



Natural Hazard Mitigation Plan Update 2023

City Council Committee
December 5, 2023



**CITY OF
CAMBRIDGE**



AGENDA



Overview of Natural Hazard Mitigation Plan Development



2023 NHMP Contents Review



Next Steps after Council



Discussion



CITY'S PREVIOUS HMP

The work undertaken serves as an update to the previous Hazard Mitigation Plan



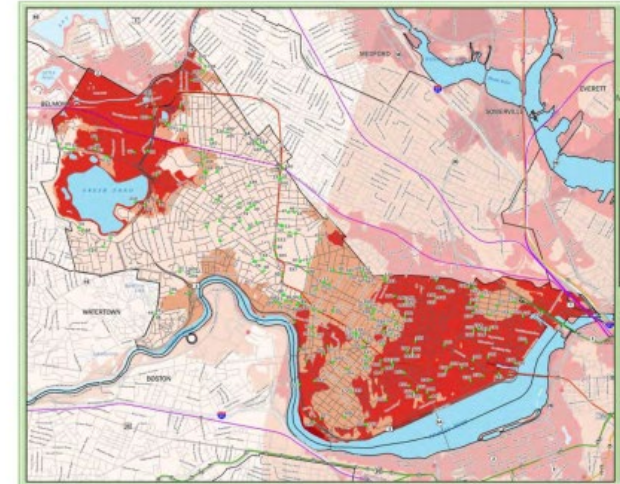
**CITY OF CAMBRIDGE
HAZARD MITIGATION PLAN 2015 UPDATE**
Prepared by MAPC

Adopted: 3/21/2016

Approved: 5/24/2016

24 Mitigation Actions for 2016-2021

**CITY OF CAMBRIDGE
HAZARD MITIGATION PLAN 2015 UPDATE**



Metropolitan Area Planning Council

Final Plan

Approved by FEMA

May 24, 2016

FEMA & MEMA REQUIREMENTS



“The Disaster Mitigation Act of 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (44 CFR Part 201), creating the framework for state, local, tribal and territorial governments to engage in hazard mitigation planning to receive certain types of non-emergency disaster assistance.”

FEMA updated *Local Mitigation Planning Policies and Guidance* (released April 2022, effective April 2023)

FEMA updated *Location Mitigation Planning Handbook* (May 2023)

2022 Updates Include:

- ✓ Expanded list of participants required in planning process.
- ✓ Requires consideration of climate change.
- ✓ Recognizes the important role of adopting and enforcing building, land use, and development code.
- ✓ Facilitates stronger alignment with other FEMA mitigation programs.

VALUE OF HAZARD MITIGATION PLANNING



Health & safety



Grant eligibility



Equitable outcomes



Preparedness
planning



Building consensus



EVERY \$1 SPENT ON MITIGATION



SAVES \$6 ON DISASTER RECOVERY



2023 CAMBRIDGE NHMP DEVELOPMENT



| Task | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 Project Initiation | | | | | | | | | | |
| 2 Engagement | | | | | | | | | | |
| 3 Hazard Profiles | | | | | | | | | | |
| 4 Facility/Asset Inventory | | | | | | | | | | |
| 5 Vulnerability Assessment | | | | | | | | | | |
| 6 Mitigation Goals & Capabilities | | | | | | | | | | |
| 7 Develop Actions | | | | | | | | | | |
| 8 Plan Implementation | | | | | | | | | | |
| 9 Public Review | | | | | | | | | | |
| 10 Adoption | | | | | | | | | | |
| Meetings | | | | | | | | | | |

Legend:

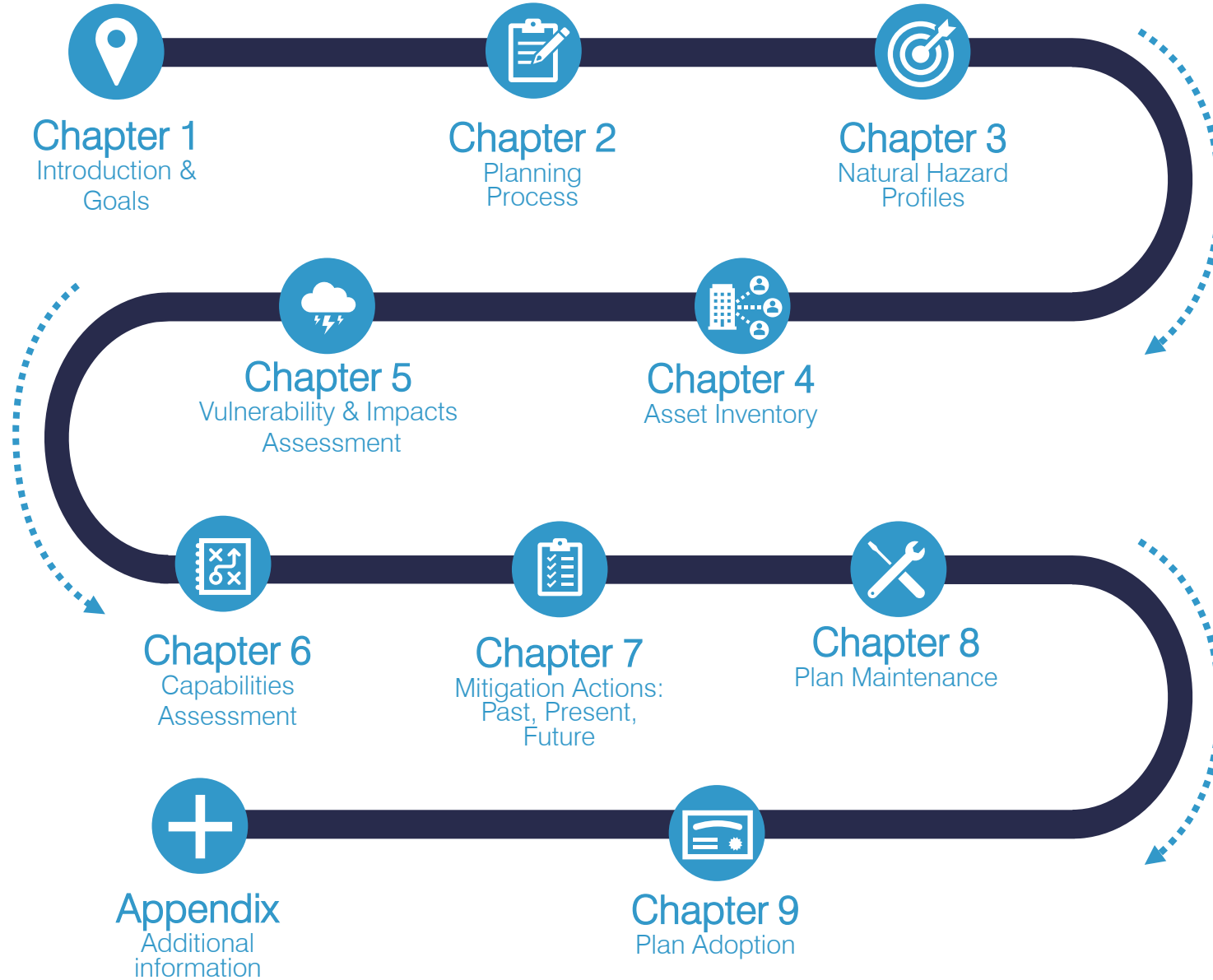
K Kickoff Meeting

P Public Meeting

S STC Meeting

H HMPT Workshop

2023 CAMBRIDGE NHMP OVERVIEW



CH 1: INTRODUCTION & GOALS



MITIGATION GOALS:



CH 2: PLANNING PROCESS



City Staff



Steering Committee

19 key City staff

who guides the planning process and endorse draft Goals

**6 Monthly Meetings
& 3 Workshops**

Stakeholders



Hazard Mitigation Planning Team (HMPT)

90 stakeholders

including advocates, residents, business-owners, state and local agency representatives, and people from various other organizations.

3 Workshops

Public



Public Engagement

Everyone

Results from public meetings and other feedback are integrated into the final report.

**3 Public Meetings
150+ Survey Responses
9 Survey Responses on
Mitigation Actions**

CH 3: NATURAL HAZARD PROFILES



HURRICANES
/ TROPICAL
STORMS



INLAND
FLOODING



EXTREME
TEMPERATURES



SEVERE WINTER
WEATHER /
NOR'EASTERS



COASTAL
FLOODING



TSUNAMI



DROUGHT



WILDFIRE



EARTHQUAKES



TORNADOES



LANDSLIDES



INVASIVE
SPECIES



WHAT WE'VE HEARD FROM THE PUBLIC...

Summary of Public Survey Results

Most concerning natural hazards

1. Flooding
2. Extreme heat
3. Winter Storms / Nor'easters

Most concerning impact of natural hazards

1. Power outages (>75%)
2. Damage to the home (72%)
3. Contaminated drinking water (69%)
4. Limited access to food or supplies (>50%)

CH 4: ASSET INVENTORY

Examples of assets in FEMA categories

Critical Facilities:

- Facilities within Cambridge to which Eversource prioritizes providing electrical power.

People / Community:

- Populations, shelters, housing, schools, and food distribution

Structures:

- Faith community buildings, grocery stores, medical facilities, transportation infrastructure, schools, and Fresh Pond Water Treatment Plant

Systems:

- Power grid, cell towers, transit routes, MWRA facilities, and water/sewer system

Resources:

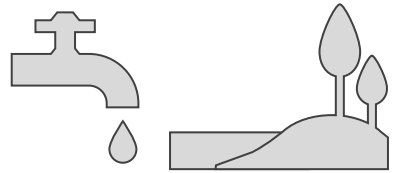
- Parks, open spaces, community gardens, and arts and cultural facilities

Activities:

- Festivals, events, community-building activities that strengthen social capital and resilience



CH 5: VULNERABILITY & IMPACT ASSESSMENT



Drinking water at
Fresh Pond...

ASSET

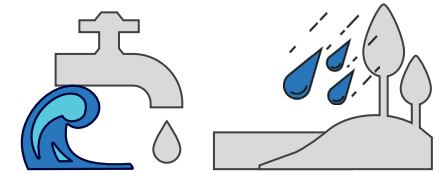
...is vulnerable to...



...saltwater intrusion
from coastal flood
events...

HAZARD

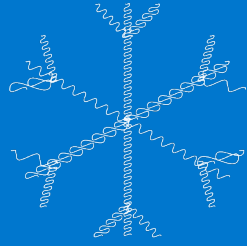
...resulting in...



...detrimental impacts to
ecosystem and drinking
water quality.

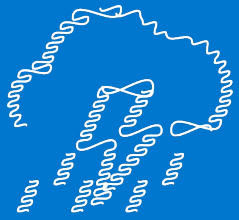
IMPACT

WHAT WE'VE HEARD FROM THE PUBLIC...



Major blizzards have disrupted daily life and work, with power outages, mountains of snow to shovel, digging out the car, difficulty navigating on foot due to relentless ice that's never fully addressed by community.

- Survey Respondent



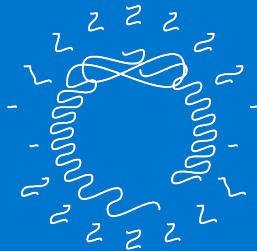
My basement has flooded twice when we had storms that dumped 7-8 inches in 48 hours.

- Survey Respondent



Recent wildfire smoke affected my health

- Survey Respondent



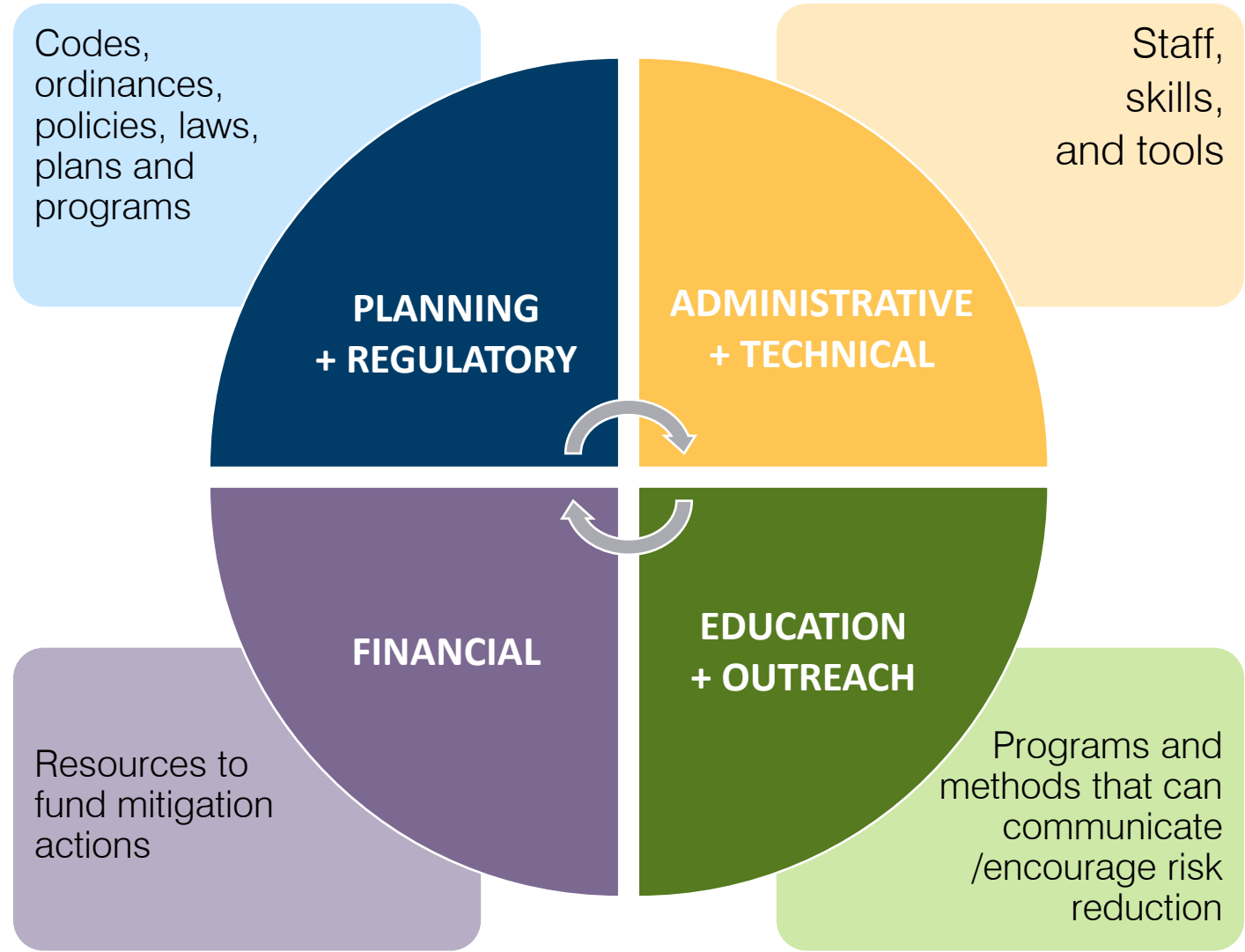
Extremes of heat and cold or heavy snow make it difficult and unpleasant for me to get around. I don't have a car, and I still have to walk to or from the bus stop or T station and wait for the bus in bad weather conditions.

-Survey Respondent

CH 6: CAPABILITIES ASSESSMENT



The City of Cambridge has a unique set of capabilities, in the form of laws, policies, programs, staff, funding and other resources, to carry out the HMP and increase resilience.

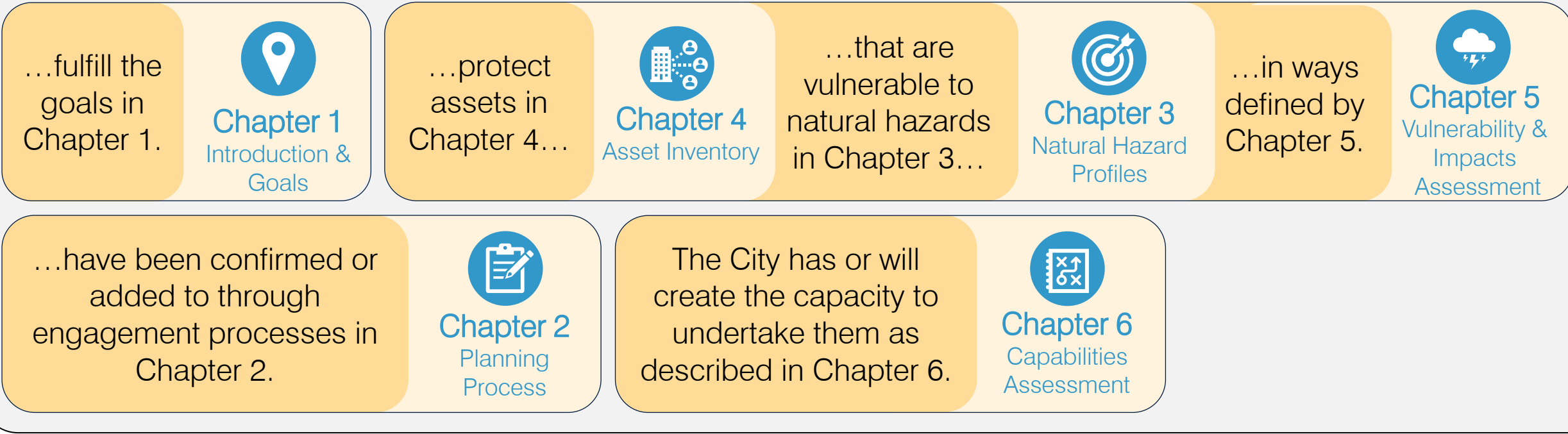


CH 7: MITIGATION ACTIONS



Mitigation Actions are what the whole plan has been building up to.

Mitigation Actions....



A mitigation action is a measure, project, plan, or activity proposed to reduce current and future vulnerabilities.


These actions will create resilience for the City of Cambridge (ability to withstand and swiftly recover from an extreme event). These actions will support adaptation to climate change.

CH 7: PRIORITIZATION CRITERIA



Does this action contribute to **regional resilience**? 

Is the action **part of other city plans**? 

Does the action **positively impact residents** of Low to Moderate Income (LMI) or Environmental Justice (EJ) census block groups (based on EEA's viewer)? 

Is this action a **nature-based solution**? 

Would the action **mitigate economic loss/damage**? 

Will the action **reduce risk to life/safety**? 

Does the action **address future climate change projections**? 

Does the action **leverage innovation/technology**? 

CH 7: MITIGATION ACTIONS



| # | Action | Timeframe to Start | Hazards | Enhances Inclusion and Equity / Co-Benefits | Priority | Cost |
|---|---|---|--|--|----------|--|
| | | In Progress Less than 1 year 1-2 years 2-5 years | | Positive Impact on Priority Populations Positive Impact on Renters Positive Impact on Students Enhances Community Education Equitable Implementation | | High = \$1M Medium = Over \$100k up to \$1M Low = Up to \$100k |
| 1 | Improve collection and conveyance system in the Port Neighborhood. | In progress | Precipitation Flooding | Equitable Implementation | High | High |
| 2 | Design and construct updates to metering stations for Combined Sewers | In progress | Precipitation Flooding | | Medium | Medium |
| 3 | Identify areas for green stormwater infrastructure and reducing impervious surfaces | In progress | Precipitation Flooding | | High | Medium |
| 4 | Undertake interventions as a regional collaboration at Charles River and Amelia Earhart Dam to reduce overtopping/flanking | In progress | Coastal Flooding | Positive Impact on Priority Populations | High | High |
| 5 | Upgrade deicing / snow removal equipment, including smaller equipment that is able to accommodate bicycle facilities and pedestrian paths | In progress | Winter Storms | Positive impact on students, positive impact on Priority Populations | High | Medium |
| 6 | Complete study to evaluate shade needs (other than trees) referred to as "The Shade Study", and implement recommendations (e.g., adding shade structures) | In progress | Extreme Heat | Positive impact on Priority Populations, Equitable implementation | High | Low |
| 7 | Install water fountains and cooling features locations along bus/bike routes | In progress | Extreme Heat | Positive Impact on Priority Populations Positive Impact on Students | High | Medium |
| 8 | Update and Improve Floodplain Mapping (Cambridge Flood Viewer) | In progress | Precipitation Flooding, Coastal Flooding | Enhances Community Education, Equitable Implementation | High | Low |
| 9 | Encourage energy efficiency in buildings through zoning requirements and community engagement and support | In progress | Extreme Heat, Extreme Cold | Positive impact on renters | Low | Low |

CH 7: MITIGATION ACTIONS



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| 10 | Identify recommendations for municipal facility improvements for resiliency, including an updated flood duration study using MC-FRM | In progress | Extreme Heat, Precipitation Flooding, Coastal Flooding | | Medium | Low |
| 11 | Implement actions of Cambridge Urban Forest Master Plan | In progress | Extreme Heat, Precipitation Flooding, Drought | Positive impact on Priority Populations | High | Low |
| 12 | Continue to engage with the Charles River Climate Compact and Mystic River Watershed Association on regional collaboration | In progress | Precipitation Flooding, Coastal Flooding, Extreme Heat | | Medium | Low |
| 13 | Prioritize clean energy solutions for power such as solar, battery, geothermal, etc. where feasible | In progress | All | | Low | Low |
| 14 | Begin to develop a central emergency response plan and centralize emergency response within the city | Less than 1 year | All | Positive Impact on Priority Populations, Equitable implementation | Medium | Low |
| 15 | Coordinate with the MBTA their efforts to protect critical regional transit infrastructure in Cambridge | Less than 1 year | All | | High | Low |
| 16 | Collaborate with energy providers to protect critical community infrastructure | Less than 1 year | All | Positive impact on Priority Populations, equitable implementation | High | Medium |

CH 7: MITIGATION ACTIONS



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| 17 | Extend swimming pool operational hours and season | 1-2 years | Extreme Heat | Positive impact on Priority Populations, Equitable implementation | Low | Low |
| 18 | Perform a study to evaluate the replacement of manually operated components with remote operated components, including the evaluation of cybersecurity vulnerability of the public water supply system | 1-2 years | Loss of Water Supply | | Medium | High |
| 19 | Conduct maintenance activities to monitor and reduce brushfire risks | 1-2 years | Brushfire | | Low | Low |
| 20 | Update the climate change vulnerability assessment to include up-to-date climate information | 1-2 years | Extreme Heat, Precipitation Flooding, Coastal Flooding | | Medium | Low |
| 21 | Integrate resiliency strategies and considerations into implementation of open space projects. | 1-2 years | Extreme Heat, Precipitation Flooding, Drought | Positive impact on Priority Populations | Medium | Low |
| 22 | Develop an operations plan for DPW and Police on how to respond to flooding in the roadway | 1-2 years | Precipitation Flooding, Coastal Flooding | Equitable implementation | Medium | Low |
| 23 | Succession planning should be integrated into the City's Continuity of Operations Plan (COOP) and revisited on a yearly basis by June 30 of every year and updated to reflect staff changes and required trainings for staff identified as part of the planning process | 1-2 years | All | | Medium | Low |

CH 7: MITIGATION ACTIONS



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| 24 | Develop an emergency community support reference guide which provides a list of health services which are operational during extreme events for community reference(i.e. dialysis centers) | 1-2 years | All | Enhances community education | Low | Low |
| 25 | Collaborate with Cambridge public housing authority and community centers to identify community rooms to use as cooling centers and shelters during storms | 1-2 years | All | Positive impact on Priority Populations, Positive impact on renters, Equitable implementation | Low | Low |
| 26 | Coordinating with adjacent communities for hazard preparation and response | 1-2 years | All | | Medium | Low |
| 27 | Create an emergency response higher education and city collaboration plan | 1-2 years | All | Positive impact on Priority Populations, Positive impact on students, equitable implementation | Low | Low |
| 28 | Conduct study to identify how to engage with the disability community during an emergency. | 1-2 years | All | Positive Impact on Priority Populations, Enhances Community Education | Low | Low |
| 29 | Develop an annual media campaign about signing up for code red notifications | 1-2 years | All | Enhances Community Education, Equitable implementation | Medium | Low |
| 30 | Provide a central location on the City's website to provide up-to-date notification and items such as extreme weather, air quality alerts, etc. | 1-2 years | All | Enhances Community Education | Medium | Low |

CH 7: MITIGATION ACTIONS



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| 31 | Purchase emergency radios for critical staff to utilize when an emergency event is expected where power and cell phone service may be compromised. Develop a plan for distribution and use. | 1-2 years | All | | Medium | Medium |
| 32 | Each department shall ensure identified staff have been trained in ICS and NIMS and continuing education and training shall be determined by each department head or training division | 1-2 years | All | | High | Low |
| 33 | Design and construct sewer separation work for the Baldwin neighborhood | 2-5 years | Precipitation Flooding | | Low | Medium |
| 34 | Update and improve the City's HeatViewer with best available information | 2-5 years | Extreme Heat | Enhances Community Education, Equitable Implementation | Medium | Low |
| 35 | Perform a study to identify how to best protect Fresh Pond reservoir from saltwater intrusion | 2-5 years | Coastal Flooding | Equitable Implementation | Low | Low |
| 36 | Prepare an Earthquake Emergency Plan | 2-5 years | Earthquake | Positive Impact on Renters, Positive Impact on Students, Equitable Implementation | Low | Low |
| 37 | Prepare a Pest Vulnerability Matrix using the most recent tree inventory and develop a management options report | 2-5 years | Invasive Species | | Low | Low |

CH 7: MITIGATION ACTIONS



| # | Action | Timeframe to Start | Hazards | Enhances Inclusion and Equity / Co-Benefits | Priority | Cost |
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| 38 | Create a program that offers support to property owners located in the 2070 10% flood area, as determined by the City's flood viewer, to help them make improvements that increase the resiliency of their properties against flooding. | 2-5 years | Precipitation Flooding, Coastal Flooding | Positive impact on Priority Populations, positive impact on renters | Low | Medium |
| 39 | Perform a vulnerability assessment of vaults where hard copy records are kept | 2-5 years | Precipitation Flooding, Coastal Flooding | | Low | Low |
| 40 | Develop flood protection and operations planning for historic and critical facilities. | 2-5 years | Precipitation Flooding, Coastal Flooding, Extreme Heat | | Medium | Low |
| 41 | Develop and update materials to support homeowners in completing retrofits related to flooding & heat (e.g., trainings, & educational materials on funding assistance) | 2-5 years | Extreme Heat, Precipitation Flooding, Coastal Flooding | Positive impact on Priority Populations, Equitable implementation | Low | Low |
| 42 | Evaluate use of Microgrid(s) for critical facilities and implement recommendations | 2-5 years | All | | Medium | Medium |
| 43 | Develop an enhanced communication plan and program related to natural hazards in collaboration with community groups | 2-5 years | All | Positive Impact on Priority Populations, Enhances Community Education, Equitable implementation | Low | Low |

CH 8: PLAN MAINTENANCE



MONITORING THE PLAN

The City will monitor the mitigation actions to ensure that they are going according to plan.



EVALUATING THE PLAN

The City will meet regularly, and after major natural hazard events, to evaluate how well the plan is working.



UPDATING THE PLAN

The City will continue to update the Plan every 5 years.



INTEGRATING THE PLAN

The City will integrate data, information, and actions from the HMP into other City plans and initiatives.



PUBLIC PARTICIPATION THROUGHOUT PLAN MAINTENANCE

The City is committed to conducting equitable and impactful public participation. Public engagement activities will align with the evaluation, monitoring, and plan update meetings as well as with large natural hazard events.

CH 9: PLAN ADOPTION



City of Cambridge

IN CITY COUNCIL
_____, 2023

CITY OF CAMBRIDGE, MASSACHUSETTS
RESOLUTION NO. _____

A RESOLUTION OF THE CITY OF CAMBRIDGE ADOPTING THE 2023 HAZARD MITIGATION PLAN UPDATE

MAYOR SIDDIQUI

WHEREAS the City Council recognizes the threat that natural hazards pose to people and property within the City of Cambridge; and

WHEREAS the City of Cambridge has prepared a multi-hazard mitigation plan, hereby known as the City of Cambridge 2023 Hazard Mitigation Plan Update, in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the City of Cambridge 2023 Hazard Mitigation Plan Update identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Cambridge from the impacts of future hazards and disasters; and

WHEREAS duly-noticed public meetings on the 2023 Hazard Mitigation Plan Update were held by the City on June 13, 2023 and two on September 13, 2023; and

WHEREAS the City Council authorizes Departments to executive their responsibilities demonstrated in the 2023 Hazard Mitigation Plan Update; and

WHEREAS adoption by the City Council demonstrates its commitment to hazard mitigation and achieving the goals outlined in the City of Cambridge 2023 Hazard Mitigation Plan Update; now therefore be it

Resolved: That in accordance with M.G.L. 40 §4 or the charter and ordinances of the City of Cambridge, the City Council adopts the City of Cambridge 2023 Hazard Mitigation Plan Update. While content related to the City of Cambridge may require revisions to meet the plan approval requirements, changes occurring after adoption will not require the City of Cambridge to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

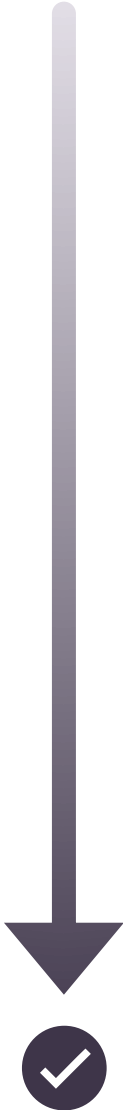
Step 1

City approves NHMP, allowing for potential updates due to MEMA/FEMA Review. Resolution language leaves room for any required NHMP revisions that occur after adoption is approved

Step 2

Submit plan to MEMA following state guidance (issued in Feb. 2023).

NEXT STEPS AFTER SUBMITTAL TO MEMA



Step 1
MEMA provides review and comments, if any (likely some)

Step 2
If comments (likely some), City responds to comments and updates plan, and sends revised documents to MEMA.

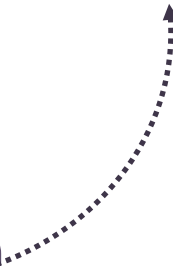
Step 3
MEMA reviews and sends to FEMA

Step 4
If comments, City responds and provides updated final HMP.

Step 5
FEMA confirms and provides final approval.

Address comments from MEMA and restart process

Address comments from FEMA and restart process





Questions or Comments?



**Natural Hazard
Mitigation Plan
Update 2023**
Thank You!



**CITY OF
CAMBRIDGE**

