

# Zoning for Flood Resilience



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## Workshop Agenda

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1. Overview of zoning for flood resilience – 20
2. Table Activity about building-scale resilience strategies in the Rockaways – 60 min
3. Report Summary of Table Discussions – 15 min

Questions? DCP staff will be available after the activity to answer more specific questions!!!

# Zoning for Flood Resilience

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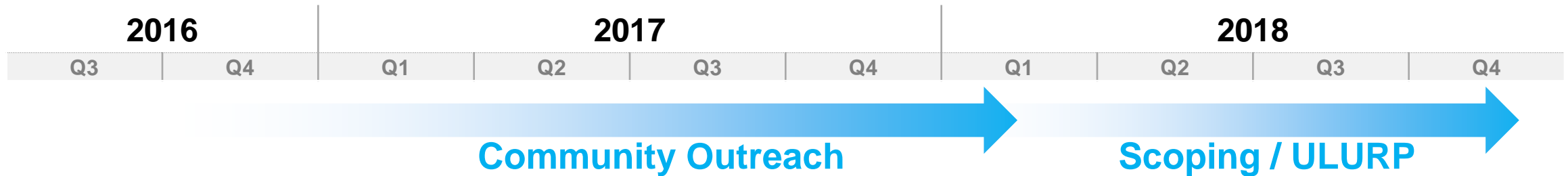
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2. Table Activity about building-scale resilience strategies in the Rockaways – 60 min
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# Zoning for Flood Resilience

## Overview of DCP's Timeline

DCP plans a robust public engagement process:



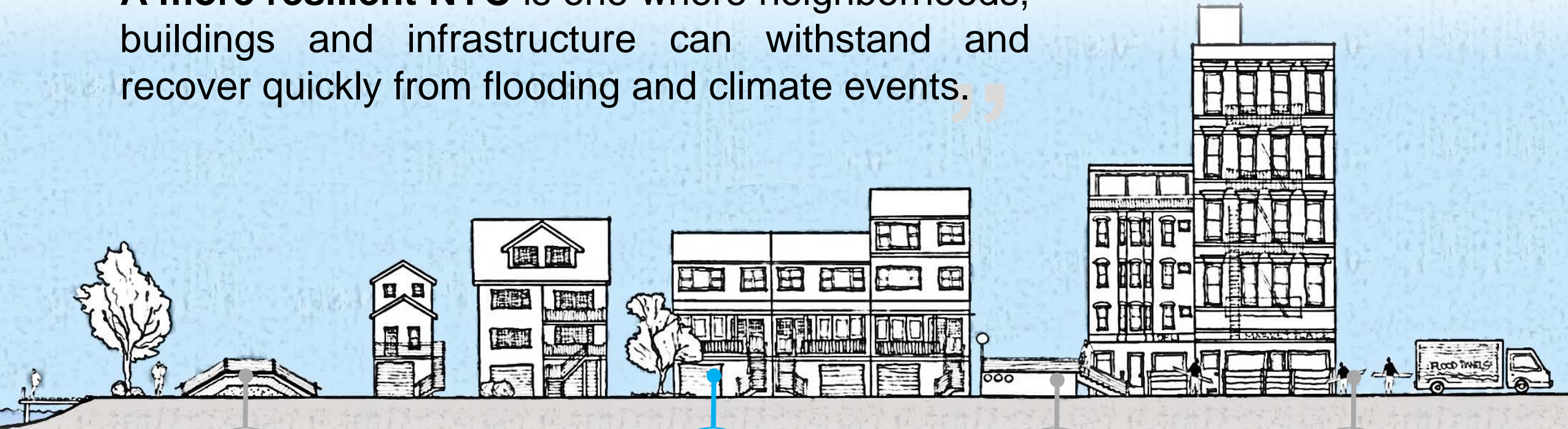
As part of this outreach process, DCP has been:

- **Partnering with stakeholders** to educate and promote awareness of flood risk and resiliency issues
- **Explain how zoning tools** relate to resiliency
- **Explore unique neighborhood issues** through in-depth public presentations and workshops
- Develop a proposal through an **iterative process** that is shaped by feedback



# #ONENYC

“A more resilient NYC is one where neighborhoods, buildings and infrastructure can withstand and recover quickly from flooding and climate events.”



## Coastal defenses

are strengthened as first line of defense against flooding and sea level rise



## Buildings

are designed to withstand and recover from flooding



## Infrastructure

is protected from climate hazards



## Residents and businesses

are prepared

# How are buildings in the floodplain regulated?

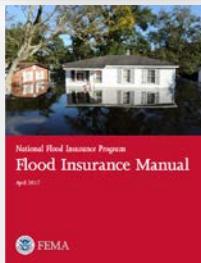


FEMA



Flood Insurance Rate Maps (FIRMs)

Determine where floodplain regulations apply



National Flood Insurance Program

Set up Insurance Rates depending on building elevation and other requirements



Construction Standards (ASCE 24)

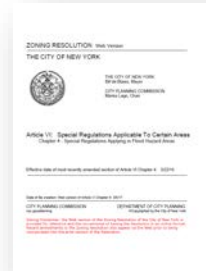
Design minimum construction requirements for flood hazard areas

NYC



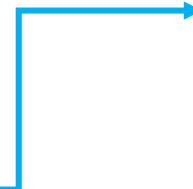
Building Code (DOB)

Requires new buildings and substantial improvements to meet FEMA standards



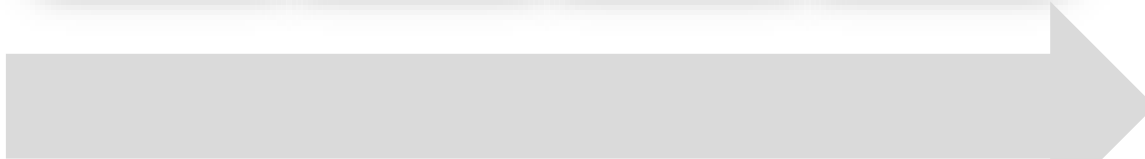
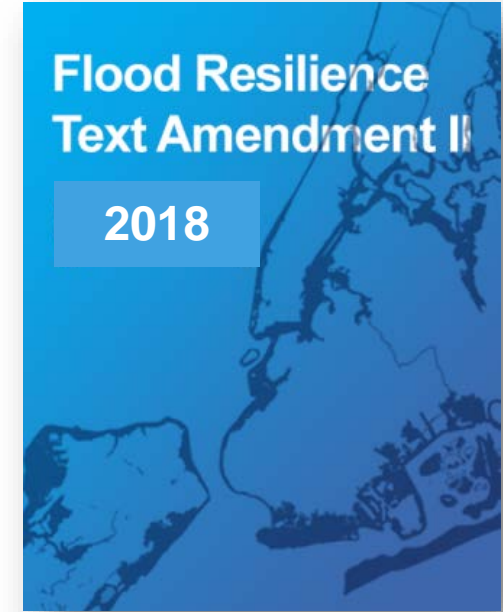
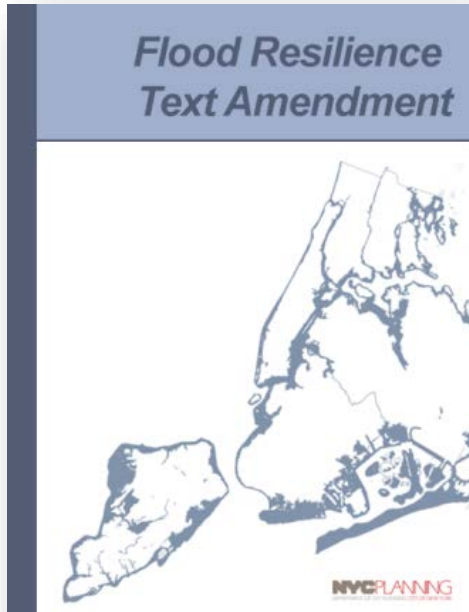
Zoning Resolution (DCP)

Zoning accommodates these regulations and improves neighborhood character





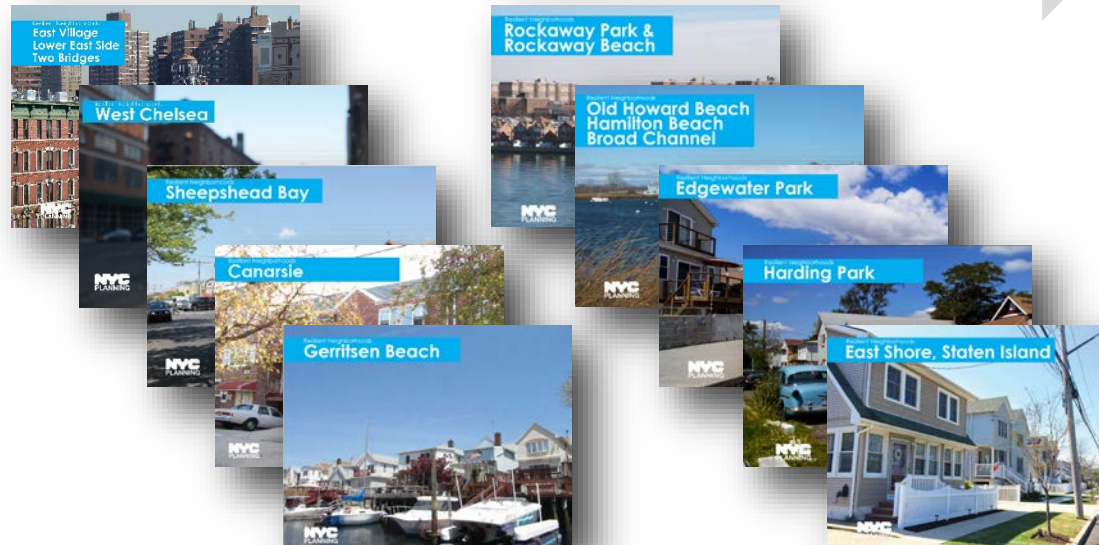
# Flood Resilience Zoning Projects at DCP



**2013**

**“Flood Text”**

initial temporary regulations to facilitate recovery

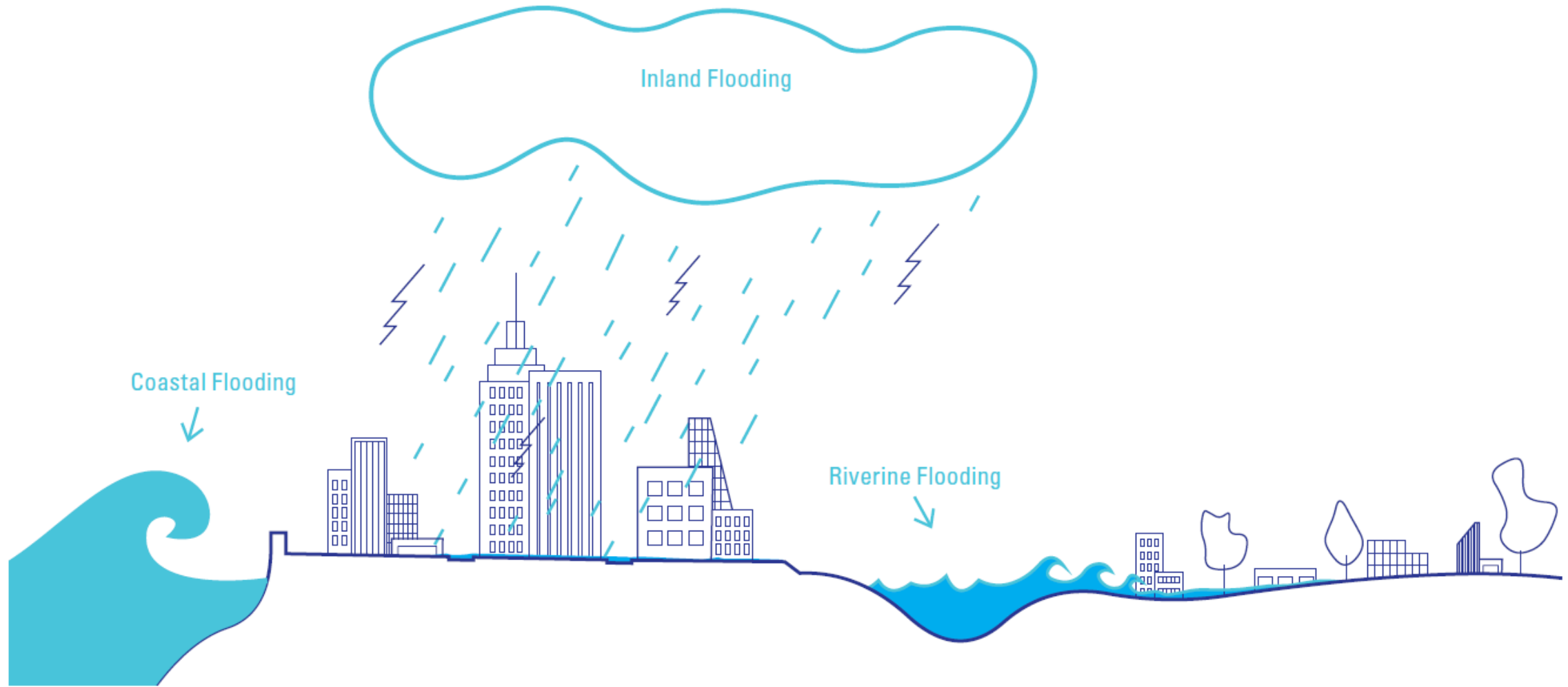


**2018**

**“Flood Text Update”**  
improve upon, and make permanent, the Flood Text

# Types of Flooding

## Citywide Flood Risk



FLOOD TYPES

# FEMA Flood Map

## Citywide Flood Risk

NYC's flood risk is high.

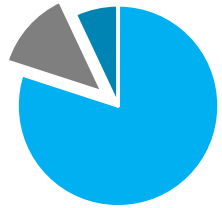
The floodplain affects a large geography and most community and council districts.

### 100 Year Floodplain

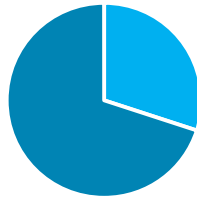
FEMA 2015 PFIRM

Population: **400,000**  
Buildings: **71,500**

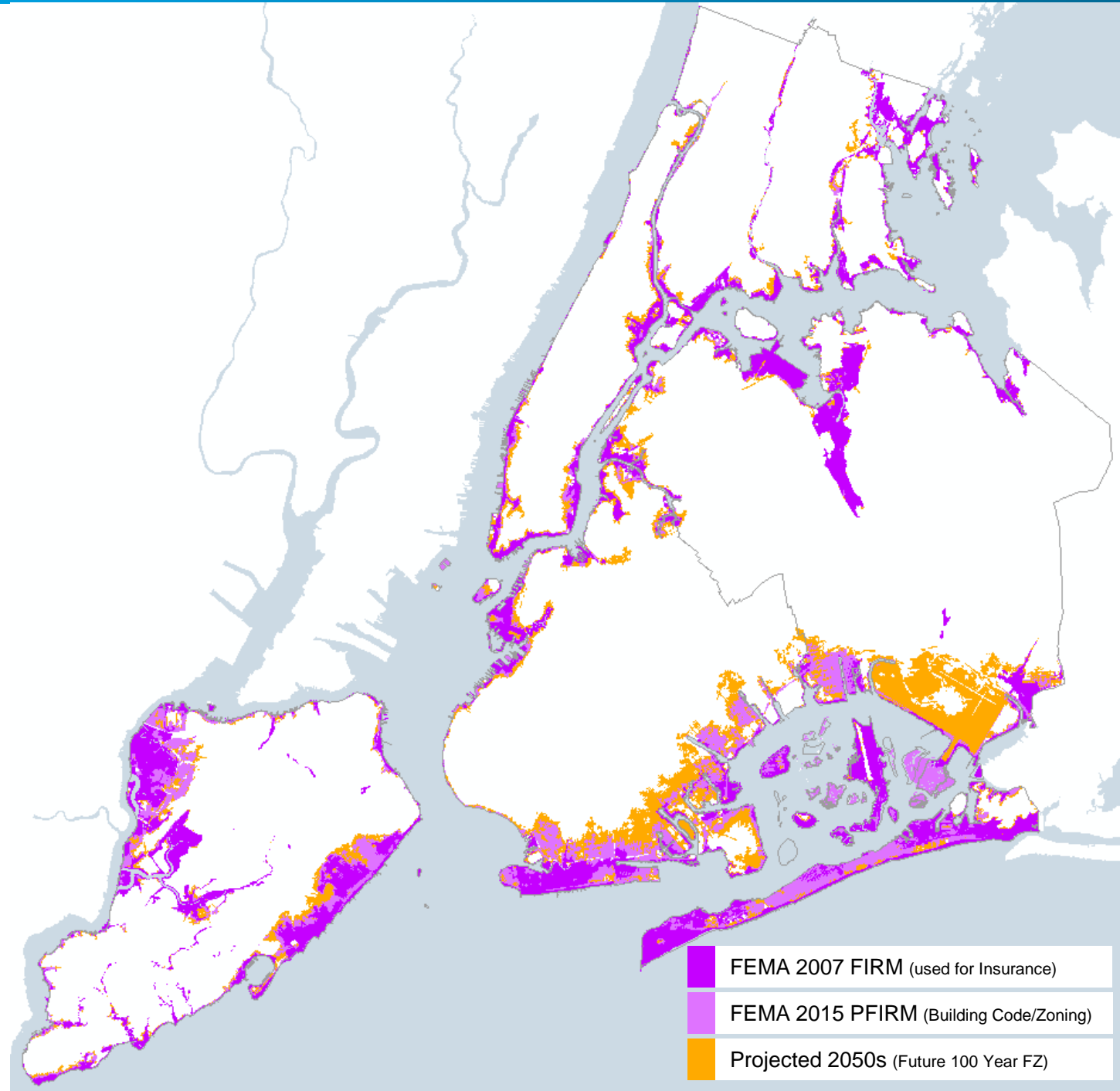
**50** of 59 Community Boards  
**45** of 51 Council Districts



Buildings:  
**80%** 1-4 units  
**7%** 5+ units  
**13%** nonresidential



Residential  
Units:  
**30%** 1-4 units  
**70%** 5+ units



FEMA 2007 FIRM (used for Insurance)

FEMA 2015 PFIRM (Building Code/Zoning)

Projected 2050s (Future 100 Year FZ)



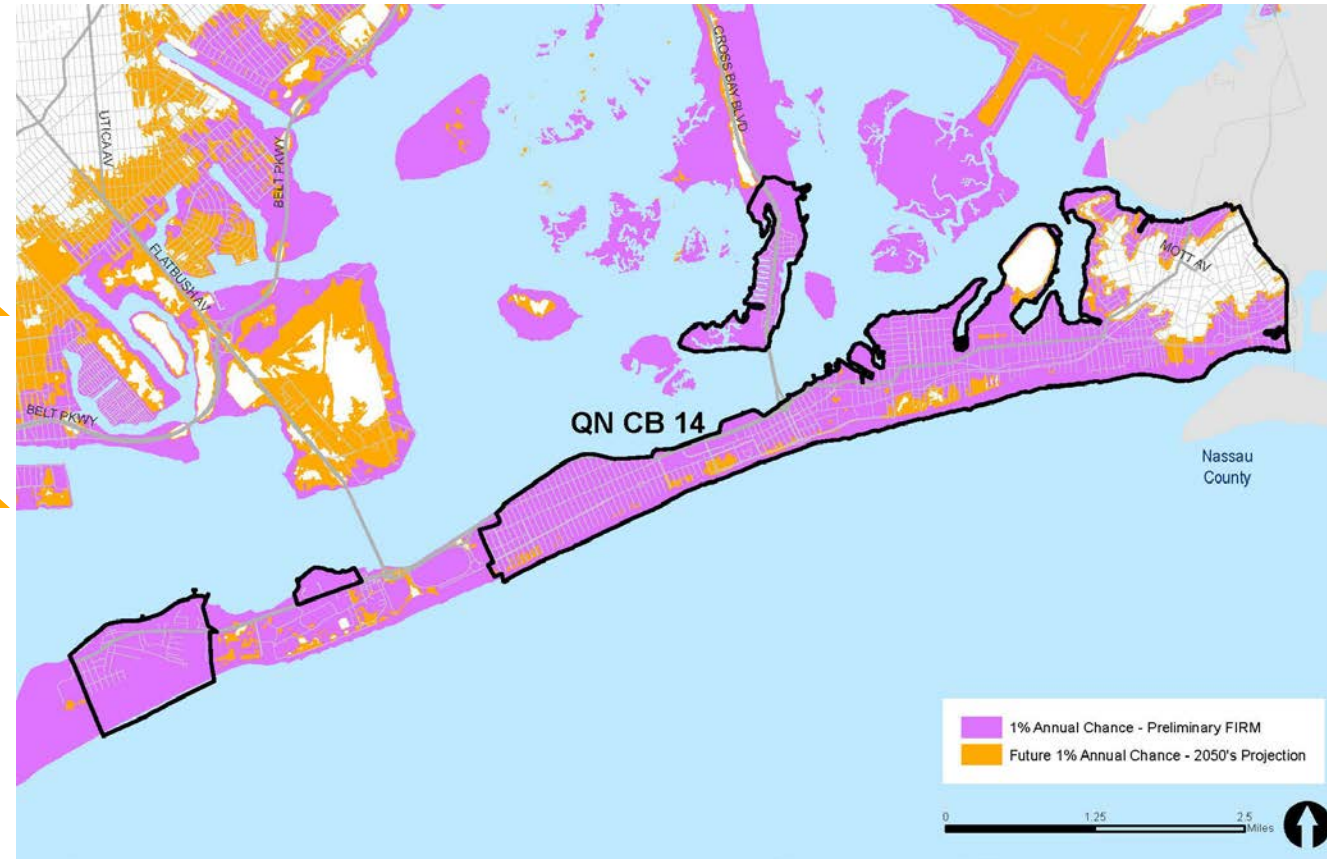
# Future Flood Map

## Flood Risk in QN CB 14

|                         | 2015<br>PFIRMS | 2050's<br>Projected |
|-------------------------|----------------|---------------------|
| R units in floodplain   | 37,460         | 39,930              |
| Buildings in floodplain | 16,510         | 17,650              |
| % buildings in QN CB 14 | 80%            | 85%                 |

↑ 7%

↑ 7%



# Urban Design Principles

The future of NYC coastal communities:



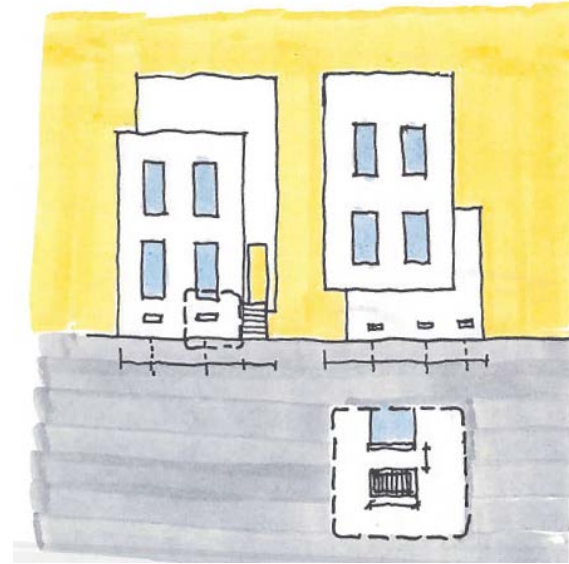
## PLACE

Preserve  
Neighborhood  
Character



## EQUITY

Ensure  
Inviting Access



## DETAIL

Encourage Dynamic  
and Thoughtful  
Architecture



## COMFORT

Maintain Street  
Vitality and Safety



# Rockaways – Neighborhood Character



**Small bungalows –**  
1-2 stories, detached, wood frame

**Larger homes –**  
2-3 stories, 1-4 family, masonry and wood frame, detached and semi attached

**Multifamily apartment buildings –**  
2-6 stories, some mixed-use, masonry, concrete, and steel frame, attached and semi attached

**Large scale apartment buildings –**  
6+ stories

**Commercial corridors –**  
1-2 stories

**Industrial lots –**  
1 story, large buildings with parking



# Rockaways – Neighborhood Character





# Rockaways – Neighborhood Character



Rockaway Park



Belle Harbor



Arverne by the Sea



# Rockaways – Neighborhood Character



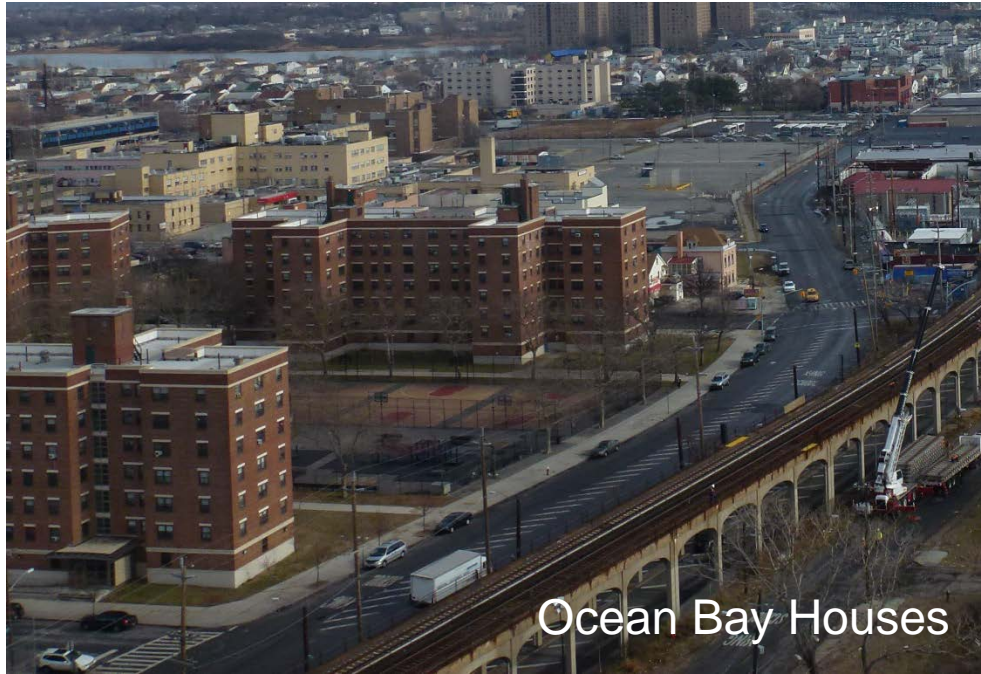
Rockaway Beach – Rockaway Beach Blvd.



Rockaway Beach – Shorefront Parkway



# Rockaways – Neighborhood Character



Ocean Bay Houses



Arverne View



# Rockaways – Neighborhood Character

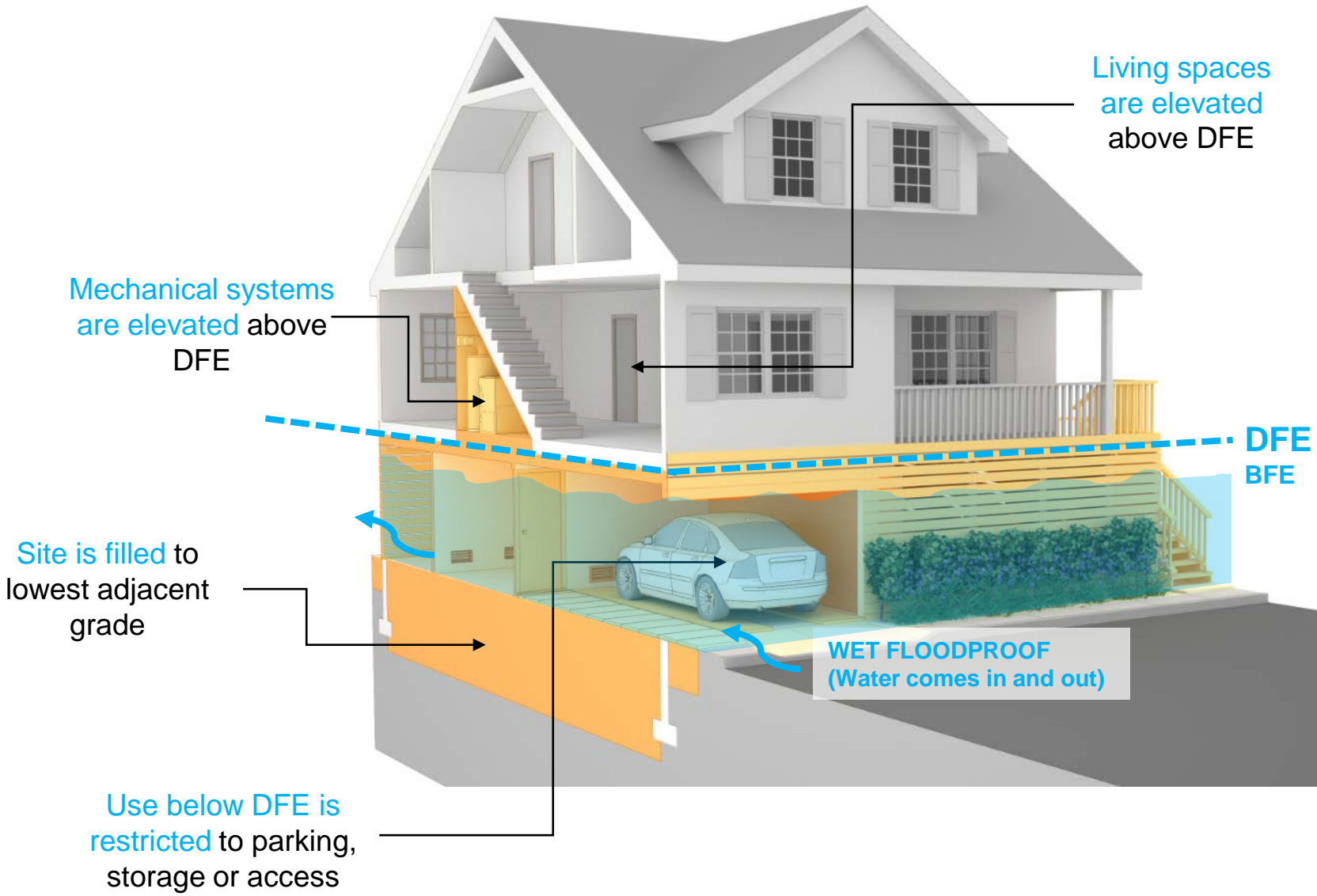


# Flood resilient construction

## Required by DOB

Building Code (DOB)

**Flood resilient construction** standards require certain buildings to elevate the lowest floor, as well as mechanical equipment, above the Design Flood Elevation (DFE).





# Flood resilient construction

## Examples of Residential Buildings

Building Code  
(DOB)



Residential Building  
Elevated to DFE



Residential Building Under Construction  
Elevated to DFE



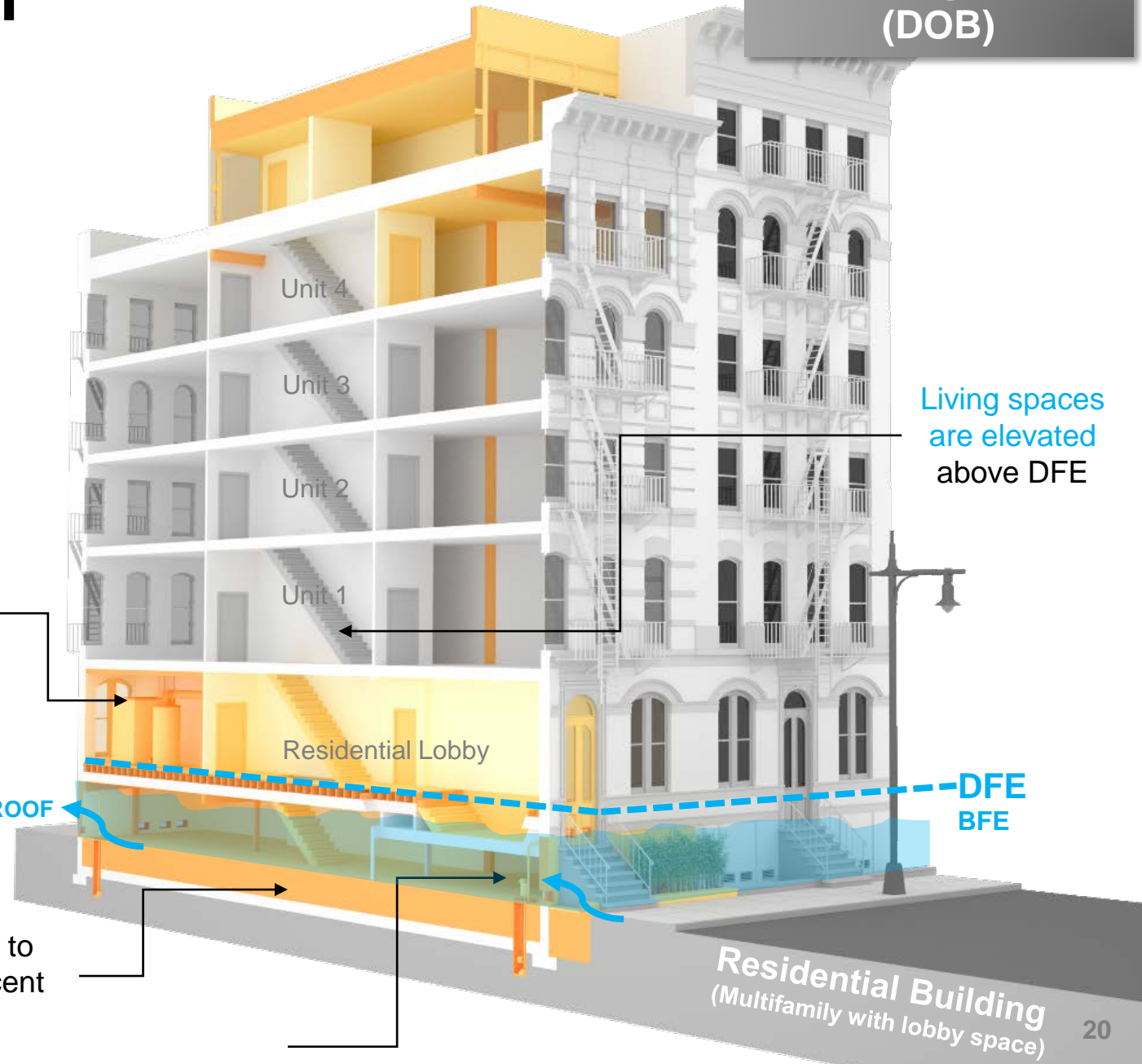
# Flood resilient construction Required by DOB

Flood resilient construction standards require certain buildings to elevate the lowest floor, as well as mechanical equipment, above the Design Flood Elevation (DFE).

Mechanical systems are elevated above DFE

WET-FLOODPROOF

Site is filled to lowest adjacent grade



Building Code  
(DOB)

Living spaces  
are elevated  
above DFE

Unit 4

Unit 3

Unit 2

Unit 1

Residential Lobby

DFE  
BFE

Residential Building  
(Multifamily with lobby space)

# Flood resilient construction

## Examples of Residential Buildings

Building Code  
(DOB)



Residential Building  
with access at grade (wet-floodproofed)



Residential Building  
Elevated to DFE – 3' above grade

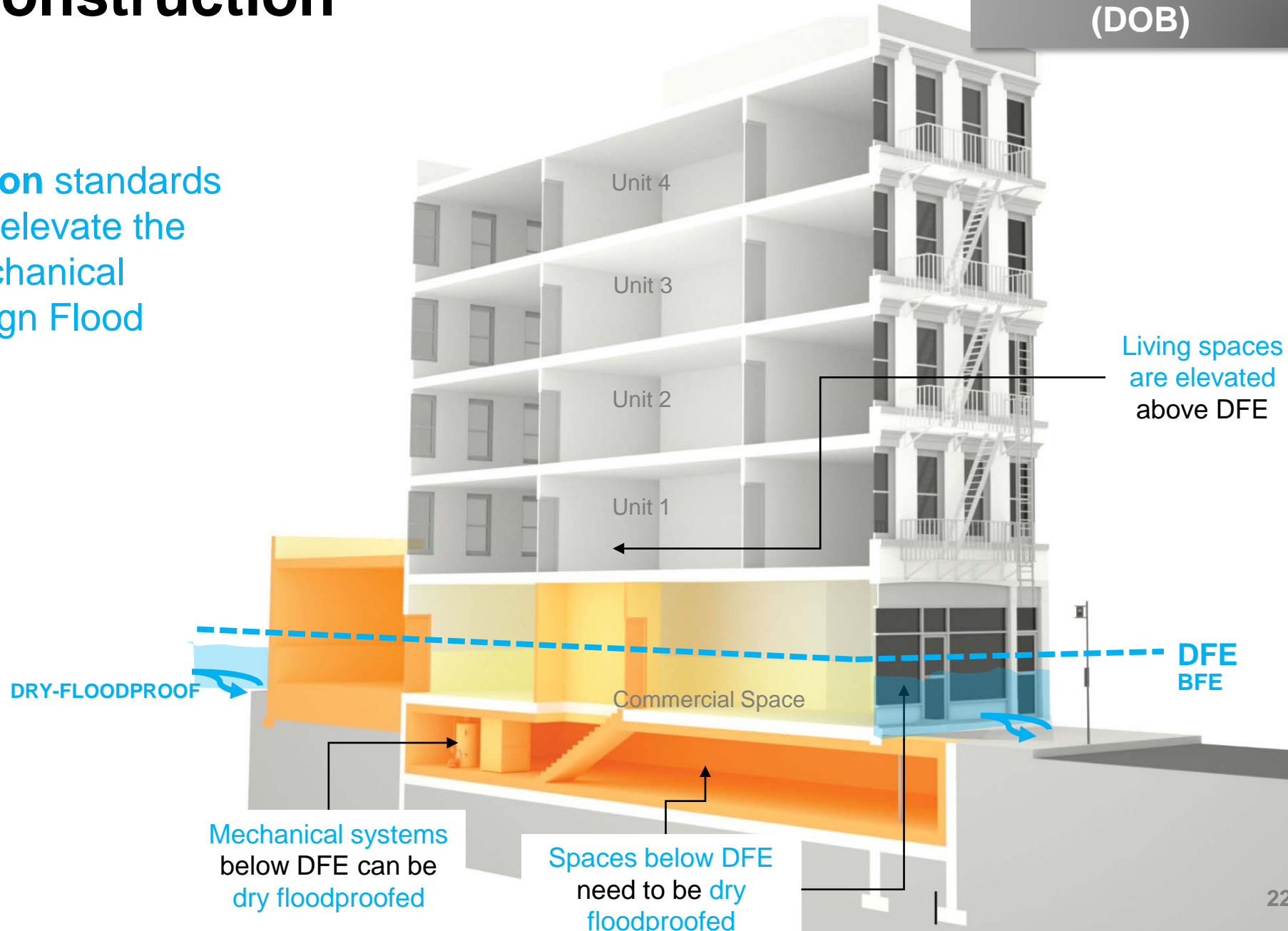


# Flood resilient construction

## Required by DOB

Building Code  
(DOB)

Flood resilient construction standards require certain buildings to elevate the lowest floor, as well as mechanical equipment, above the Design Flood Elevation (DFE).



# Flood resilient construction

## Examples of Commercial Buildings

Building Code  
(DOB)



Commercial Ground Floor  
Existing Building with access at grade (deployable flood shields)



Commercial Ground Floor  
Elevated to DFE - 2.5'

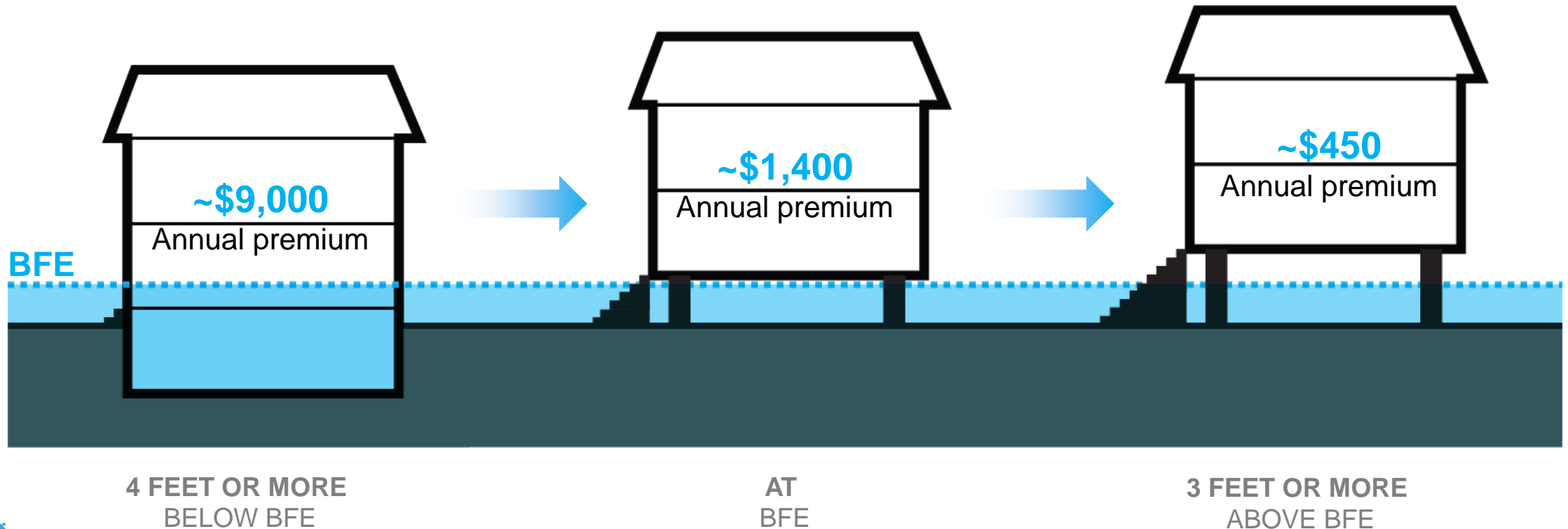
# Flood insurance rates

## Set by FEMA



Raising or retrofitting your building or home will reduce costs

FEMA's flood insurance premiums are lowest when the lowest inhabited floor (any area not used solely for storage, access or parking) is elevated above the **Base Flood Elevation (BFE)**.

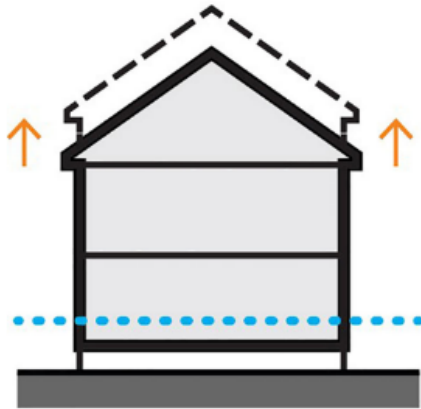




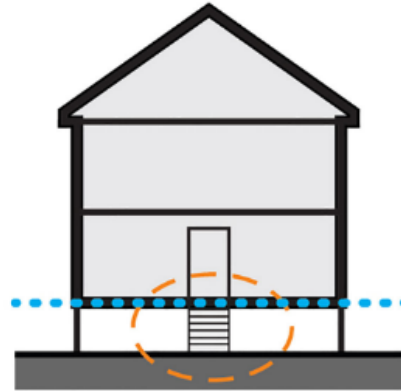
# 2013 Citywide Flood Text

Amended zoning in six key areas

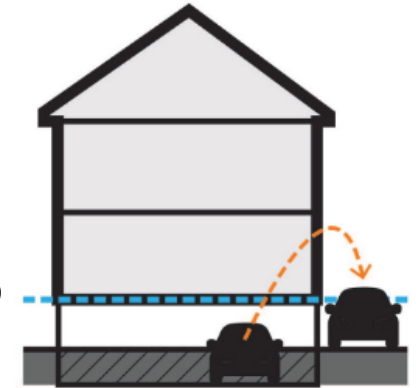
**1**  
**Height**  
Measured from flood elevation



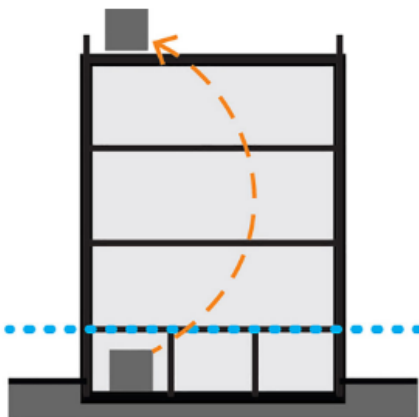
**2**  
**Access**  
Flexibility for stairs, ramps, lifts



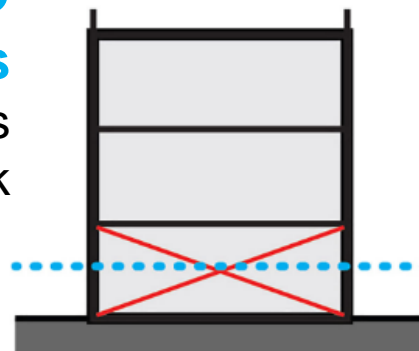
**3**  
**Parking**  
Flexibility to relocate parking



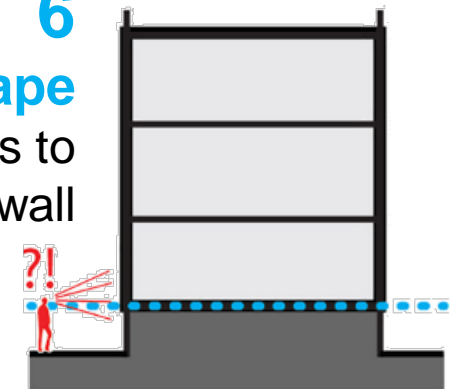
**4**  
**Systems**  
Flexibility to relocate/elevate



**5**  
**Ground Floors**  
Account for costs of new flood risk



**6**  
**Streetscape**  
Require features to mitigate blank wall



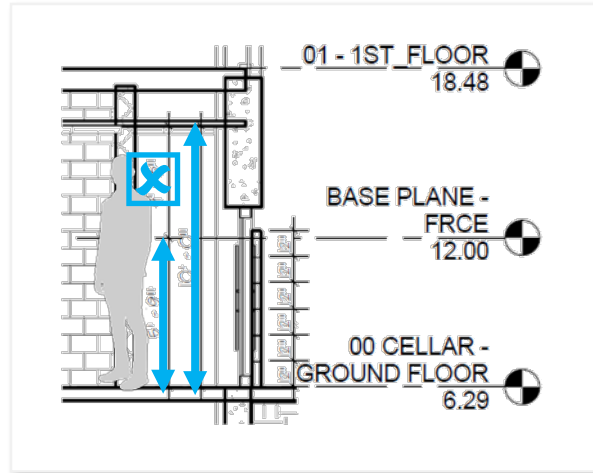
# Flood Text Update

Need for a new citywide text amendment:



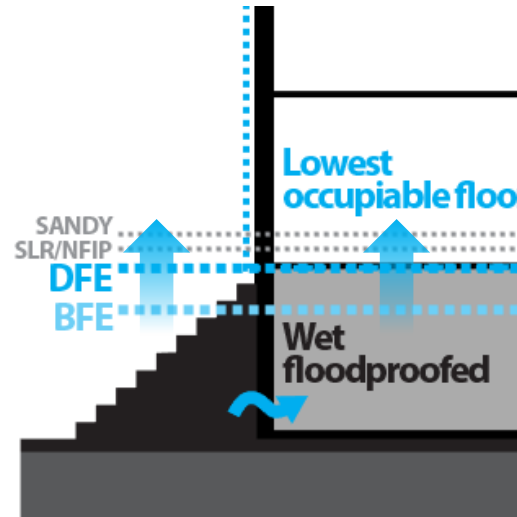
1

Make the provisions of the current, temporary 2013 Flood Text permanent



2

Fix and improve provisions based on studies and lessons learned in six key areas



3

Begin to promote new development + proactive retrofitting to high resiliency standards



4

Encourage good resilient construction that enhances the character of coastal communities



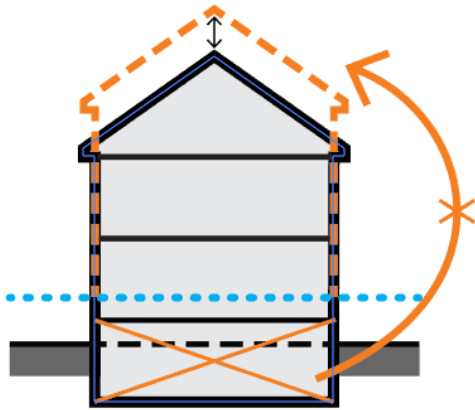
# Flood Text Update

Fix and improve provisions based on lessons learned

1

## Height

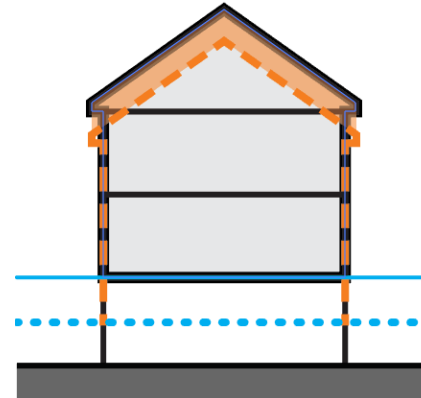
Homeowners may face the loss of subgrade spaces when retrofitting



2

## Height

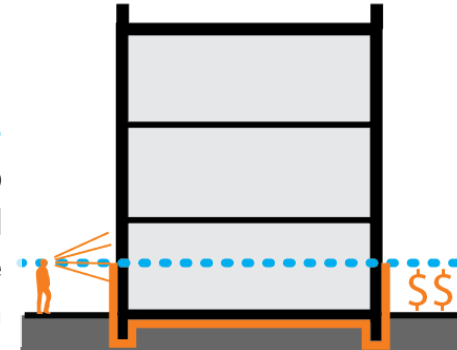
Property owners may want to address future risk by over-elevating



3

## Ground Floors

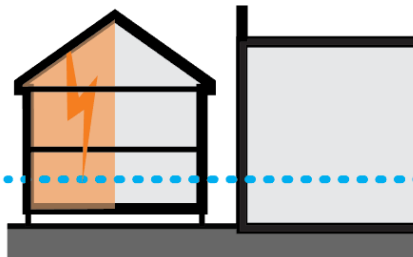
Current incentives to keep active ground floors may not be enough



4

## Homes in M Districts

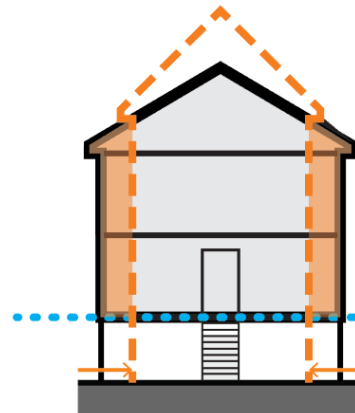
Existing homes in M. Districts, if damaged, may not be able to rebuild



5

## Old Homes in Small Lots

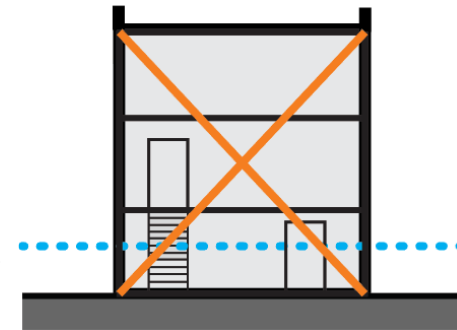
Old homes on small lots may need more flexibility to rebuild in the future



6

## Improve Streetscape

Mitigate the effects of elevated buildings on neighborhood character



# Outreach Resources



## NYC Flood Hazard Mapper

[www.nyc.gov/floodhazardmapper](http://www.nyc.gov/floodhazardmapper)

Info briefs on Flood Resilience Zoning, Flood Risk, Flood Resilient Construction, and Flood Insurance (available in 6 other languages!)

[www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods)

### NYC PLANNING Info Brief Flood Insurance

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 business.
- Even properties far from the coast are at risk of flooding.
- Homeowner and property insurance do not cover damage by flooding. You need 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 FIRM (to the 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 National Flood Insurance Program (NFIP) limits, or the outstanding mortgage balance, whichever is lower. Failure to do so may require mortgage servicers to purchase a policy for you—possibly at a higher price—over the cost through monthly mortgage payments. Homeowners without a federally backed mortgage or outside a high-risk flood zone may carry up to the maximum policy limit with additional contents coverage up to \$100,000 for owners or renters. Co-tenanted multifamily buildings and business properties can be covered up to \$500,000. Businesses and tenants can also purchase up to \$500,000 in contents coverage.

NYC Planning | November 2016

### NYC PLANNING Info Brief Flood Risk in NYC

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.

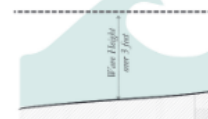
#### Flood Risks

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

For building code, zoning, and planning purposes, flood risk in NYC is regulated by FEMA's 2015 Preliminary Flood Rate Maps (PFIRMs).

- PFIRMs show the extent to which waters are expected to rise during a 1% annual chance flood event that has a 1% annual chance of occurring. This height is denoted as Flood Elevation (FE) on the maps.
- The 1% annual chance floodplain, sometimes referred to as the 100-year floodplain, is the area that is expected to be flooded within 100 years. In the 1% annual chance floodplain, there is a 26% chance over the life of a 30-year mortgage that a flood will occur.

For flood insurance purposes, the 1% annual chance floodplain with a federally backed mortgage are mandated by law to purchase flood insurance.



The 1% annual chance floodplain is divided into different degrees of flood risk: V and Coastal Flood, but not wave damage. The map shows areas with a lower annual chance of flooding.

NYC Planning | November 2016

### NYC PLANNING Flood Resilience Zoning

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. The Flood Resilience Zoning Text is one part of a wide range of efforts by the City to recover from Hurricane Sandy, promote rebuilding, and increase the city's resilience to climate-related events.

#### Overview

The Flood Text enables and encourages resilient building construction through designated floodplains.

The Flood Text modified zoning to regulate buildings that hindered or impeded the reconstruction of storm-damaged buildings by enabling new and existing buildings with new, higher flood elevations issued by the Federal Emergency Management Agency (FEMA), and to comply with new requirements from the New York City Building Code.

It also introduced regulations to mitigate negative effects of flood resilient construction on the public realm. The text was adopted on a temporary, emergency basis. The future update of this text, guided by community input, will aim to make the text more responsive to lessons learned during the rebuilding process.

#### Where is the Flood Text Applicable?

The Flood Text is available to build in designated floodplains entirely or partially within annual chance floodplains.

These rules can be found in Article 24 of the Zoning Resolution and, if utilized, require the building to fully comply with resilient construction standards found in the New York City Building Code. Some provisions, such as elevation certification, are available to all buildings in the floodplain, even if not fully compliant with Appendix G.

For more information about the Flood Resilience Zoning Text, visit [www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods).

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

NYC Planning | March 2017 | Flood Resilient Construction

### NYC PLANNING Info Brief Flood Resilient Construction

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.

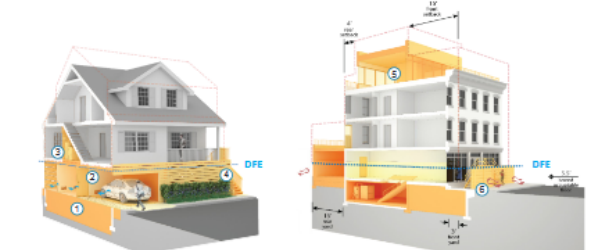
#### Overview

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.



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

NYC Planning | November 2016 | Flood Resilient Construction



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