

Reducing Flood Risk through Local Actions

Western & Central Massachusetts
Engagement Session 1 – October 25, 2023

Greater Boston Inland Massachusetts
Engagement Session 2 – November 2, 2023



Project Management Team

- Executive Office of Economic Development (EOED)
- Executive Office of Energy and Environmental Affairs (EEA)
- Department of Conservation and Recreation (DCR)
 - Flood Hazard Management Program
- Office of Coastal Zone Management (CZM)



Agenda

- Project Overview
- Local Flood Risk Actions
 - Limitations and Restrictions
 - Zoning Bylaws
 - Policies and Procedures
 - Incentives, Exemptions, and Other Tools



Local Floodplain Management Action Guide

Goal: Develop a guide for cities and towns to take impactful local actions to improve floodplain management standards and promote flood-resilient construction.



This project has three main steps:

Review existing floodplain management publications from local, state, federal, and private entities for recommendations for higher standards.

Engage state and local entities to get their recommendations for higher standards.

Develop the guide based on the recommendations.

1. Massachusetts State Building Code

- The Massachusetts State Building Code governs the design of buildings.
- Opportunities that fall into State Building Code improvements will be included in a separate project and presented for feedback, ideas, and suggestions in the future.



2. Considered Climate Change Projections

Western & Central Facts

- 175 Cities and Towns
- 1,904,800 People
- 654,600 Residential Properties

Most Urgent Impacts in Western and Central Regions

- Reduction in state and municipal revenues, including a reduced property tax base due to inland flood risk
- Reduction in the Availability of Affordably Priced Housing from direct damage and the scarcity caused by increased demand

2. Considered Climate Change Projections

Greater Boston Inland Facts

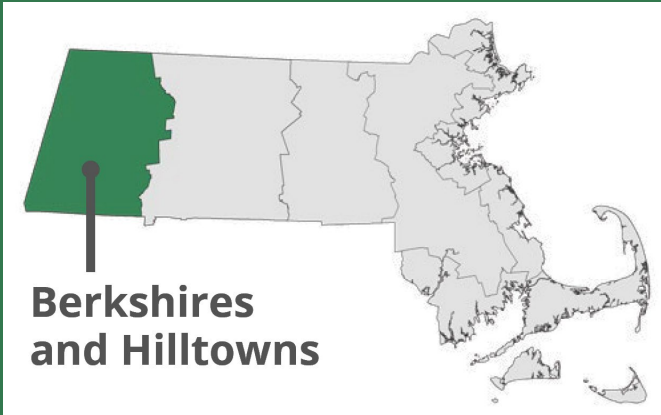
- 88 Cities and Towns
- 2,112,500 People
- 267,600 Residential Properties

Most Urgent Impacts in Greater Boston Inland

- Damage to Inland Buildings from heavy rainfall and overwhelmed drainage systems
- Reduction in the Availability of Affordably Priced Housing from direct damage and the scarcity caused by increased demand

2. Considered Climate Change Projections

Berkshires & Hilltowns



Highlights of Future Climate Projections from the 2022 Massachusetts Climate Change Assessment

(<https://www.mass.gov/info-details/massachusetts-climate-change-assessment>)

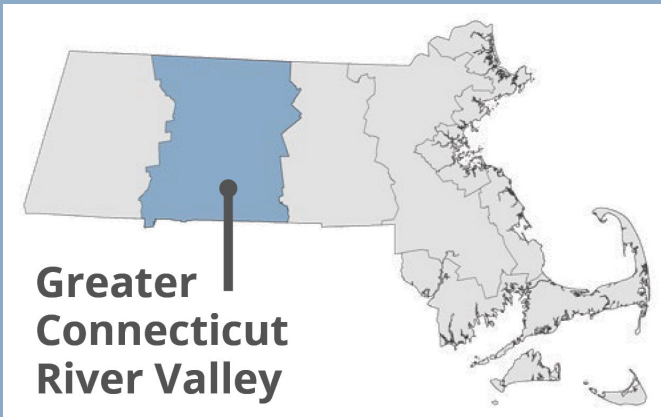


Regional Climate Outlook

2030	2050	2070	2090
NEAR TERM The summer mean temperature could increase by 3.6°F from the historical period (1950-2013), causing impacts to Berkshire dairy and crop agriculture.	MID-CENTURY The 1 percent annual chance river flood could be three times more likely to occur, increasing Housatonic and other river flood risk.	MID-LATE CENTURY There could be 63 fewer days below freezing, increasing the chance of ticks overwintering and contributing to increased Lyme disease risk.	END OF CENTURY The historical 10 percent annual chance daily rainfall event (2.8 to 4 inches) could occur five times more frequently.

2. Considered Climate Change Projections

Greater Connecticut River Valley



Highlights of Future Climate Projections from the 2022 Massachusetts Climate Change Assessment

(<https://www.mass.gov/info-details/massachusetts-climate-change-assessment>)

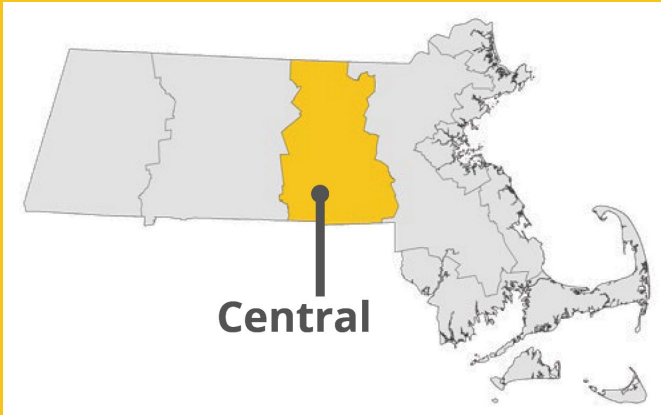


Regional Climate Outlook

2030	2050	2070	2090
NEAR TERM The summer mean temperature could increase by 3.6°F from the historical period (1950-2013), increasing urban heat stress and reducing local crop yields.	MID-CENTURY The 1 percent annual chance river flood could be three times more likely to occur, increasing Connecticut River and other area flood risk.	MID-LATE CENTURY There could be 65 fewer days below freezing, increasing the chance of ticks overwintering and reducing winter recreation opportunities.	END OF CENTURY The historical 10 percent annual chance daily rainfall event (2.6 to 4 inches) could occur four times more frequently.

2. Considered Climate Change Projections

Central



Highlights of Future Climate Projections from the 2022 Massachusetts Climate Change Assessment

(<https://www.mass.gov/info-details/massachusetts-climate-change-assessment>)



Regional Climate Outlook

2030

NEAR TERM

The summer mean temperature could increase by 3.6°F from the historical period (1950-2013), worsening stress on electric transmission and utility distribution infrastructure.

2050

MID-CENTURY

The 1 percent annual chance river flood could be two times more likely to occur, increasing Blackstone River and other river flood risk.

2070

MID-LATE CENTURY

There could be 38 more days above 90°F, contributing to extreme heat health impacts.

2090

END OF CENTURY

The historical 10 percent annual chance daily rainfall event (2.8 to 4 inches) could occur five times more frequently.

2. Considered Climate Change Projections

Eastern Inland



Highlights of Future Climate Projections from the 2022 Massachusetts Climate Change Assessment

(<https://www.mass.gov/info-details/massachusetts-climate-change-assessment>)



Regional Climate Outlook

2030

NEAR TERM

The summer mean temperature could increase by 3.6°F from the historical period (1950-2013), worsening stress on electric transmission and utility distribution infrastructure.

2050

MID-CENTURY

The 1 percent annual chance river flood could be two times more likely to occur, increasing Merrimack River and other river flood risk.

2070

MID-LATE CENTURY

There could be 58 fewer days below freezing, increasing the chance of ticks overwintering and reducing winter recreation opportunities.

2090

END OF CENTURY

The historical 10 percent annual chance daily rainfall event (2.8 to 4 inches) could occur four times more frequently.

2. Considered Climate Change Projections

Most Urgent Impacts Statewide

- Damage to inland buildings from heavy rainfall and overwhelmed drainage systems
- Reduction in state and municipal revenues, including a reduced property tax base due to coastal and inland flood risk
- Reduction in the availability of affordably priced housing from direct damage and the scarcity caused by increased demand

2. Considered Climate Change Projections



ResilientMass identifies inland flooding as the most significant climate hazard in Massachusetts



Environmental justice and priority populations live near commercial and industrial buildings that have a 57% higher risk of flood damage than the rest of the state



By 2070, Massachusetts is expected to receive 12 to 42% more winter precipitation, and the frequency and intensity of precipitation events is also increasing

3. Improvements to Local Floodplain Management Regulations

When considering improvements, we look for options that reduce flood damage and risk.

We determine that regulating development was not the only way to reduce flood damage and risk.

There are also administrative options, such as improving compliance using incentives, exemptions, and other options that encourage flood risk reduction.

4. Justifiable and Appropriate for Massachusetts Municipalities

An option is considered justifiable and appropriate if:

1. It is identified multiple times during the publication review,
2. The project subject matter experts have seen it work in the past, and/or
3. The NFIP Community Rating System (CRS) awards points for the activity.
 - CRS is a federal program that discounts flood insurance premium rates for NFIP-participating communities
 - If CRS awards points for a floodplain practice, it indicates that the practice was evaluated and found to be beneficial to reducing flood risk



Limitations and Restrictions

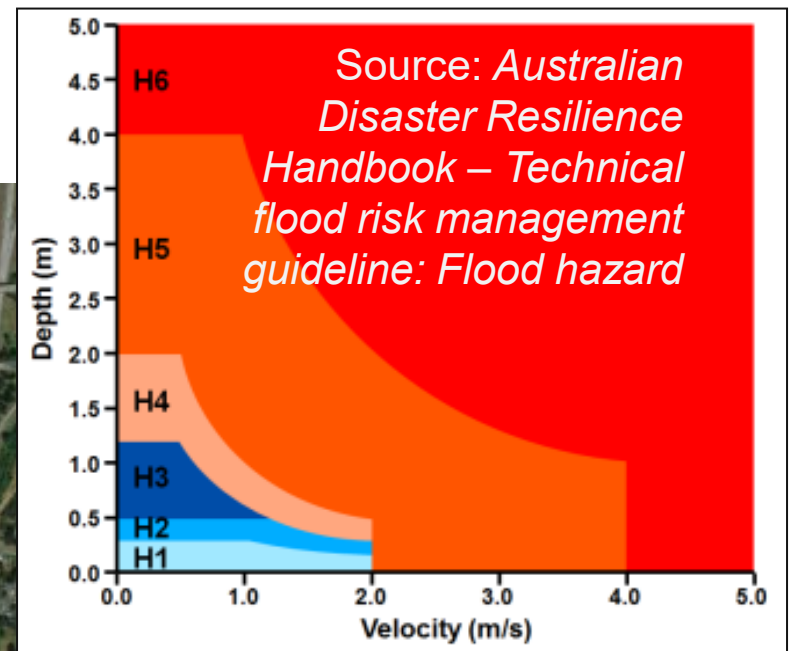
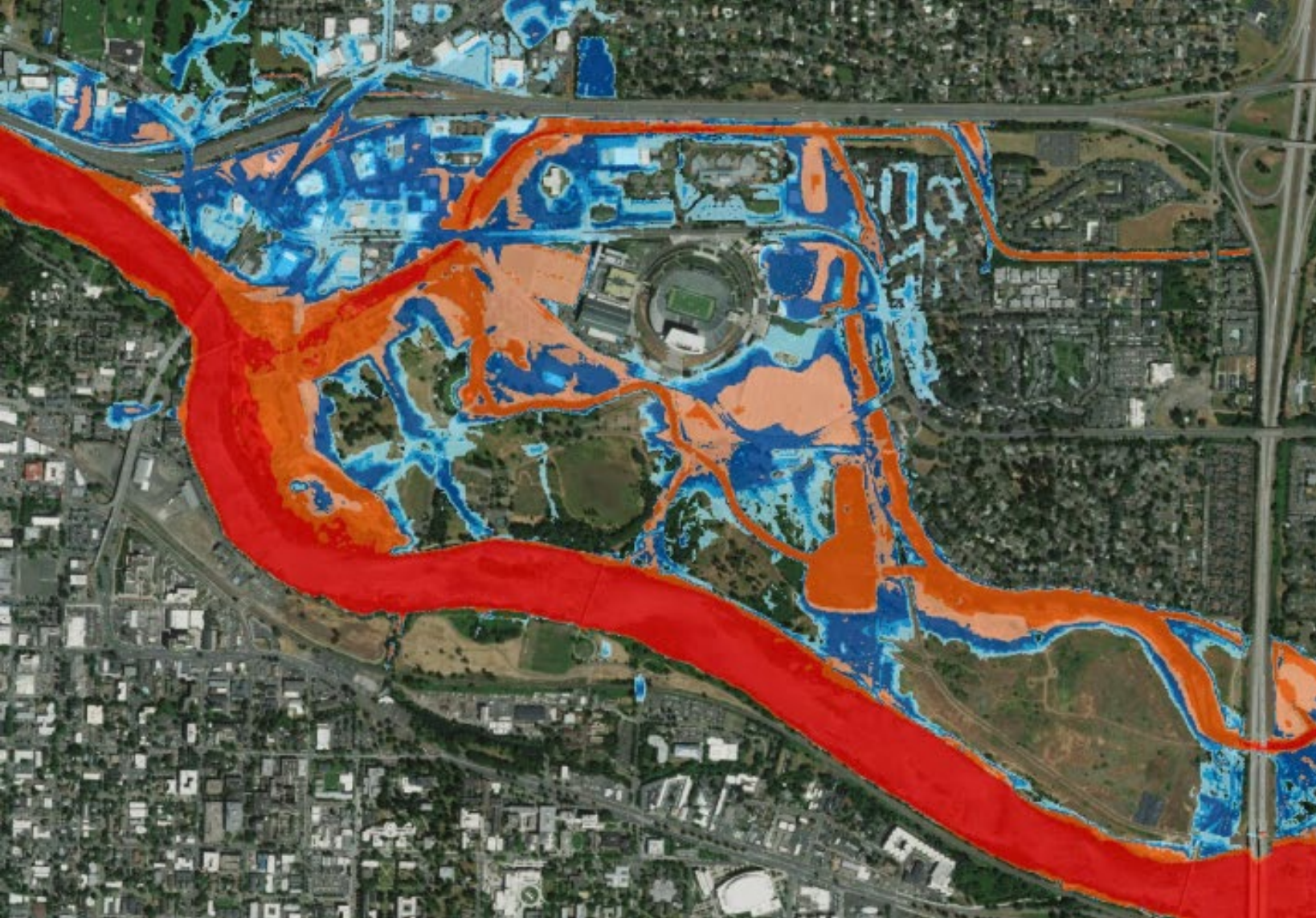


Limitations and Restrictions

Title	Description
Restrictions Based on Depth and Velocity	Restrict development, or just new construction, on sites where flood depths are greater than 4 to 5 feet and on sites where velocities are faster than 10 feet per second. This could include requiring applicants to assess locations on their parcels that are outside of mapped flood zones or where flood depths are shallower.
Limit Development within the Flood Zone and/or Floodway	Limit new development within the flood zone. This could include all development or a list of activities (new structures for human habitation, dry cleaners, septic systems, critical facilities, etc.).
Limit Fill within the Flood Zone	Limit fill or allow no fill within the flood zone.



Restrictions Based on Depth & Velocity



Hazard Classifications

- **H6** – Unsafe for vehicles and people. All building types considered vulnerable to failure.
- **H5** – Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.
- **H4** – Unsafe for people and vehicles.
- **H3** – Unsafe for vehicles, children, and the elderly.
- **H2** – Unsafe for small vehicles.
- **H1** – Caution, but generally safe for people, vehicles, and elevated buildings.



Limit Development within the Flood Zone and/or Floodway

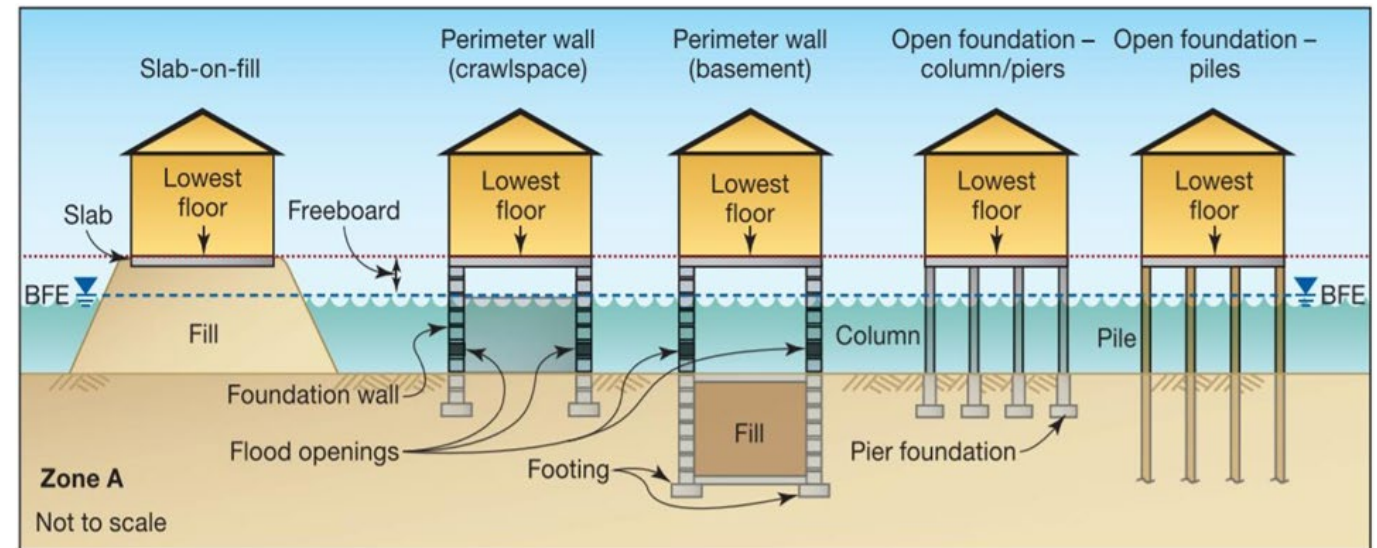
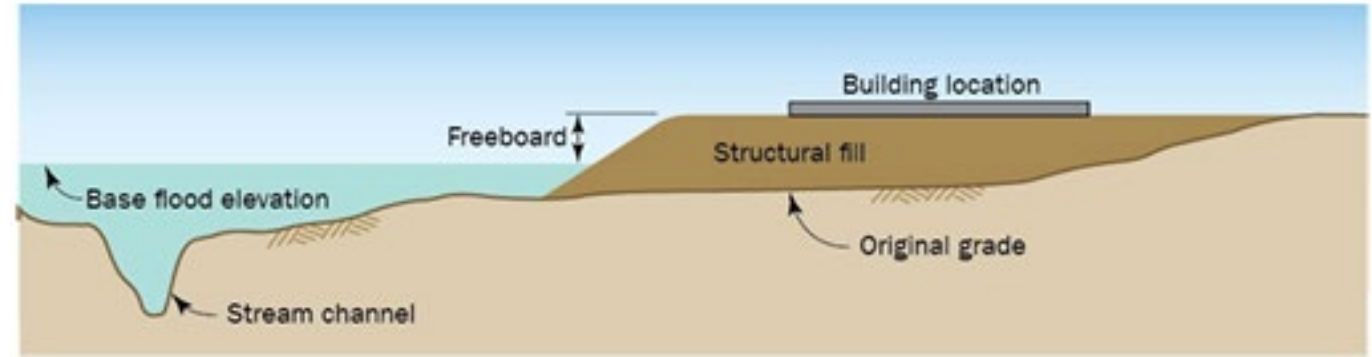
- Prohibit new structures for human habitation in the floodway or flood zone
- Prohibit certain development or activities (dry cleaners, septic systems, critical facilities, manufacturing and/or storage of hazardous materials)





Limit Fill within the Flood Zone

- Prohibit the use of fill to elevate buildings.
- Regulate the content and compaction of fill based on anticipated future use to support buildings.
- Regulate the % of each lot that can have fill placed on it.





Zoning Bylaws



Zoning Bylaws

Title	Description
Flood Hazard Setbacks	Limit development within a specified distance from a body of water (typically the stream bank, stream centerline, floodway edge, or landward boundary of a mapped floodplain).
Dry Land Access	Require new subdivisions and developments to have a “dry land access” to allow safe entry and exit of emergency vehicles during flooding up to the base flood conditions.
Protect New Buildings from Local Drainage	Require the ‘finished floor’ of all new buildings to be at or above a specific number of inches above the adjacent grade or the crown of the nearest road or street.
Low-Impact Overlay Districts	Develop an overlay zone for flood zones to control the impact of allowed uses. Low-impact uses could include agriculture, conservation, forestry, passive recreation, and low-density residential zoning districts.
Adopt Additional Flood Risk Maps	Communities may adopt other flood risk data products (studies and maps) in addition to FEMA’s FIS and FIRM and regulate using the most restrictive data (widest extent or highest elevation).



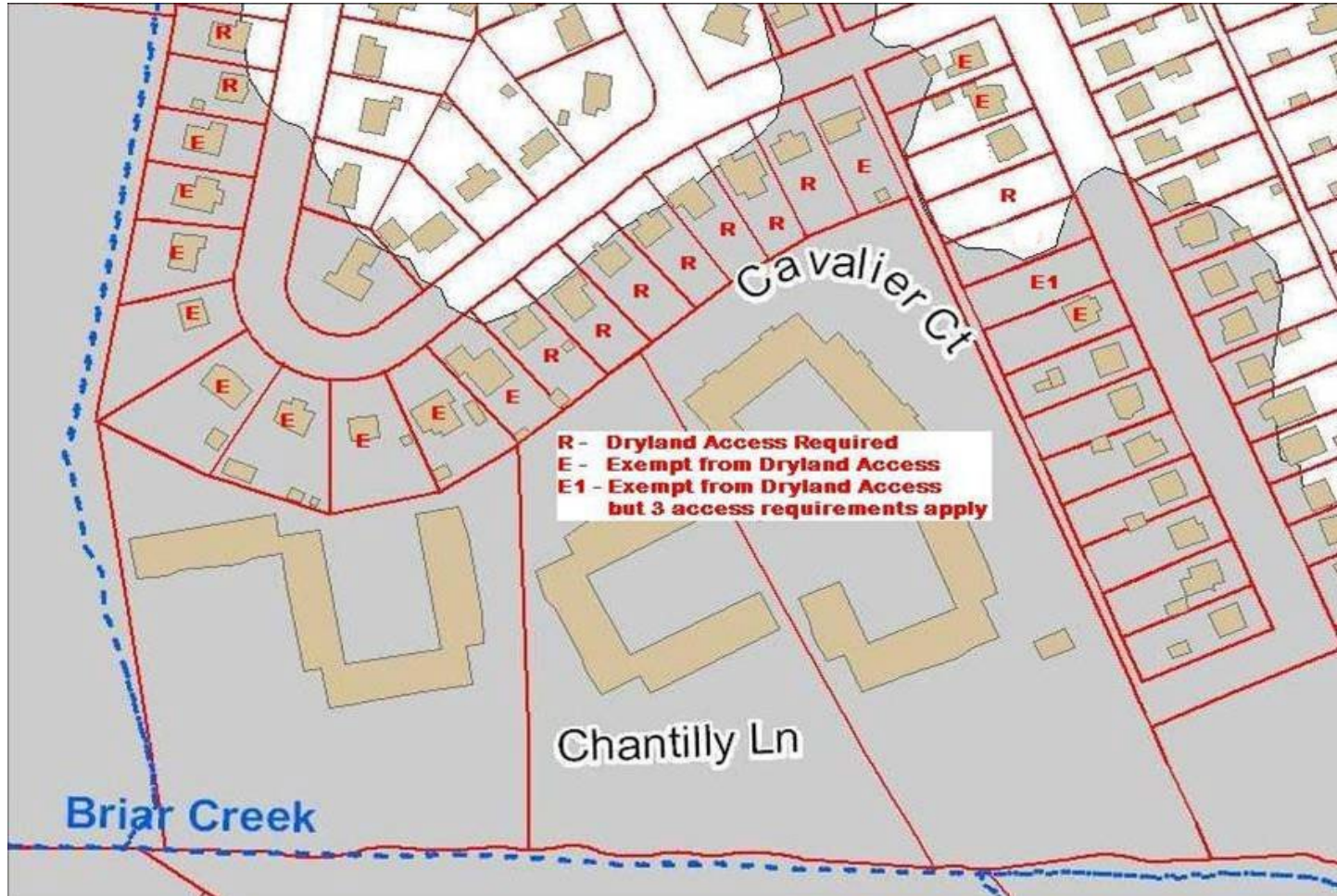
Flood Hazard Setbacks

- Setbacks prohibit or limit development within a specified distance from a flood zone or property boundary.
- Setbacks provide an added margin of safety by guiding development away from high risk areas.
- Setbacks can be paired with other options (special permits or incentives) to further guide development away from high risk areas.





Dry Land Access



- Require new subdivisions and developments to have a “dry land access” to allow safe entry and exit of emergency vehicles during flooding up to the base flood conditions.



Protect New Buildings from Local Drainage

- Require the ‘finished floor’ of all new buildings to be at or above a specific number of inches above the adjacent grade or the crown of the nearest road or street.
 - More than 20% of NFIP claims are outside the flood zone.
 - This would be communitywide regardless of flood zone.





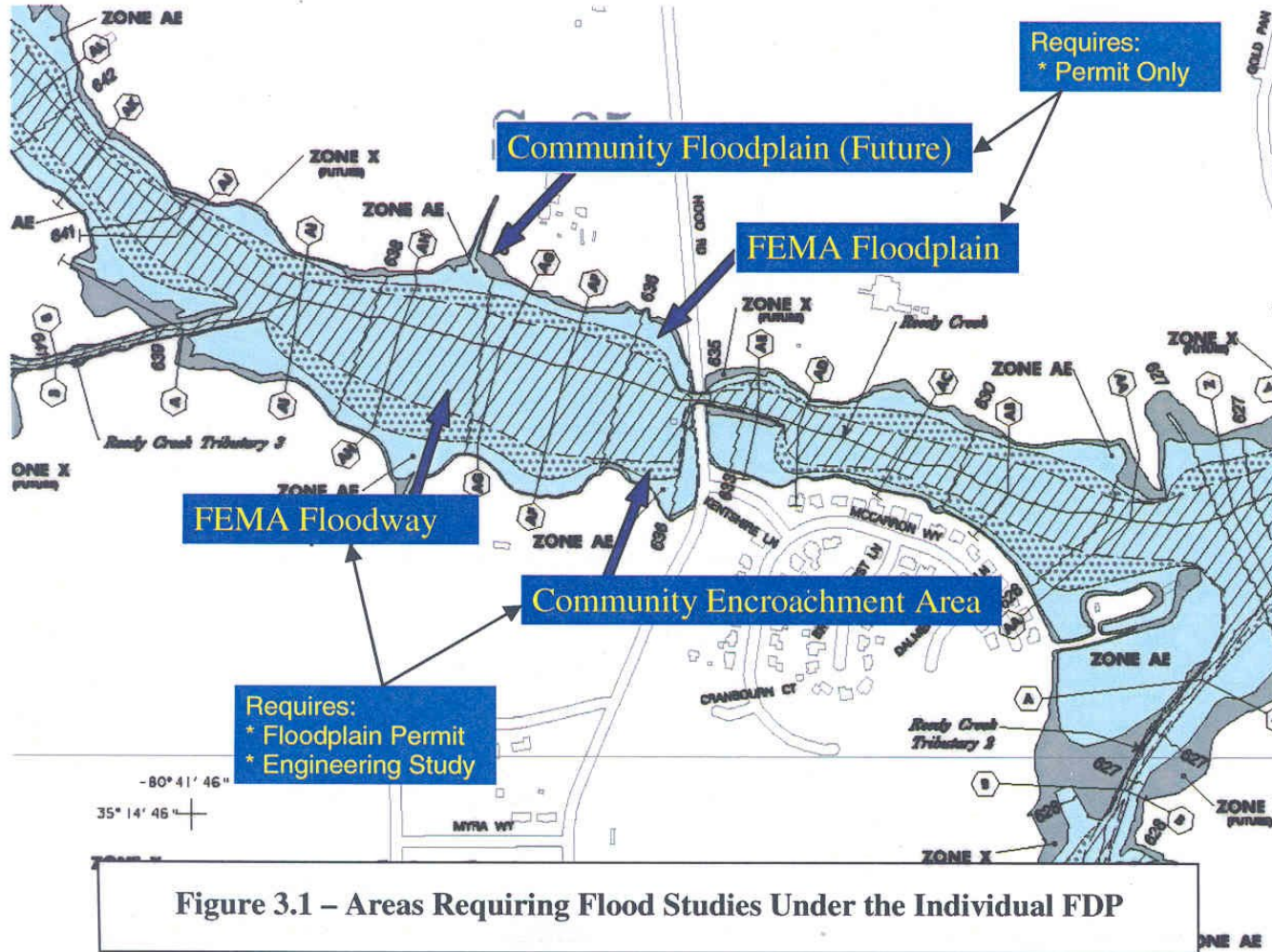
Low-Impact Overlay District

- Shifts development away from the flood zone by controlling the allowed uses in the overlay zone.
- Low impact uses include:
 - Agriculture
 - Conservation
 - Forestry
 - Passive recreation (parks and ballfields)
 - Low-density residential
 - Impervious surface restrictions





Adopt Additional Flood Risk Maps



- Adopting maps in addition to FIRMs allows communities to manage known flood risks.
- Possible Maps to Adopt:
 - Erosion Zones
 - Future Condition Floodplain
 - Pluvial Flooding
 - Inundation Mapping



Policies and Procedures



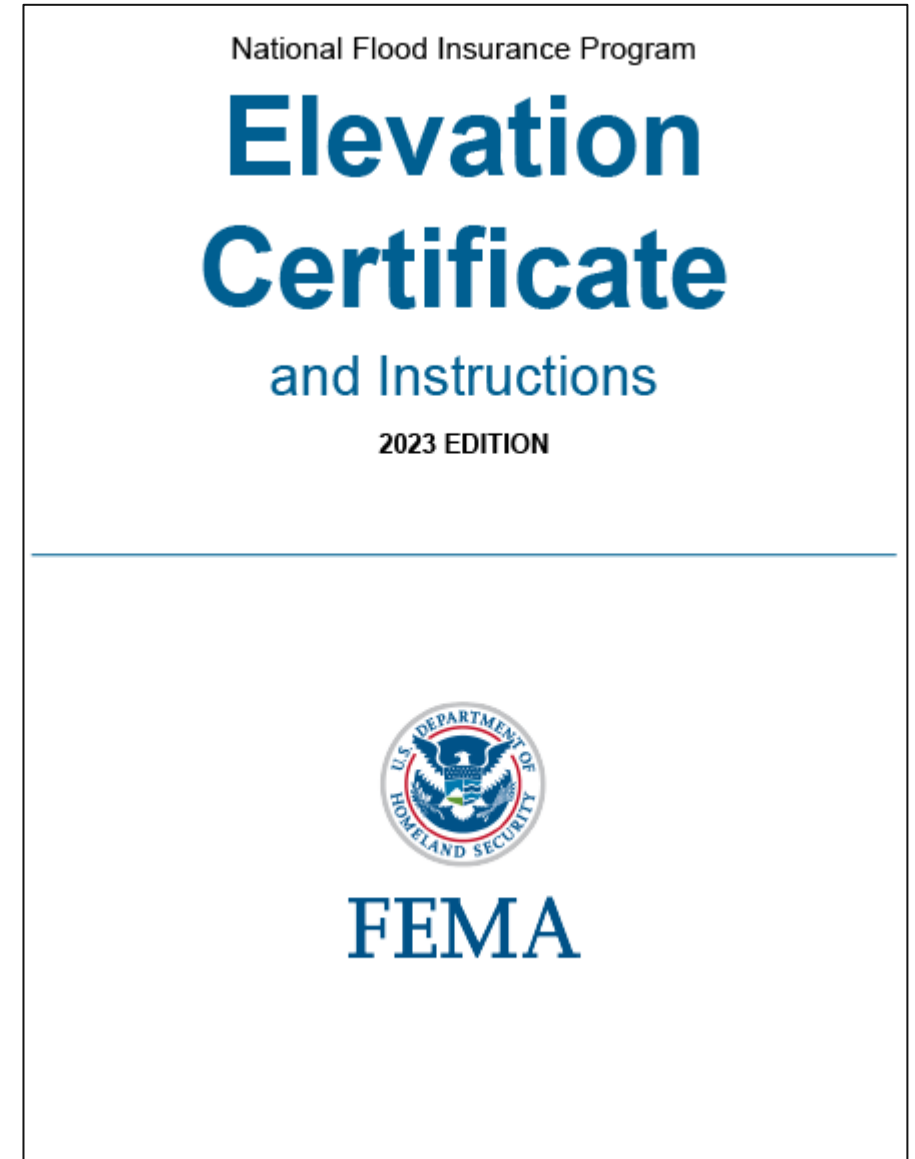
Policies and Procedures

Title	Description
FEMA Certificates: Elevation Certificate and Dry Floodproofing Certificate	Require use of FEMA Elevation Certificates and FEMA Dry Floodproofing Certificates.
Non-Conversion Agreements for Enclosures Under Elevated Buildings, with Deed Restriction	Require property owners to sign non-conversion agreements to acknowledge the restrictions on use of enclosures below elevated buildings and to agree not to modify or convert the enclosures. The non-conversion agreement is then recorded with the property deed to inform future owners of use limitations.
Interlocal Agreements for Administration	Develop model interlocal agreements that can be used by two or more municipalities to cooperate on administration of floodplain management bylaws.



FEMA Certificates: Elevation Certificate and Dry Floodproofing Certificate

- Require use of FEMA Elevation Certificates and FEMA Dry Floodproofing Certificates.
 - FEMA forms have all the information needed to verify compliance and provide the certificate of occupancy.
 - Using the same form makes the information easier to find with each submittal.





Non-Conversion Agreements for Enclosures Under Elevated Buildings, with Deed Restriction

- Require property owners to sign non-conversion agreements to acknowledge the restrictions on use of enclosures below elevated buildings and to agree not to modify or convert the enclosures.
 - Allowed uses include building access, vehicle parking, and storage.
 - Could also require periodic inspection of the enclosure to ensure compliance.
- The non-conversion agreement is then recorded with the property deed to inform future owners of use limitations.



Interlocal Agreements for Administration

- Develop interlocal agreements between municipalities to cooperate on administration of floodplain management bylaws.





Incentives, Exemptions, and Other Tools

Incentives, Exemptions, and Other Tools

Title	Examples
Freeboard Incentives	<ul style="list-style-type: none">• Permit fee reductions/waivers
Special Permits	<ul style="list-style-type: none">• Density bonuses• Flexibility with setback and frontage requirements• Allowing higher height limits for elevated buildings
Exemptions or Streamlined Approvals	<ul style="list-style-type: none">• Alternate permitting procedures• Site plan reviews
Tax Benefit or Rewards	<ul style="list-style-type: none">• Tax incentives• Conservation easements• Floodplain/drainage easements
Elevation Grant Assistance	<ul style="list-style-type: none">• Home elevation programs
Other Tools	<ul style="list-style-type: none">• Quotient/points systems• Cluster subdivisions



Hull, Massachusetts

	Freeboard Incentive Example
Description:	For residential and commercial building elevation, or new construction projects, building department permit fees will be reduced by \$500 (or by the cost of the permit, if lower than \$500) if an Elevation Certificate is provided to verify the building is elevated a minimum of 2 feet above the highest state requirement for the flood zone.
Explanation & Effectiveness:	Towns do not have the right to require that property owners build higher than building code requirements, but they can encourage owners to add additional freeboard. In 2009, Hull voted to enact the state's first freeboard incentive program to encourage elevation that accounts for future coastal storms and sea level rise. Since then, up to 80 percent of permit requests have included two or more feet of freeboard and qualified for the credit providing more safety for their property during storms and floods.



Thank you

Q&A

