



# TOWN OF WINTHROP

Town Hall – 1 Metcalf Square  
Winthrop, Massachusetts 02152

## Winthrop Flood Resilience Checklist Addendum

Last Updated: April 1<sup>st</sup>, 2021

### Why a Flood Resilience Checklist?

As a coastal community, development and land use decisions in Winthrop must consider the potential impacts and risks of flooding. In 2018, Winthrop completed the State's Municipal Vulnerability Preparedness (MVP) planning process and identified land use policy as a priority action to address climate change hazards. Flood risks are changing due to increasing Sea Level Rise (SLR), more intense coastal storms, and increased precipitation (see How Climate Change Impacts Flooding section below).

The Flood Resilience Checklist is meant to help educate and prepare developers and property owners to consider future flood risks for new construction and substantial improvements of residential property. However, the checklist may also be informative for those doing smaller projects and upgrading or replacing utilities, and for those who want to consider flood resilient design. This checklist should be completed and submitted as part of your building permit process.

*Note: This Resilience Checklist and Addendum is meant to be an educational tool, please work with an experienced contractor to ensure your property complies with local building code.*

### What Developers and Property Owners Can Do to Increase Resilience:

Whether you're a property owner planning to stay in your home long-term, renting to tenants, or a developer looking to sell there are several things you can do to protect your property.

1. **Understand your property's current and future flood risk.**
2. **Make structural improvements.**
3. **Obtain flood insurance to better recover after a flood event.**

#### 1. Understand your property's current and future flood risk.

Across the United States, the **Federal Emergency Management Agency (FEMA)** manages the **Risk Mapping, Assessment and Planning (Risk MAP)** program that analyzes and assesses flood risk data. This data is used to create the **Flood Insurance Rate Maps (FIRMs)** used by both the **National Flood Insurance Program (NFIP)** and local policy makers to manage floodplain regulations. FEMA identifies areas at risk of flooding through the development of flood risk maps. Areas at risk of a 1% or 0.2% annual chance of flood are commonly known as the floodplain and are currently designated in FEMA's Flood Insurance Rate Maps (FIRMs). A 1% annual chance flood is also colloquially called a "100-year storm", but this can be confusing because in actuality this flood event has a 1 in 100 chance of occurring every year. Winthrop's 1% annual chance floodplain covers approximately 45% of the Town's land area.



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Despite the challenges with mapping flood risk, you can use the existing FEMA flood maps and projected flood maps developed by Metropolitan Area Planning Council to better understand your current and future flood risk.

<https://experience.arcgis.com/experience/28130418457a4b9f99c6cd648c1e2b1f>

## Limitations to existing flood maps:

There are several limitations to FEMA flood maps especially when considering future flood risk:

- 1) 70% of homes in Massachusetts were built before most of the first FIRMs in Massachusetts were adopted in the 1980s (the first flood map in Winthrop was done by HUD in 1976). As a result, many properties located in the Special Flood Hazard Area (SFHA) were grandfathered in and still have basements or are located below the current base flood elevation.
- 2) Flood risk is dynamic and can change based on altered land use patterns and development, weather patterns, and erosion along waterways.
- 3) FIRMs are updated infrequently and it is often a lengthy process to get the new maps adopted, so there may be a lag in how the flood maps reflect development changes.
- 4) FIRMs are based on current conditions and historic data and do not incorporate future flood predictions based on increases in rainfall, Sea Level Rise, or more intense storm surge due to climate change. To better understand how climate change is impacting flood risk in Massachusetts, see the section “Flooding and Climate Change” below.

<https://experience.arcgis.com/experience/28130418457a4b9f99c6cd648c1e2b1f>

Knowing your property’s flood risk can help you make decisions to protect your property from future damage and recover more easily in the event of a flood. Please note that flooding is still possible outside of the mapped floodplain and that these maps should be used for planning purposes only.

## 2. Make structural improvements.

If your property is in the floodplain you will be required to mitigate the impacts of flooding. In Massachusetts the State Building Code is the primary tool used to protect structures from flood



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damage and mitigate the impacts of flooding. The State is on its 9<sup>th</sup> Edition CMR 780 and went into effect in 2017.<sup>1</sup> Local governments enforce the State Building code through permitting.

Building code flood protection requirements apply only in the **Special Flood Hazard Areas (SFHA)** identified in FEMA FIRMs, which represent the area with a 1% chance annual flood area.

Compliance with the Building Code is required for new construction as well as “substantial repair/improvement”.<sup>2</sup>

The [Massachusetts Building Code](#) 9<sup>th</sup> Edition- Residential Code requires the following in the floodplain:

- The FIRM or Flood Hazard Boundary Map determines Base Flood Elevation (BFE).
- Design Flood Elevation (DFE) is calculated for the following flood zones: AO Zones is the highest adjacent grade, plus flood depth plus one foot OR highest adjacent grade plus three feet if no flood depth is specified; A zones is base flood elevation (BFE) plus one foot; V zones is BFE plus two feet. (See section R322.1.4 of Massachusetts Building Code).
- The “Lowest floor” includes enclosed areas such as basements, but excludes and “unfinished, flood resistant” enclosure used solely for parking, storage, or building access (R322.1.5). Unfinished areas below the DFE must include flood openings.
- Electrical, plumbing, and mechanical equipment must be protected by being located at or above the elevated levels specified in the code (R322.1.6)
- Substantial repair (50% +) of a foundation counts as substantial repair of a structure and will require compliance with the building code.

In addition to the requirements in the Building Code, you may consider additional resilience measures:

- Increase freeboard above the predicted flood plane elevation. By elevating your home, this allows for uncertain and changing flood depths, and will provide savings on flood insurance.
- Strengthen key parts of your property including the roof and foundation to withstand storm impacts such as wind and flooding.
- Elevate or relocate mechanical and electrical equipment.
- Consider back-up sources of electricity in the event of an outage, such as a generator or solar+storage.

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<sup>1</sup> The Ninth Edition CMR is based off amendments to the 2015 International Code Council (ICC) base codes.

<sup>2</sup> Substantial improvement occurs when a building improvement including reconstruction, rehabilitation, and additions for which costs are equal to 50% or more of the market value of the property before construction.



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## For more information:

- **FEMA's Homeowner's Guide to Retrofitting for Flooding (3<sup>rd</sup> Edition) (2014)**  
<https://www.fema.gov/media-library/assets/documents/480>
- **SeaGrant Massachusetts Homeowner's Handbook to Prepare for Coastal Hazards (2020)** <https://seagrant.who.edu/wp-content/uploads/sites/106/2020/07/MA-Homeowners-Handbook-2020-1.pdf>
- **Massachusetts State Building Code:** <https://www.mass.gov/massachusetts-state-building-code-780-cmr>
- **Massachusetts Guide on Floodplain Management:**  
<https://www.mass.gov/guides/floodplain-management>
- **Mass.gov Using Freeboard to Elevate Structures Above Predicted Floodwaters:**  
<https://www.mass.gov/service-details/using-freeboard-to-elevate-structures-above-predicted-floodwaters>

### 3. Obtain flood insurance to better recover after a flood event.

The Town of Winthrop participates in the National Flood Insurance Program (NFIP) with 1,055 policies in force as of July 2, 2020. This program is administrated by the U.S. Federal Emergency Management Agency (FEMA) and allows property owners, renters, and businesses to purchase flood insurance and receive assistance following flood events.

As defined by FEMA, a repetitive loss property is any property for which the NFIP has paid two or more flood claims of \$1,000 or more in any given 10-year period since 1978. There are 380 repetitive loss structures in Winthrop, the majority of which are single-family homes, although flooding in Winthrop has impacted many multi-family and several commercial structures. These repetitive loss properties had a total of 562 losses between 1978 and 2020, totaling over \$4 million in damages.<sup>3</sup>

The Town complies with the National Flood Insurance Program (NFIP) by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements. However, given that FIRM maps are based on historical storms and current conditions, they do not account for expected increases in sea level rise and more extreme storm events. Therefore, taking action to improve the ability to withstand the impacts of climate change and extreme weather is an important step toward significantly lowering risk and helping to create a more resilient community.

## For more information:

- **National Flood Insurance Program Official Site:** <https://www.floodsmart.gov/>
- **National Flood Insurance Program "Why Do I Need Flood Insurance?" Brochure:**  
[https://www.fema.gov/media-library-data/1590776729853-6ce3ffbba1366840aca5ba0816a9b403c/101752-010\\_FEMA\\_NFIPBrochure\\_55X85\\_v8r7\\_2020Update\\_508.pdf](https://www.fema.gov/media-library-data/1590776729853-6ce3ffbba1366840aca5ba0816a9b403c/101752-010_FEMA_NFIPBrochure_55X85_v8r7_2020Update_508.pdf)

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<sup>3</sup> Data on repetitive losses comes from FEMA's Community Information System, data received July 2, 2020.



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## How Climate Change Impacts Flooding:

Winthrop is expected to experience an increase in flooding due to Sea Level Rise (SLR), more intense coastal storms, and increased precipitation. Coastal communities across Massachusetts already experience flooding during high tides and extreme weather events including nor'easters and tropical storms. In addition, intense rainstorms can overwhelm municipal drainage systems and cause inland flooding. The frequency and intensity of flooding is increasing due to climate change. The following are flood hazards that Winthrop is expected to face:

- **Sea Level Rise:** According to the State website Resilient MA, there will be between 1.4 and 2.4 ft. of sea level rise by 2050 (in the next 30 years) and between 4 ft. and 7.6 ft. of sea level rise by 2100. The amount of SLR is based on the projected Greenhouse Gas (GHG) emissions scenarios at intermediate and high levels, which will impact the amount that the ice sheets will melt. SLR is already causing an increase in “sunny day” or “nuisance” flooding in low-lying areas, particularly during king tides (the highest of the high tides associated with the full moon).
- **Coastal Storms:** Extreme weather events are increasing in frequency and intensity—with more severe wind, increased precipitation amounts and rates, and increase wave heights and storm surge.
- **Increased precipitation:** Climate projections for the region forecast an increase in average annual rainfall and in the amount of rain falling in large weather events. In Eastern Massachusetts, annual precipitation has already increased by 10%-15% from historic rainfall averages in the first half of the prior century (1901-1960). Increased rain and snow can overwhelm municipal drainage systems and cause localized flooding and back flow issues. For example, in March of 2010 a series of intense rainstorms releases 17.7 inches of rain over the course of 19 days on mostly frozen ground. These storms were declared a federal disaster, which allowed for assistance to be made available to property owners who did not have flood insurance. Nearly 60% of the claims were outside the FEMA SFHA. These types of intense rain events will increase in frequency due to climate change.

## More Information:

- **Resilient MA: Climate Change Clearinghouse for the Commonwealth:**  
<https://resilientma.org/>



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## Glossary:

**Base Flood Elevation (BFE):** Is the minimum elevation of the lowest floor of a building, which is determined by the water elevation above base sea level during a 1% annual chance flood event (designated on FEMA flood maps). .

**Design Flood Elevation (DFE):** Defined by FEMA as the height of the lowest occupied floor, this consists of the Base Flood Elevation plus the required freeboard.

**Freeboard:** Additional elevation required above the Base Flood Elevation to provide a safety buffer between the flood level and lowest occupied floor (i.e. the distance between Base Flood Elevation and Design Flood Elevation).

**Federal Emergency Management Agency (FEMA):** The Federal agency in charge of responding to natural and man-made disasters. The agency also manages the National Flood Insurance Program (NFIP) and issues flood maps.

**Flood Insurance Rate Maps (FIRM):** Maps produced by FEMA showing flood risk and depths based on existing and historic flood data. FIRMs do not include expected flooding due to projections of Sea Level Rise or other climate change impacts. FEMA Flood Map Service Center: <https://msc.fema.gov/portal/home>

**Moderate Flood Hazard Areas:** The designated floodplain in the FIRMs representing the 0.2% (1 in 500) chance annual flood risk.

**National Flood Insurance Program (NFIP):** Managed by FEMA, this national insurance program provides flood insurance coverage for buildings and contents, such as personal belongings. Property owners are required to purchase flood insurance if their property falls within the SFHA FEMA floodplain.

**Sea Level Rise (SLR):** Sea level rise is the amount that the ocean elevation will increase due to climate change. The amount of SLR projected is based on different greenhouse gas emissions scenarios, due in part to the degree that polar ice caps melt. Sea Level Rise rates are also impacted by local topography and land subsidence.

**Substantial Improvement:** According to the building code, a building improvement including reconstruction, rehabilitation, and additions for which costs are equal to 50% or more of the market value of the property before construction.

**Special Flood Hazard Area (SFHA):** The designated floodplain in the FIRMs representing the 1% chance annual flood risk. The SFHA is considered a high-risk flood area delineated on the map as zones A or V.

**100-Year Flood:** A colloquial term for the SFHA to represent the 1% (1 in 100) chance of flooding annually. The 1% chance annual flood is what is used for the FEMA special flood hazard area.