

New York City is highly vulnerable to flooding from coastal storms due to its intensively used waterfront and its extensive coastal geography. Floods have the potential to destroy homes and businesses, impair infrastructure, and threaten human safety. With climate change and sea level rise, these risks are expected to increase in the future, but will most adversely affect low-lying neighborhoods.

**Flood Risks**

Hurricanes, tropical storms, nor’easters, intense rain storms, and even extreme high tides are the primary causes of flooding in NYC.

For building code, zoning, and planning purposes, flood risk in NYC is represented on FEMA’s 2015 Preliminary Flood Insurance Rate Maps (PFIRMs).

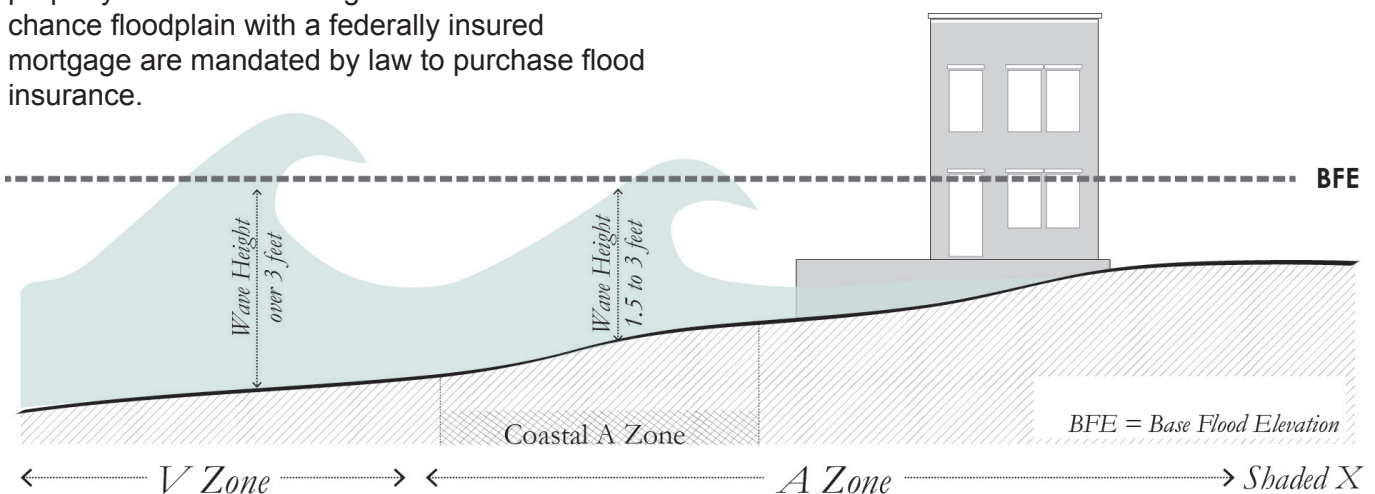
- PFIRMs show the extent to which flood waters are expected to rise during a flood event that has a 1% annual chance of occurring. This height is denoted as the Base Flood Elevation (BFE) on the maps.
- The 1% annual chance floodplain is sometimes referred to as the 100-year floodplain. However, this term is misleading since these floods can occur multiple times within 100 years. In the 1% annual chance floodplain, there is a 26% chance of flooding over the life of a 30-year mortgage.

For flood insurance purposes, refer to FEMA’s 2007 Flood Insurance Rate Maps (FIRMs). All property owners of buildings in the 1% annual chance floodplain with a federally insured mortgage are mandated by law to purchase flood insurance.

Approximately who and what is affected by the 1% annual chance floodplain?*	
Residents	400,000
Jobs	291,000
Buildings	72,000
1-4 Family Buildings	53,000
Multifamily Buildings	5,000
Residential Units	183,000
Floor Area (Sq. Ft.)	532M

The number of New Yorkers living in the city’s floodplain is higher than the entire population of Cleveland, OH, Tampa, FL, or St. Louis, MO.

\* These numbers are based on FEMA’s 2015 PFIRMs. In October 2016, FEMA announced that the City won its appeal of the PFIRMs and has agreed to revise New York City’s flood maps. For now, the 2015 PFIRMs are in use for building code, zoning, and planning purposes, while the 2007 FIRMs remain in use for flood insurance. For more information on the appeal visit [www.nyc.gov/floodmaps](http://www.nyc.gov/floodmaps).



The 1% annual chance floodplain is divided into three areas—the V Zone, Coastal A Zone, and A Zone—and each has a different degree of flood risk. V and Coastal A Zones are vulnerable to waves, while the rest of the A zone is vulnerable to flooding but not wave damage. The maps also show the 0.2% annual chance floodplain, denoted as the Shaded X Zone, which has a lower annual chance of flooding than the A Zone.

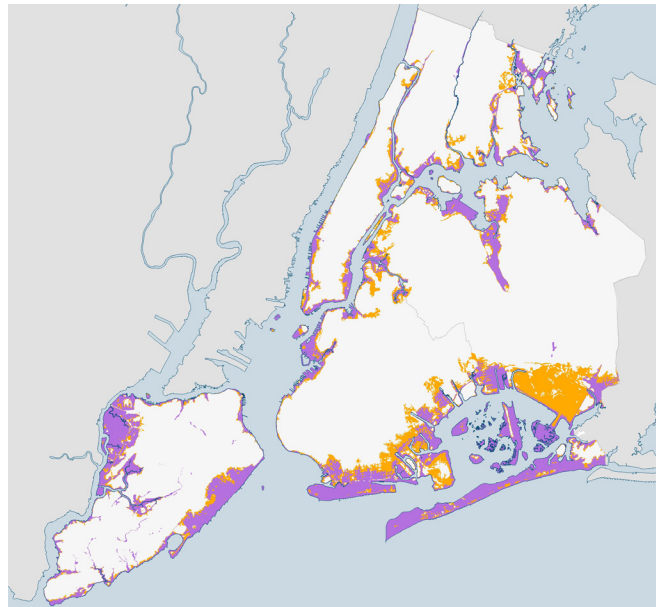
## Future Flood Risks

With climate change, the risk of coastal storm surges, intense rain, and high tides will increase.

- Sea levels in NYC have already risen a foot over the last 100 years.
- According to the New York City Panel on Climate Change, sea levels are expected to increase between 8 to 30 inches by the 2050s, and as much as 15 to 75 inches by the end of the century.
- Sea level rise will lead to frequent, potentially daily, tidal inundation in some especially low-lying neighborhoods. This type of flooding causes less damage than extreme storms, but can be a nuisance and has significant long-term impacts on public safety and City services.

Higher sea levels mean the future 1% annual chance flood will cover a larger area and affect more people.

- By the 2050s, the number of people living in the 1% annual chance floodplain could more than double.
- The annual chance of major storms will also increase. What is a 1% annual chance storm today will have nearly a 3% annual chance of occurring in the 2050s.



2015 PFIRMs 1% annual chance floodplain

2050s projected future 1% annual chance floodplain

Data Sources: Current floodplain impacts based on 2015 FEMA PFIRMs and NYC MapPLUTO version 13. Future flood risk data and information from the New York City Panel on Climate Change (2015); analysis of future flood zone impacts based on 90th percentile projections for SLR and MapPLUTO version 13.

## Terms to Know

**1% Annual Chance Floodplain:** the area that has a 1% chance of flooding in any given year, as designated on FEMA's Flood Insurance Rate Maps.

**Base Flood Elevation (BFE):** the computed elevation in feet to which floodwater is anticipated to rise during the 1% annual chance storm as shown on FEMA's Flood Insurance Rate Maps.

**Coastal Storm:** includes nor'easters, tropical storms, and hurricanes.

**Low-lying Neighborhoods:** neighborhoods that have a low elevation relative to sea level and are particularly vulnerable to flooding.

City Planning is working with communities throughout the floodplain to identify zoning and land use strategies to reduce flood risks and support the city's vitality and resiliency through long-term adaptive planning. To learn more, visit [www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods).

About the Department of City Planning

The Department of City Planning (DCP) plans for the strategic growth and development of the City through ground-up planning with communities, the development of land use policies and zoning regulations, and its contribution to the preparation of the City's 10-year Capital Strategy. For more information, go to: [nyc.gov/data-insights](http://nyc.gov/data-insights)

Flood resilient construction reduces potential damages from flooding and can lower flood insurance premiums. New buildings in the floodplain are required to meet flood resilient standards. Existing buildings can reduce their risk by retrofitting or rebuilding to meet these standards, or can take partial, short-term measures to address safety concerns.

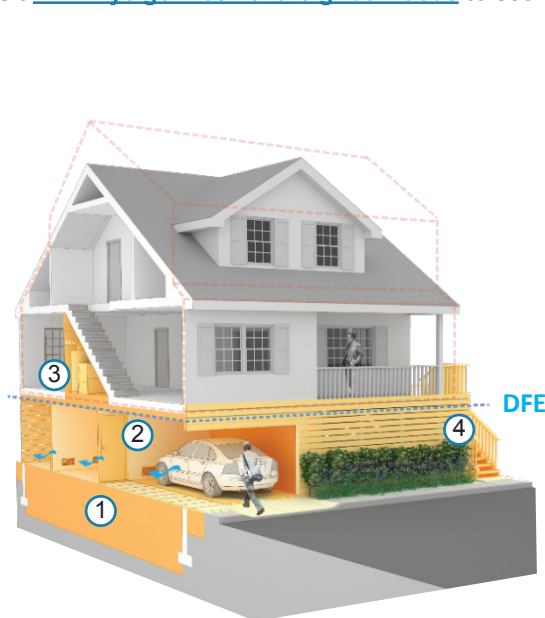
## Overview

There is a wide range of accepted flood resilient construction practices for buildings to better withstand floods and reoccupy more quickly following a storm. These include:

- Elevating the lowest floor.
- Elevating mechanical equipment such as electrical, heating, and plumbing equipment.
- **Wet floodproofing** by utilizing water resistant building materials and limiting uses below the Design Flood Elevation (DFE) to parking, building access, and minor storage. This allows water to move in and out of uninhabited, lower portions of the building with minimal damage.
- **Dry floodproofing** sealing the building's exterior to flood waters and using removable barriers at all entrances below the expected level of flooding in mixed-use and non-residential buildings.

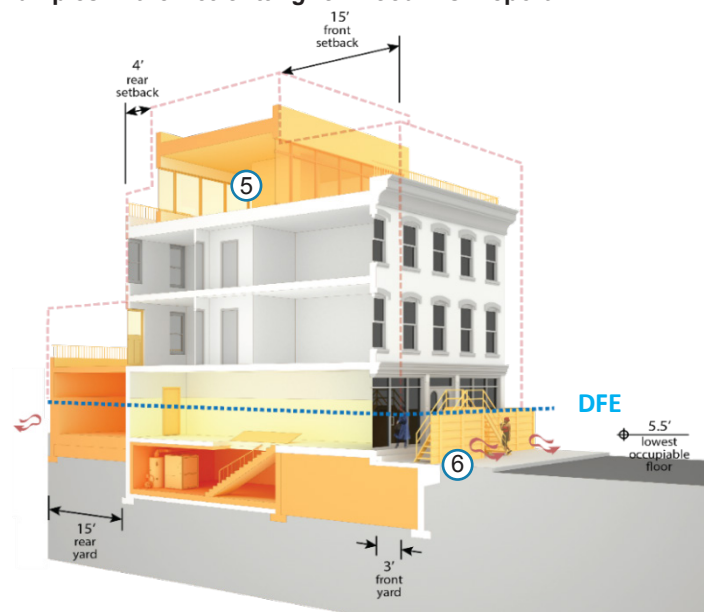
## Examples of Flood Resilient Construction

Visit [www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods) to see more examples in the *Retrofitting for Flood Risk* report.



**Wet floodproofed residential building**

- ① Site is filled to the lowest adjacent grade
- ② Space below the DFE is for parking, building access or minor storage
- ③ Mechanical systems are above the DFE
- ④ Plants and stair turns improve the look of the building from the street



**Dry floodproofed mixed-use building**

- ⑤ Rooftop addition replaces lost below grade space
- ⑥ Commercial space is dry floodproofed with removable barriers

## Requirements for New Buildings

NYC Building Code requires that all new buildings or substantial improvements within the 1% annual chance floodplain\* meet federal requirements for flood resilient construction.

- Residential buildings must elevate living spaces and may only use space below the DFE for parking, storage or building access. Mechanical systems must be elevated and enclosed walls must be wet floodproofed.
- Within the V Zone, which denotes areas subject to wave hazards, the space below the DFE must be either kept open to accommodate wave action or designed to break away during a storm.
- Mixed-use or non-residential buildings can either elevate and wet floodproof or dry floodproof.

\*Per the more restrictive of the 2007 FIRMs or 2015 PFIRMs.

## Flood Insurance

NYC is required to enforce these standards through building code to participate in FEMA's National Flood Insurance Program. Buildings that do not comply with flood resilient construction standards are at risk for both flooding and increased flood insurance rates. See the Info Brief on Flood Insurance for more information.

## Requirements for Existing Buildings

Retrofitting buildings will significantly reduce their vulnerability to damage from flooding, and could save homeowners thousands of dollars annually in flood insurance premiums.

Buildings that are substantially improved must also meet flood resilient construction code.

For buildings that are not substantially improved, lower cost, short-term adaptation measures can help reduce risk to damages caused by flooding. For example, elevating mechanical equipment to minimize damage or installing backflow valves can prevent water from flowing in the reverse direction (back up through pipes). However, such measures may not reduce premiums.

## Zoning

The **Flood Resilience Zoning Text Amendment**, a temporary measure enacted by the City after Sandy to support storm recovery, removes regulatory barriers that would hinder or prevent the reconstruction of storm-damaged properties. It also ensures that flood resilient buildings maintain neighborhood character and plants and stair turns improve the look of the building from the street. A future update of this text, guided by community input, will aim to make the text permanent and to incorporate lessons learned during the recovery and rebuilding process.

## Terms to Know

**Design Flood Elevation (DFE):** the minimum elevation to which a structure must be elevated or floodproofed, determined by adding the specified amount of freeboard, an additional height for more safety (usually 1 to 2 feet depending on building type), to the Base Flood Elevation—the anticipated elevation of a flood during a 1% annual chance storm.

**Substantial Improvement:** any repair, reconstruction, rehabilitation, addition, or improvement with a cost equaling or exceeding 50% of the current market value of the building.

City Planning is working with communities throughout the floodplain to identify zoning and land use strategies to reduce flood risks and support the city's vitality and resiliency through long-term adaptive planning. To learn more, visit [www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods).

About the Department of City Planning

The Department of City Planning (DCP) plans for the strategic growth and development of the City through ground-up planning with communities, the development of land use policies and zoning regulations, and its contribution to the preparation of the City's 10-year Capital Strategy. For more information, go to: [nyc.gov/data-insights](http://nyc.gov/data-insights)

Flood insurance covers damages to property or personal contents from flooding caused by excessive rainfall, tidal flooding, or wind-driven storm surges. Changes to flood maps and reforms to the National Flood Insurance Program will lead to increases in flood insurance rates over time. In addition to flood resilient construction, insurance is another strategy for reducing flood risk.

## Why is Flood Insurance Important?

- **Floods can cause significant damage** to your most valuable asset: your home or business.
- Even properties far from the coast may be at risk of flooding.
- Homeowner and property insurance do not cover damage by flooding. You must buy a separate policy.
- Federal assistance is not guaranteed in the event of a flood.
- Many property owners are **required by federal law to purchase and maintain flood insurance** if the property is located in a high-risk flood zone of the 2007 FIRMs (see map to right), has a federally backed mortgage, or has received federal disaster assistance.

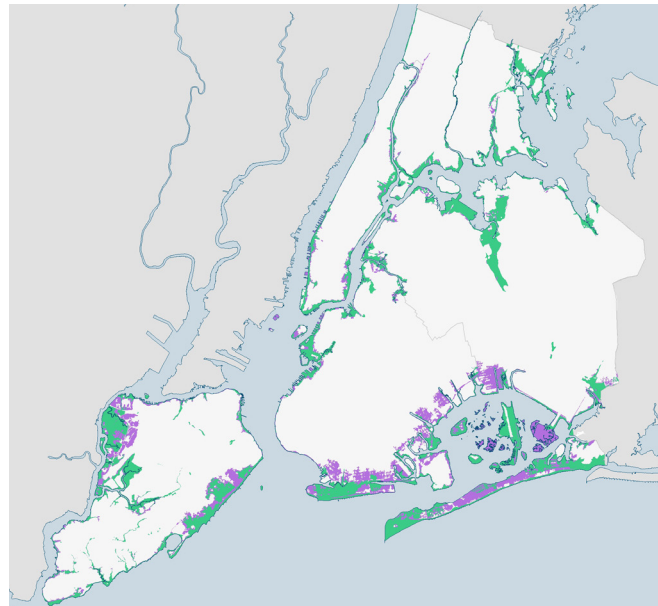
## How Much Flood Insurance Must a Homeowner Purchase?

**Properties with a federally backed mortgage in a high-risk flood zone and those that have received federal disaster assistance** must maintain flood insurance up to the NFIP coverage limits, or the outstanding mortgage balance, whichever is lower. Failure to do so may lead mortgage servicers to purchase a policy for the property—possibly at a higher price—and pass on the cost through monthly mortgage bills.

**Homeowners without a federally-backed mortgage or outside a high flood risk zone** can carry up to the maximum policy limit of \$250,000 with additional contents coverage available up to \$100,000 for owners or renters. Co-ops, larger multifamily buildings and business properties can be covered up to \$500,000. Business owners and tenants can also purchase up to \$500,000 in contents coverage.

## How Are Flood Insurance Policies Purchased?

Most flood insurance policies are administered by the National Flood Insurance Program (NFIP), a federal program run by the Federal Emergency Management Agency (FEMA). NFIP policies are separate from homeowners or property insurance, but are often sold through the same agents. A few private insurers also offer flood insurance, but these policies tend to be more expensive and less available.



- 2007 FIRMs high-risk flood zone
- 2015 PFIRMs high-risk flood zone

Purchase of a flood insurance policy is required for buildings in the floodplain as shown on the 2007 FIRMs, but may expand based on updated FIRMs. The 2015 PFIRMs, the best available data for planning purposes, are depicted above for comparison. Coverage for buildings outside of the 2007 FIRMs is available at a lower cost.

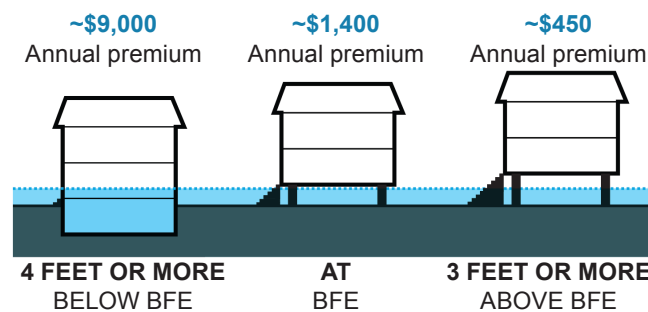
*In October 2016, FEMA announced that the City won its appeal of the PFIRMs and has agreed to revise New York City's flood maps. For more information on the appeal visit [www.nyc.gov/floodmaps](http://www.nyc.gov/floodmaps).*

## What Determines a Flood Insurance Premium?

- **Flood Zone:** The higher risk your flood zone, the higher the flood insurance base premium will be.
- **Building Type:** Single-family homes, two- to four-family homes, apartment buildings, and other non-residential buildings may have different base rates.
- **Elevation of Lowest Floor:** The higher the lowest inhabited floor (any floor not used solely for storage, access, or parking) is elevated relative to the Base Flood Elevation (BFE), the lower the premium may be.
- **Amount of Insurance:** The more insurance coverage you buy, the higher your premium.
- **Deductible:** A higher deductible may lower your insurance premium.

## Why are Flood Insurance Rates Increasing?

FEMA is in the process of updating the city's FIRMs, which designate flood zones and the BFE. Once these maps are adopted, properties may have higher flood insurance premiums over time. In addition, the federal reforms to make NFIP more financially stable will cause steady increases in premiums until the policies reflect the full risk to flooding. Property owners can reduce their insurance premiums by utilizing certain flood resilient construction methods.



Projected rates for premiums based on the BFE shown here for illustrative purposes only.

## What Should I Do?

The Mayor's Office of Recovery and Resiliency provides the following guidance to property owners seeking to understand their flood insurance options.

### Learn about your risk and flood insurance requirements:

- Identify your property's flood zone on FEMA's Flood Insurance Rate Maps (FIRMs) by visiting [Region2Coastal.com](http://Region2Coastal.com) or [FloodHelpNY.org](http://FloodHelpNY.org). Users can also use the second link to get an estimate by using FloodHelpNY's rate calculator.
- Request an Elevation Certificate by hiring a licensed engineer or surveyor to determine the height of the lowest occupied floor relative to the BFE.

### Purchase flood insurance:

- Call at least 3 agents listed on [floodsmart.gov](http://floodsmart.gov) or by call (888) 435-6637 for quotes. Homeowners or property insurance does not cover damage from floods and federal assistance is not guaranteed in the event of a flood.
- Call the FEMA National Flood Insurance Advocate's Office for other questions: (202) 212-2186

**In the event of a flood or flood warning, move your valuables to high ground and follow evacuation orders.** For more information on locating a storm evacuation center, please visit [maps.nyc.gov/hurricane](http://maps.nyc.gov/hurricane)

**City Planning is working with communities throughout the floodplain to identify zoning and land use strategies to reduce flood risks and support the city's vitality and resiliency through long-term adaptive planning. To learn more, visit [www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods).**

### About the Department of City Planning

The Department of City Planning (DCP) plans for the strategic growth and development of the City through ground-up planning with communities, the development of land use policies and zoning regulations, and its contribution to the preparation of the City's 10-year Capital Strategy. For more information, go to: [nyc.gov/data-insights](http://nyc.gov/data-insights)