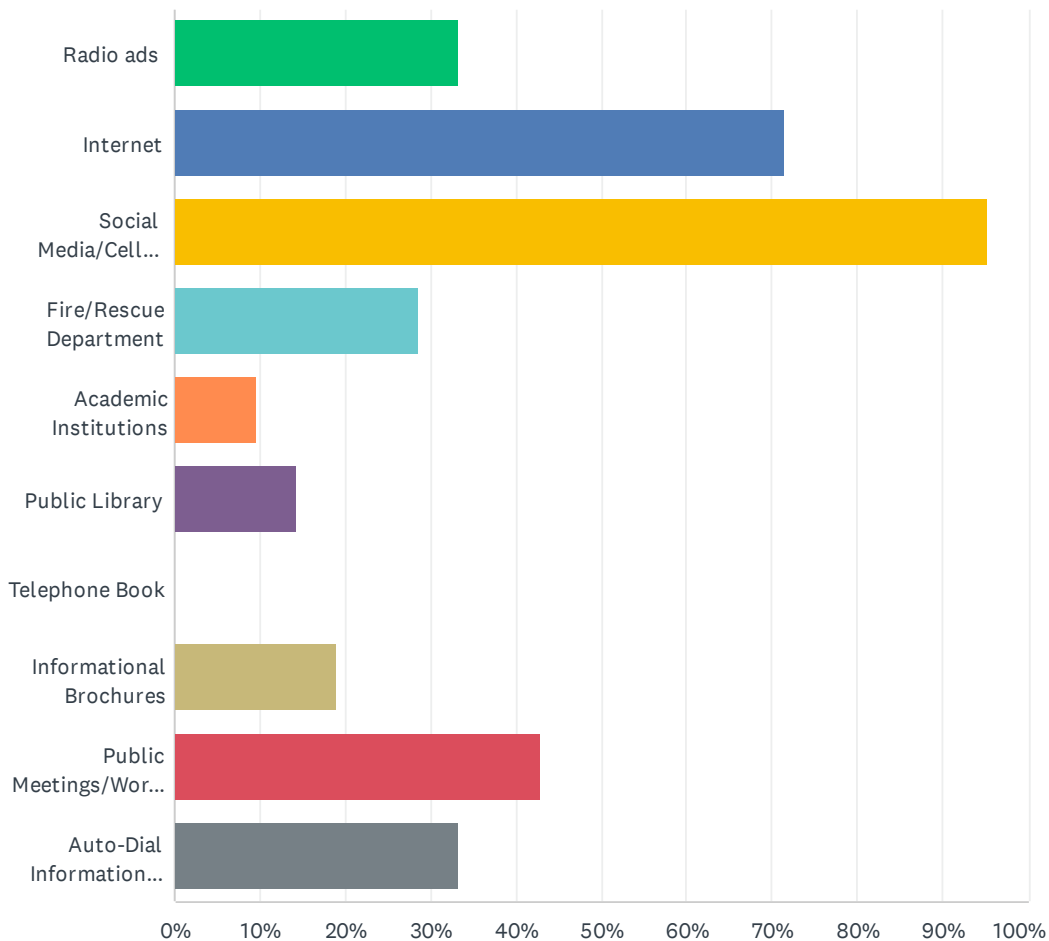


Town of Cumberland, RI Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Made a fire escape plan	61.90%	13
Designated a meeting place	66.67%	14
Identified utility shut-offs	71.43%	15
Stored sand bags	14.29%	3
Prepared a disaster supply kit	33.33%	7
Installed smoke detectors on each level of the house/business	80.95%	17
Stored food/water/batteries	38.10%	8
Prepared a medical supply kit	57.14%	12
Purchased natural hazard insurance	19.05%	4
Purchased/Learned how to program a NOAA Weather Radio	19.05%	4
Total Respondents: 21		

Q6 In your opinion, which of the following methods do you think are most effective for providing hazard and disaster information? (Check all that apply)

Answered: 21 Skipped: 0

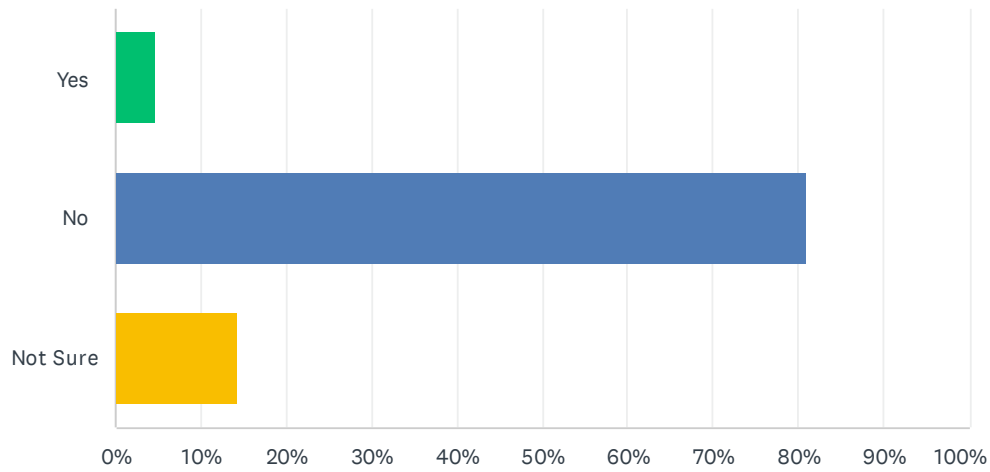


Town of Cumberland, RI Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Radio ads	33.33%	7
Internet	71.43%	15
Social Media/Cell phone apps.	95.24%	20
Fire/Rescue Department	28.57%	6
Academic Institutions	9.52%	2
Public Library	14.29%	3
Telephone Book	0.00%	0
Informational Brochures	19.05%	4
Public Meetings/Workshops	42.86%	9
Auto-Dial Information (Code Ready or similar)	33.33%	7
Total Respondents: 21		

Q7 Is your property located in or near a FEMA designated floodplain?

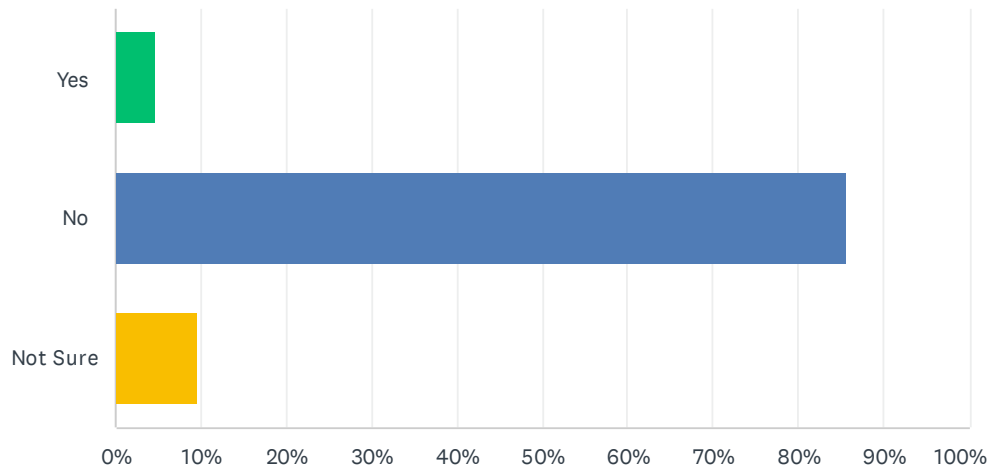
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	4.76%	1
No	80.95%	17
Not Sure	14.29%	3
TOTAL		21

Q8 Do you have flood insurance?

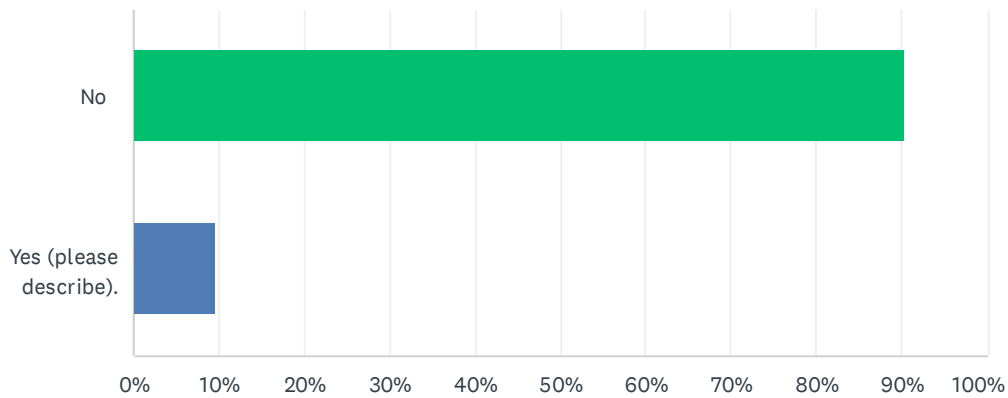
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	4.76%	1
No	85.71%	18
Not Sure	9.52%	2
TOTAL		21

Q9 Do you have any special access or functional needs within your household and/or business that would require early warning or specialized response during disasters? If yes, please describe.

Answered: 21 Skipped: 0

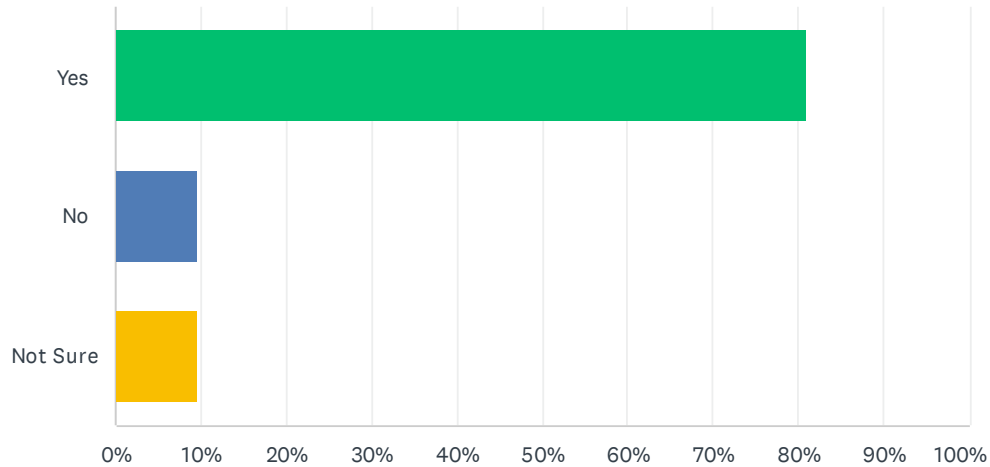


ANSWER CHOICES	RESPONSES	
No	90.48%	19
Yes (please describe).	9.52%	2
TOTAL		21

#	YES (PLEASE DESCRIBE).	DATE
1	Was	4/22/2023 11:52 AM
2	with regards to flooding it would be nice to know what the dam's upstream are doing prior to them doing it.	4/19/2023 10:50 AM

Q10 Are you interested in making your home, business or neighborhood more resistant to hazards?

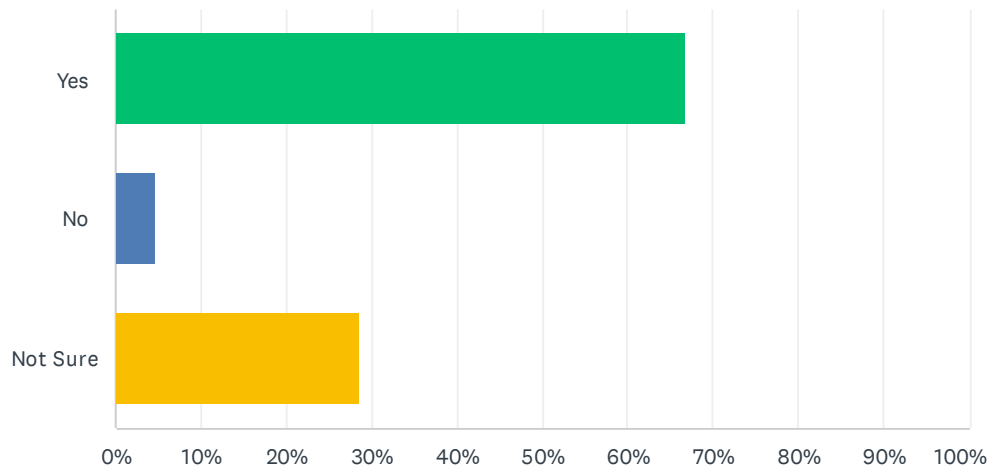
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	80.95%	17
No	9.52%	2
Not Sure	9.52%	2
TOTAL		21

Q11 Would you be willing to spend your own money on your current home and/or business to help protect it from impacts of potential future natural disasters within the community? Examples could include: Elevating a flood-prone home; Elevating utilities in flood-prone basements; Strengthening your roof, siding, doors, or windows to withstand high winds; Removing trees/low branches.

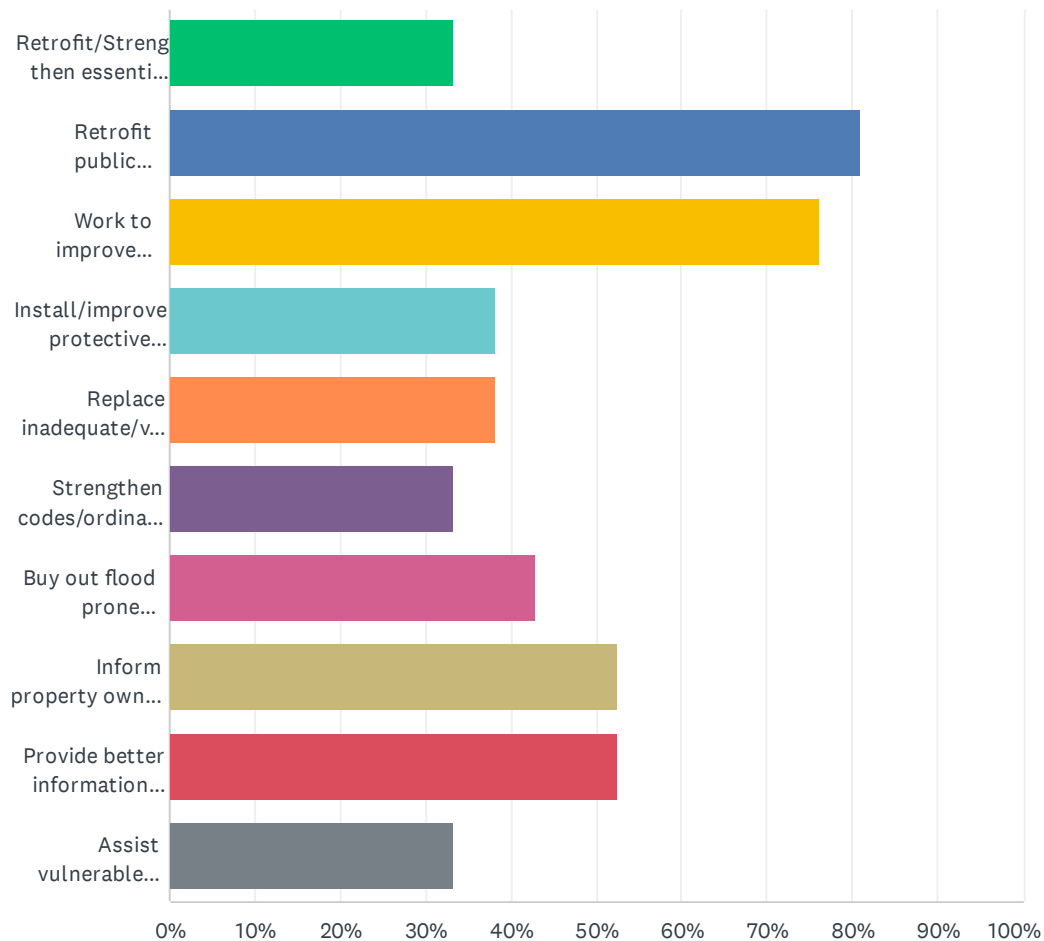
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	66.67%	14
No	4.76%	1
Not Sure	28.57%	6
TOTAL		21

Q12 What types of projects do you believe local, county, state or federal government agencies could be doing to reduce the damage and disruption of natural disasters in Cumberland? (Select your top three choices)

Answered: 21 Skipped: 0

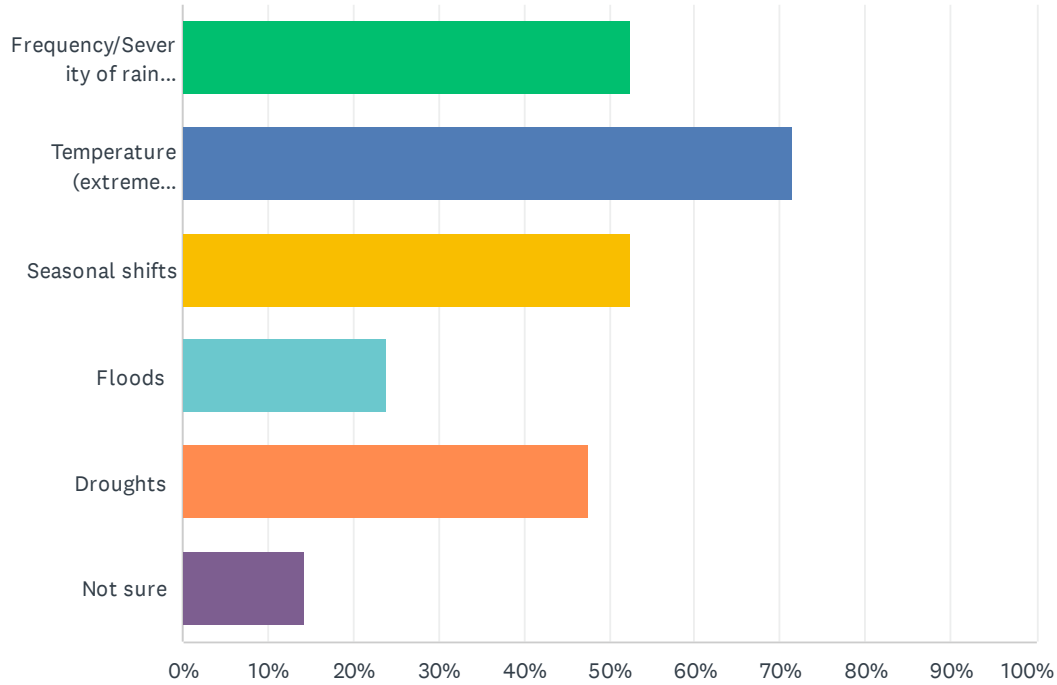


Town of Cumberland, RI Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Retrofit/Strengthen essential public facilities such as police, fire/emergency, schools,	33.33%	7
Retrofit public infrastructure, such as elevating roadways and improving drainage systems	80.95%	17
Work to improve utilities resiliency (electric, communications, water/wastewater facilities)	76.19%	16
Install/improve protective structures (floodwalls)	38.10%	8
Replace inadequate/vulnerable bridges	38.10%	8
Strengthen codes/ordinances to require higher hazard risk management standards and/or provide greater control over development in high hazard areas	33.33%	7
Buy out flood prone properties and maintain as open space	42.86%	9
Inform property owners of ways they can reduce the damage caused by natural events	52.38%	11
Provide better information about hazard risks and high hazard areas	52.38%	11
Assist vulnerable property owners with securing funding to make their properties more resilient	33.33%	7
Total Respondents: 21		

Q13 Have you noticed particular changes in the environment in the past 10 years?

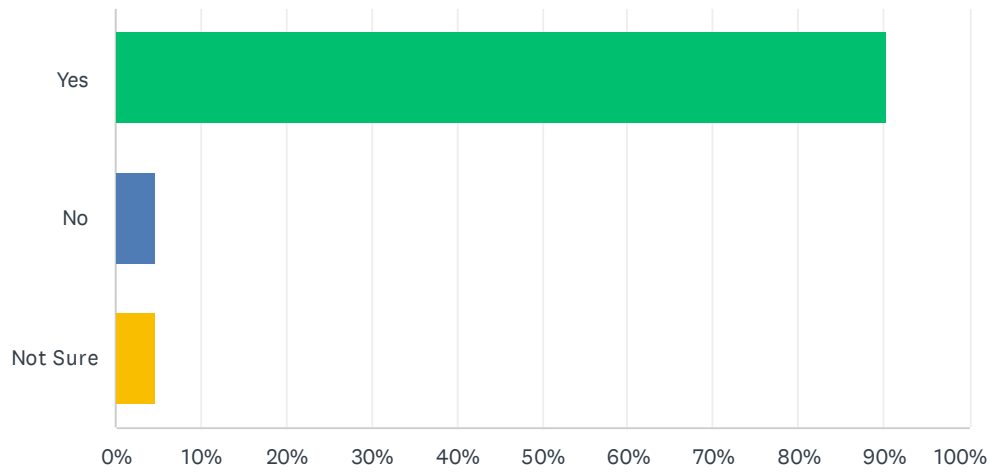
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Frequency/Severity of rain events	52.38%	11
Temperature (extreme heat/extreme cold)	71.43%	15
Seasonal shifts	52.38%	11
Floods	23.81%	5
Droughts	47.62%	10
Not sure	14.29%	3
Total Respondents: 21		

Q14 Do you follow climate change related activities, news, and policy?

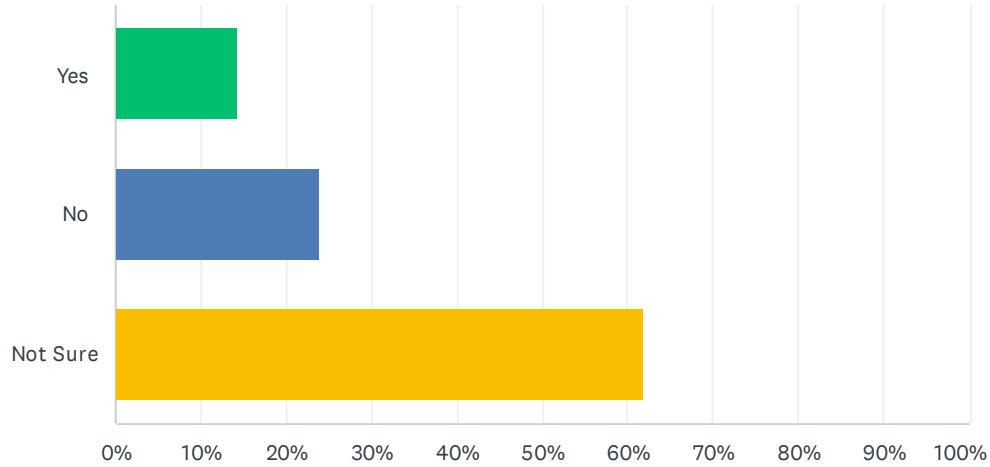
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	90.48%	19
No	4.76%	1
Not Sure	4.76%	1
TOTAL		21

Q15 In your opinion, has the Town done enough to prepare for the projected impacts of climate change?

Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	14.29%	3
No	23.81%	5
Not Sure	61.90%	13
TOTAL		21

Q16 Additional comments?

Answered: 4 Skipped: 17

#	RESPONSES	DATE
1	"If it's predictable, it's preventable"	6/16/2023 12:55 PM
2	Tree blight - causing soil erosion risk, falling trees on people and traffic	6/14/2023 6:40 AM
3	Flooding seems to be happening more often and drainage/protective actions need more attention.	4/22/2023 11:52 AM
4	Increasing awareness is the first necessary step - then responsible property-owners will take steps to protect their structures and family.	4/6/2023 10:16 AM

Appendix C – Correspondences

Availability of Draft Plan – Adjacent Communities

Availability of Draft Plan – Municipal Departments/Boards/Commissions

Public Comments

Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:42 AM
To: cityplanner
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Mr. Ayrassian,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

The comment period runs to November 17, 2023. The draft plan can be accessed at: <https://www.cumberlandri.org/197/Hazard-Mitigation>.

A Public Workshop will be held on November 15, 2023 at 7:30 PM in person at the Cumberland Town Hall, Council Chambers.

Please return any comments directly to me at: cpereira@horsleywitten.com by 5:00 PM by November 17, 2023.

Regards,
Craig

Craig Pereira, CFM | Senior Planner
Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:32 AM
To: Jim Vandermillen
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Mr. Vandermillen,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Regards,
Craig

Craig Pereira, CFM | Senior Planner
Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:36 AM
To: jberry@lincolnri.org
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Mr. Berry,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Regards,
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Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:41 AM
To: ghilario@nattleboro.com
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Mr. Hilario,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Craig

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Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:34 AM
To: bpolicastro@pawtucketri.com
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Ms. Policastro,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Regards,
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Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:40 AM
To: cyarworth@plainville.ma.us
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Chris,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Regards,
Craig

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Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:30 AM
To: mdebrousse@woonsocketri.org
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Mr. Debrousse,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Regards,
Craig

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Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Craig Pereira
Sent: Monday, November 6, 2023 9:37 AM
To: planning@wrentham.gov
Cc: Jonathan Stevens; Craig Pereira
Subject: Notice of Availability - Draft Cumberland Hazard Mitigation Plan Update 2023

Good Morning Ms. Benson,

I'm reaching out to inform you that the draft Town of Cumberland Hazard Mitigation Plan Update 2023 is now available for public comment. FEMA requires that abutting/adjacent communities have the opportunity to provide comment/feedback on the draft plan.

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Regards,
Craig

Craig Pereira, CFM | Senior Planner
Horsley Witten Group
1 Turks Head Place | Suite 300
Providence, RI 02903
Office: 401-272-1717
Direct: 774-413-2900 x 308



Craig Pereira

From: Emily O'Neill <eoneill@cumberlandri.org>
Sent: Monday, November 6, 2023 9:35 AM
To: Joe Luca; Kevin Grady; Lindsey Corse; Susan Evers; Michael Boday; George Gettinger
Cc: Craig Pereira
Subject: Hazard Mitigation Update Draft - Available for comment

Hello all,

As you may know, the Town has hired a consultant to update our Hazard Mitigation Plan.

Currently, a draft of the updated plan is available on our webpage for comment starting Monday, November 6, 2023 through Friday, November 15, 2023. You can go to <https://www.cumberlandri.org/197/Hazard-Mitigation> and click on the DRAFT CUMBERLAND HAZARD MITIGATION PLAN UPDATE 2023 tab to expand it and access the draft plan.

Thanks,

Emily O'Neill
Planning Clerk
Town of Cumberland
(401) 728-2400 ext. 140

Craig Pereira

From: Emily O'Neill <eoneill@cumberlandri.org>
Sent: Monday, November 6, 2023 9:31 AM
To: christopherbutler7536@gmail.com; dcou2@cox.net; Greg Scown; hmmac46@gmail.com; isreis866@gmail.com; kenbush1953@gmail.com; Maria Vracic; poto1@cox.net; lepaysage24@gmail.com
Cc: Craig Pereira
Subject: Hazard Mitigation Update Draft - Available for comment

Hello all,

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Thanks,

Emily O'Neill
Planning Clerk
Town of Cumberland
(401) 728-2400 ext. 140

From: Sandra Giovanelli

Sent: Monday, November 6, 2023 9:49 AM

To: Michael Kinch <mlkinch48@cox.net>; Michael Kinch <mkinch@cumberlandri.org>; James K. Metivier <jmetivier@cumberlandri.org>; Timothy C. Magill Jr. <tmagill@cumberlandri.org>; Lisa Beaulieu <lbeaulieu@cumberlandri.org>; Scott Schmitt (srschmitt1@aol.com) <srschmitt1@aol.com>; Robert Shaw <rshaw@cumberlandri.org>; Peter Bradley <pbradley@cumberlandri.org>

Cc: Jane Christopher <jchristopher@cumberlandri.org>

Subject: FW: Cumberland Council

Good morning,

The Draft Cumberland Hazard Mitigation Plan Update 2023 document is available for download via the 'Send this File' link provided below.

If you have any questions, please contact Jonathan Stevens.

Click the following link to download your file(s).

[Click to Retrieve File\(s\)](#)

DRAFT Cumberland Hazard Mitigation Plan Update 2023.pdf

If the above link is not clickable, copy and paste the following URL into your browser.

<https://www.sendthisfile.com/gywrmjScrLNBPGG6BnC6L7KZ>

Note: These files will expire in 14 days from the time this email was generated.

Sandra M. Giovanelli
Cumberland Town Clerk
45 Broad Street, Cumberland, RI
401-475-9010, 401-724-1103 (fax)
sgiovanelli@cumberlandri.org



Craig Pereira

From: Emily O'Neill <eoneill@cumberlandri.org>
Sent: Monday, November 6, 2023 9:38 AM
To: Arthur Schacht; Daniel Pedro; Gary Pelissier; Joeseeph Santoro; Joyce Hindle Koutsogiane; Kathleen McKenzie; killoughglenn@hotmail.com
Cc: Craig Pereira
Subject: Hazard Mitigation Update Draft - Available for comment

Hello all,

As you may know, the Town has hired a consultant to update our Hazard Mitigation Plan. I've been asked to distribute the following information to all municipal Boards/Commissions.

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Thanks,

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