

Flood Resilience Zoning Text

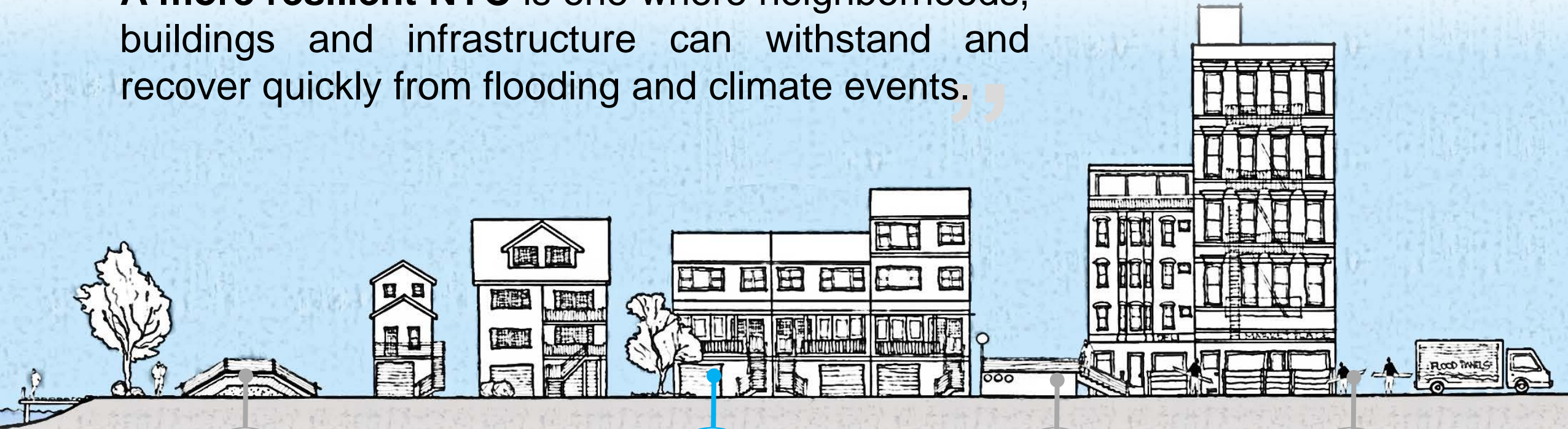
Gowanus Sustainability & Resiliency Meeting #3

April 20, 2017



#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



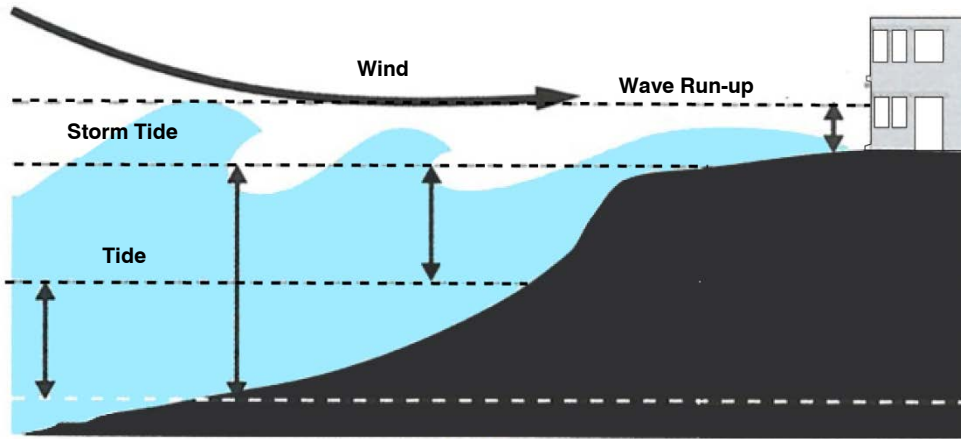
Residents and businesses

are prepared

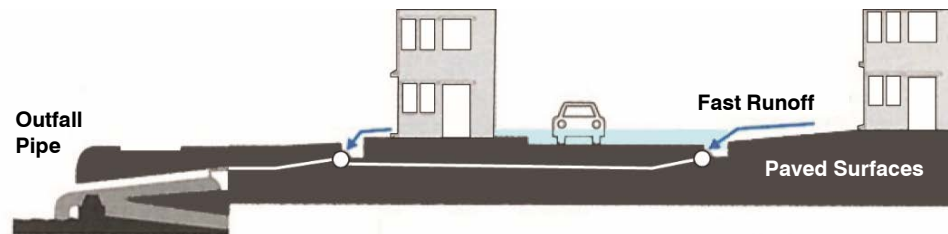
Types of Flood Risk

Stormwater vs. Coastal Storm Surge

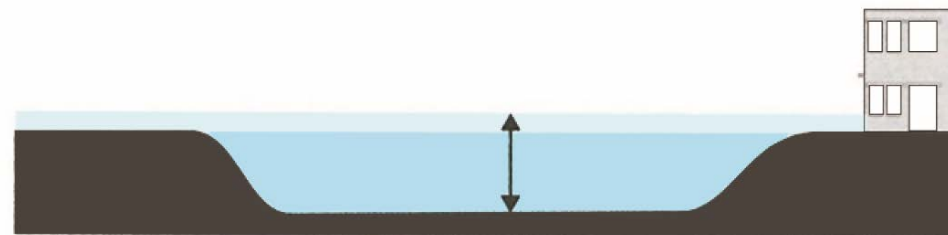
Coastal
Flooding /
Storm
Surge



Urban
Drainage /
Flash
Flooding



Riverine
Flooding



FEMA Flood Map

Citywide Flood Risk

NYC's flood risk is high.

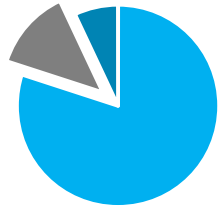
The floodplain affects a large geography and most community and council districts.

1% Annual Chance Floodplain

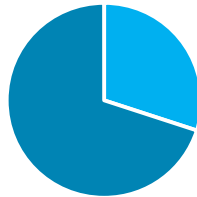
FEMA 2015 PFIRM

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

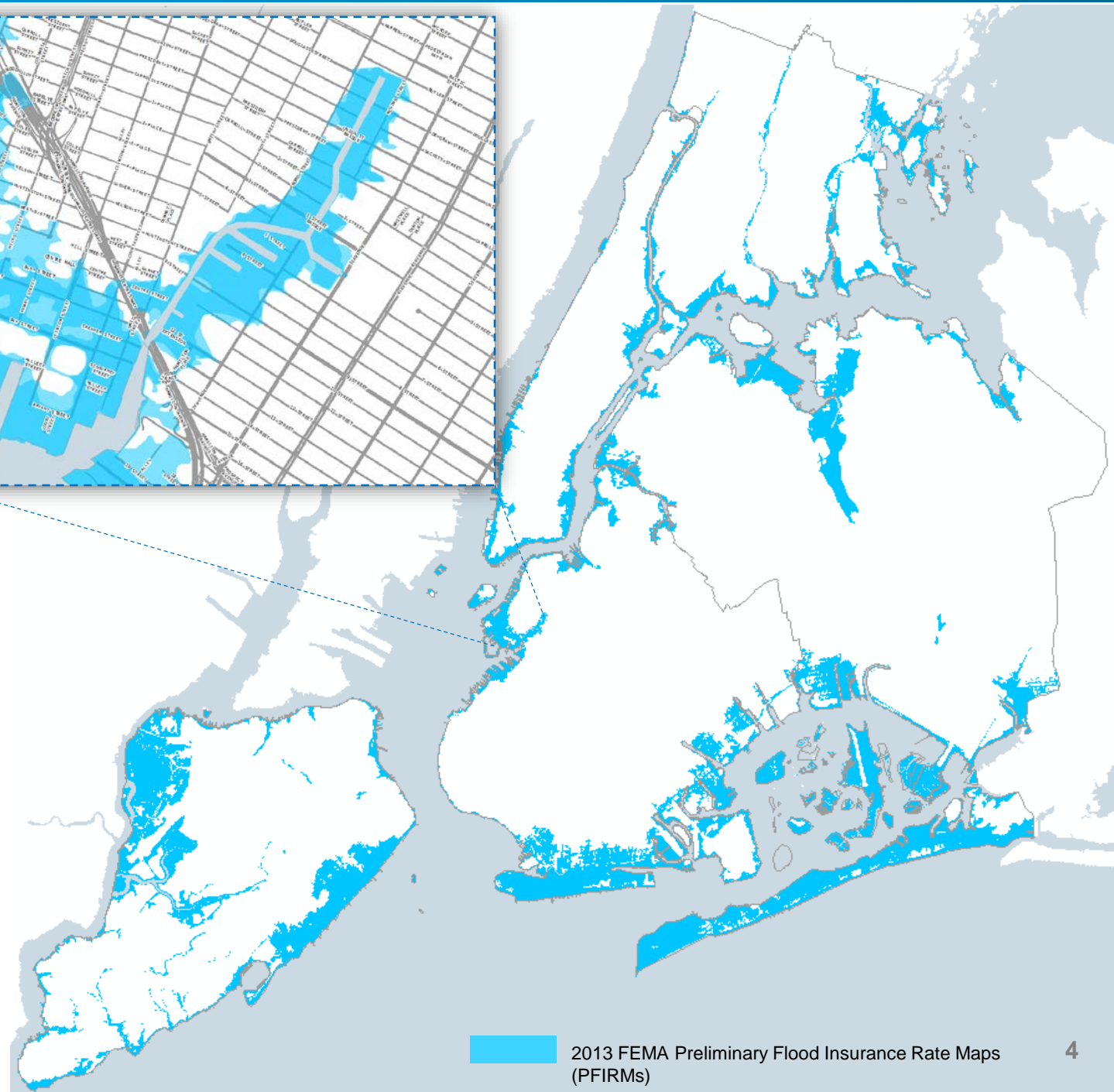
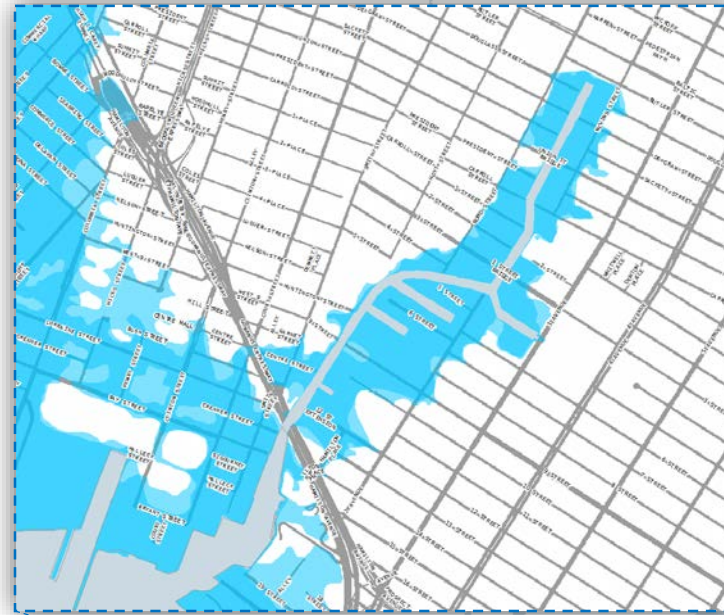
50 of 59 Community Boards
45 of 51 Council Districts



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



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



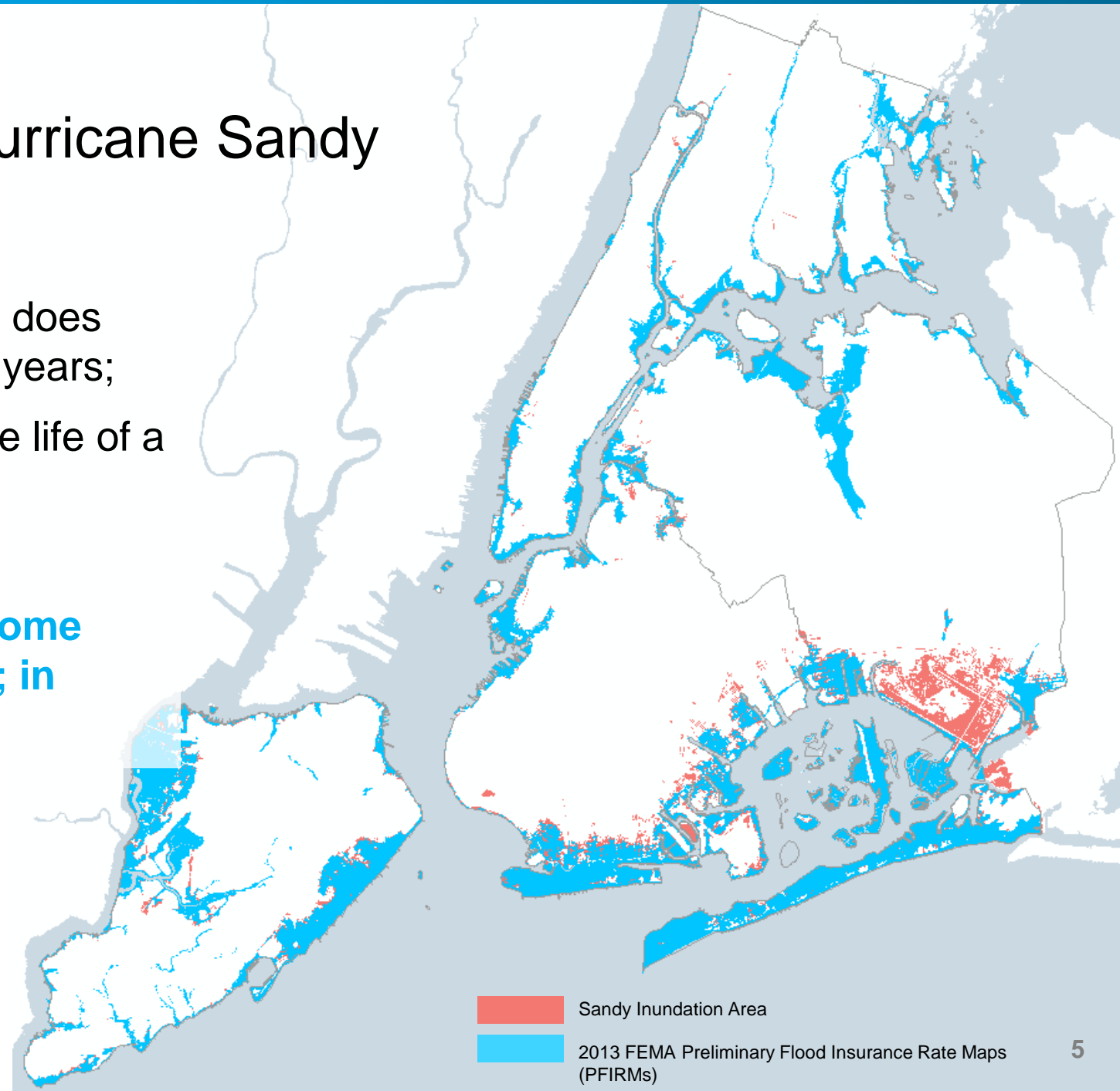
FEMA Flood Map

1% Annual Chance Storm vs. Hurricane Sandy

What does 1% annual chance mean?

- Also known as the 100yr Floodplain, but it does not mean it happens only once every 100 years;
- There is a 26% chance of flooding over the life of a 30-year mortgage.

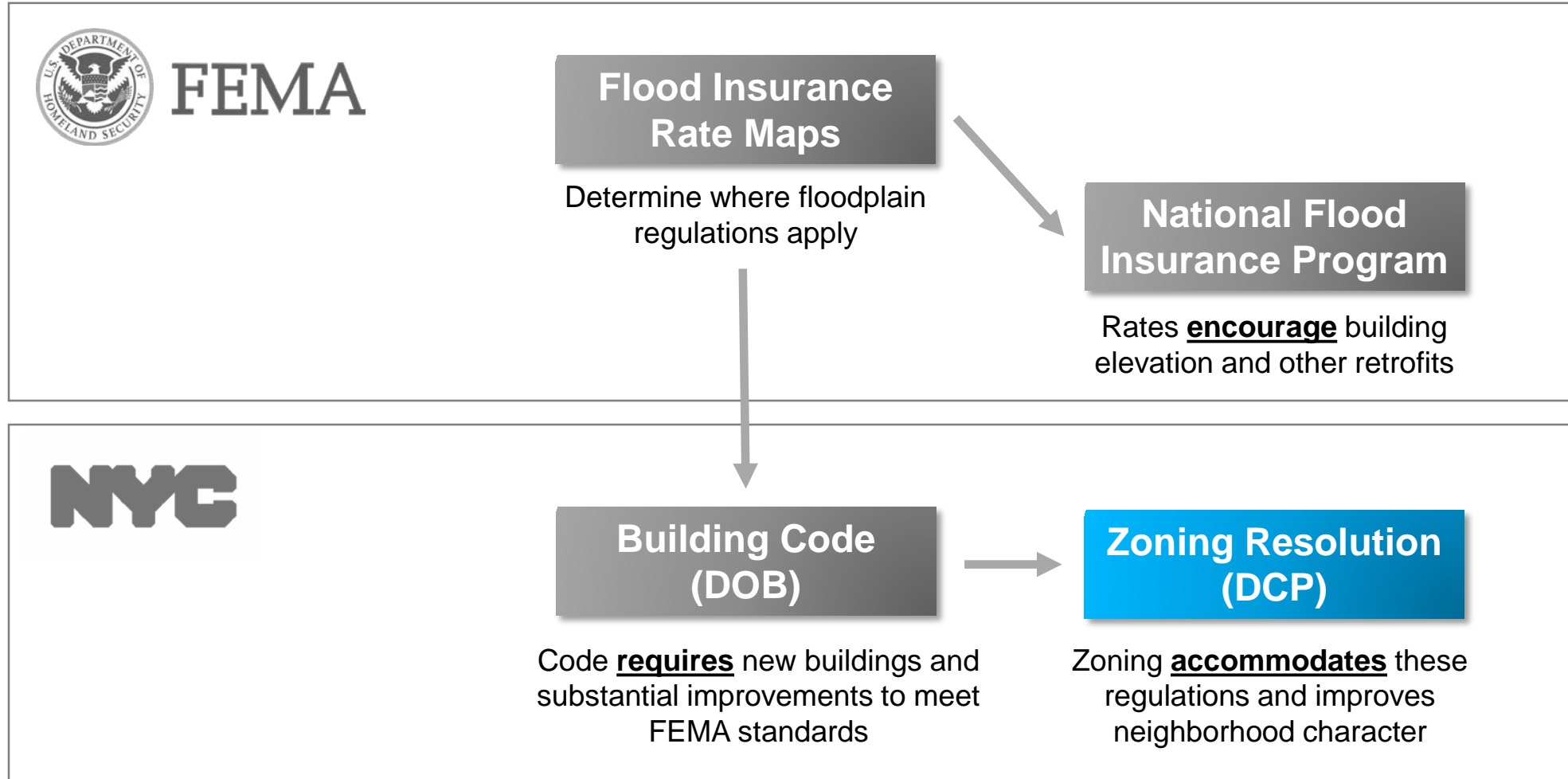
Hurricane Sandy wasn't a 1% storm – in some places, it was more significant (Brooklyn); in others it was less (Bronx).



Sandy Inundation Area

2013 FEMA Preliminary Flood Insurance Rate Maps (PFIRMs)

How are buildings in the floodplain regulated?



FEMA Flood Map

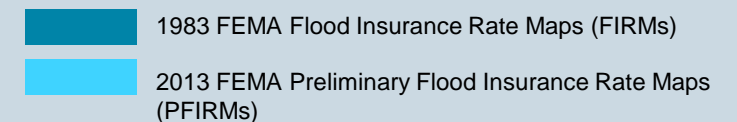
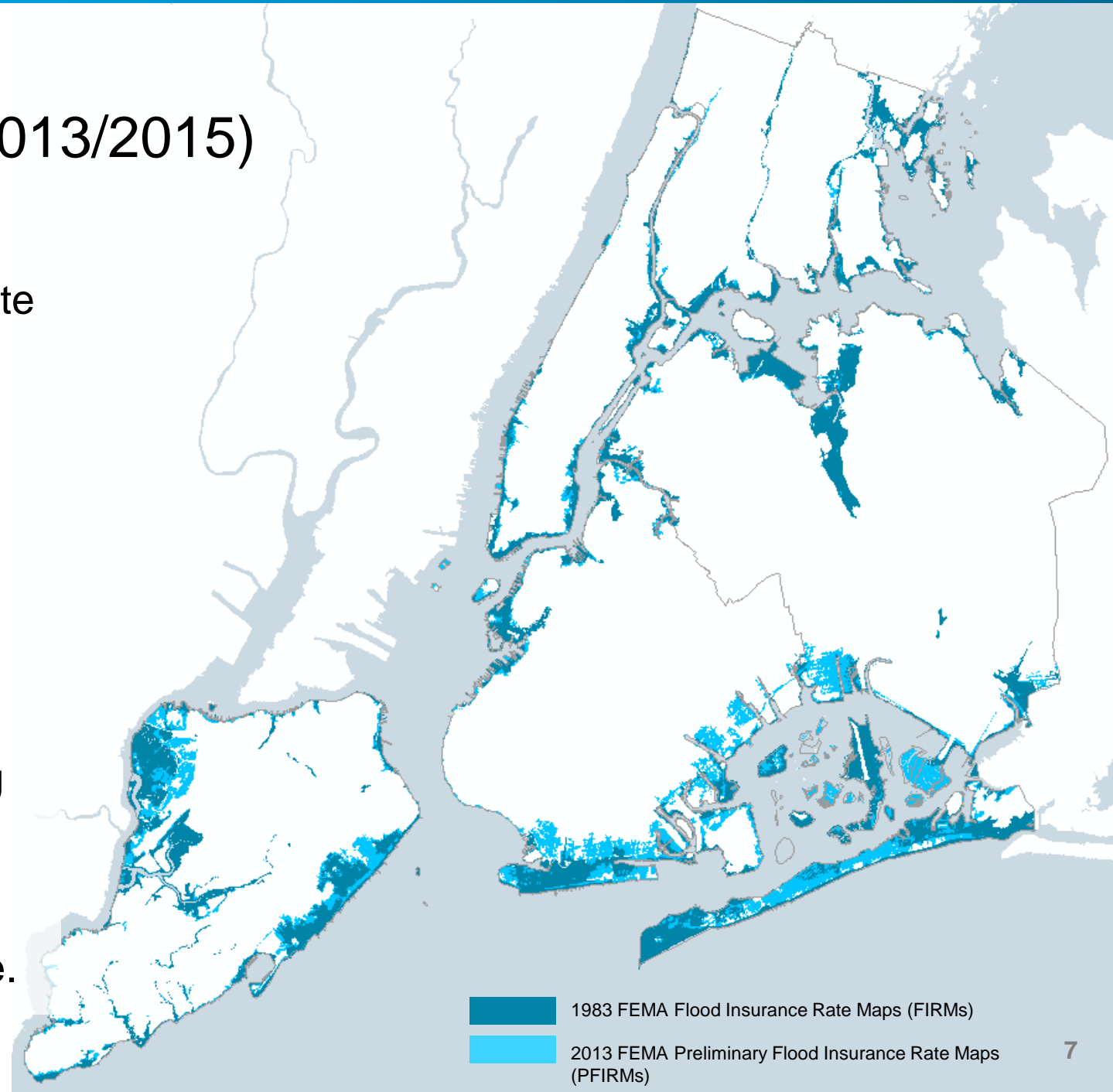
FIRM (1983/2007) vs. PFIRM (2013/2015)

Flood Insurance (FIRM)

- NYC adopted FEMA's Flood Insurance Rate Maps (FIRMs) in 1983 when it joined the NFIP program;
- This is still the map used today for flood insurance purposes.

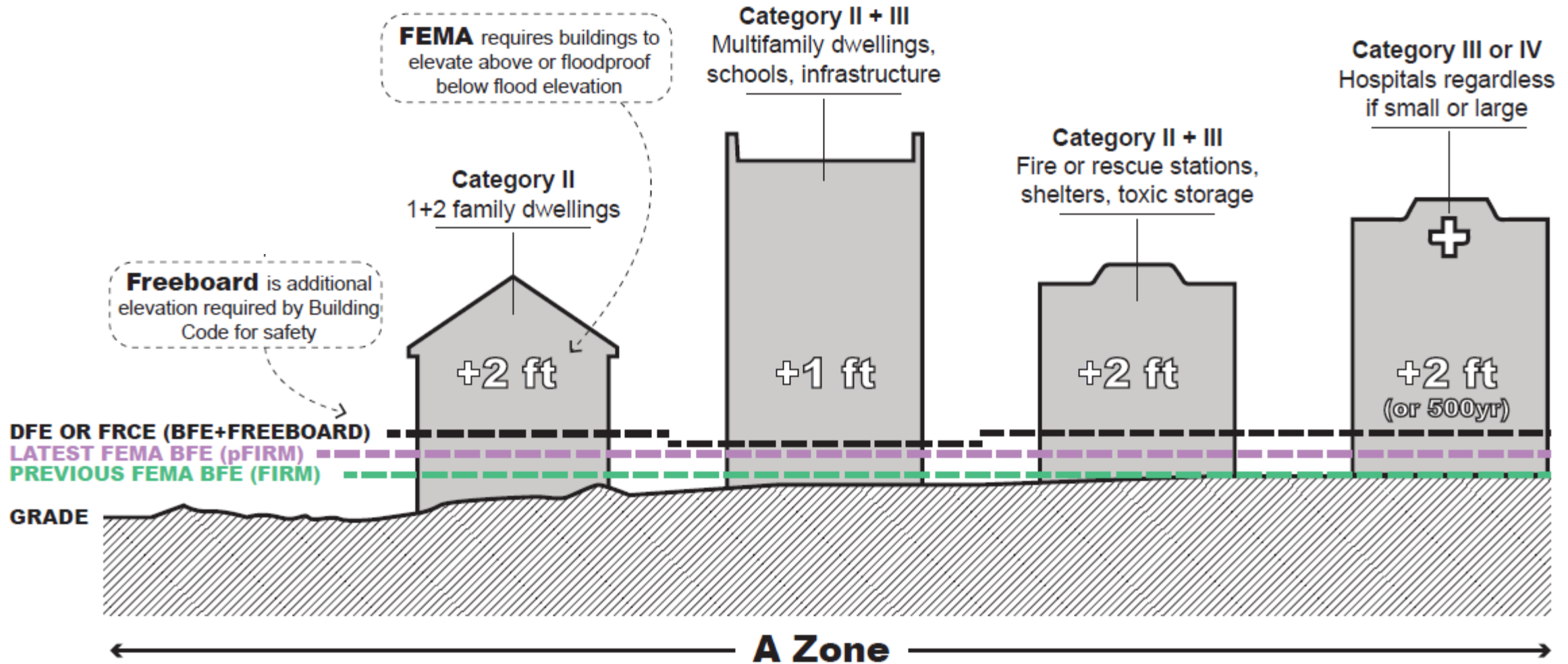
Building Code Requirements (PFIRM)

- In 2013, FEMA release preliminary maps (PFIRMs) which is used today for planning purposes:
 - Building Code is required;
 - Special Zoning regulations is available.



Flood-resistant construction

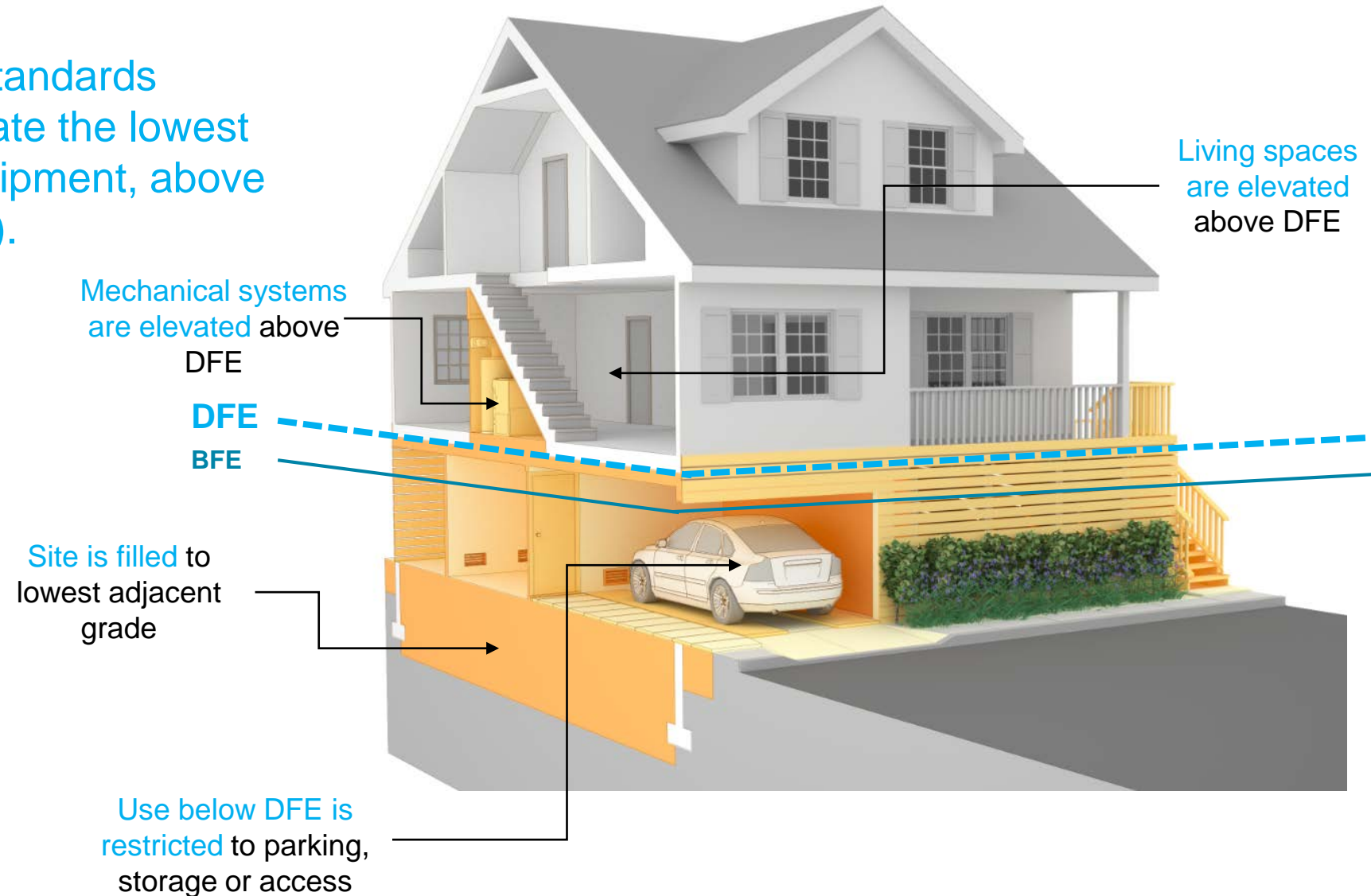
Required by DOB



Flood-resistant construction

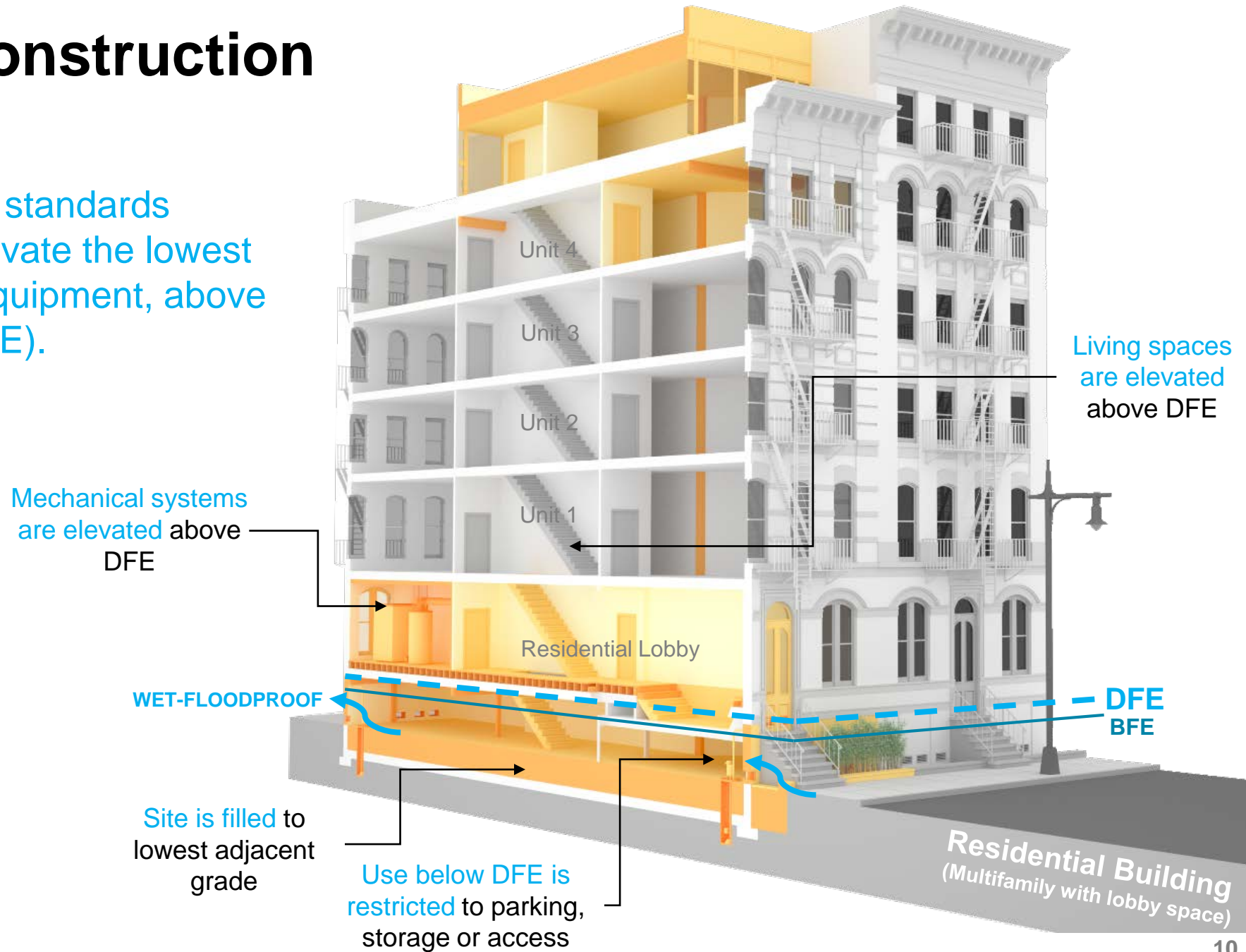
Required by DOB

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



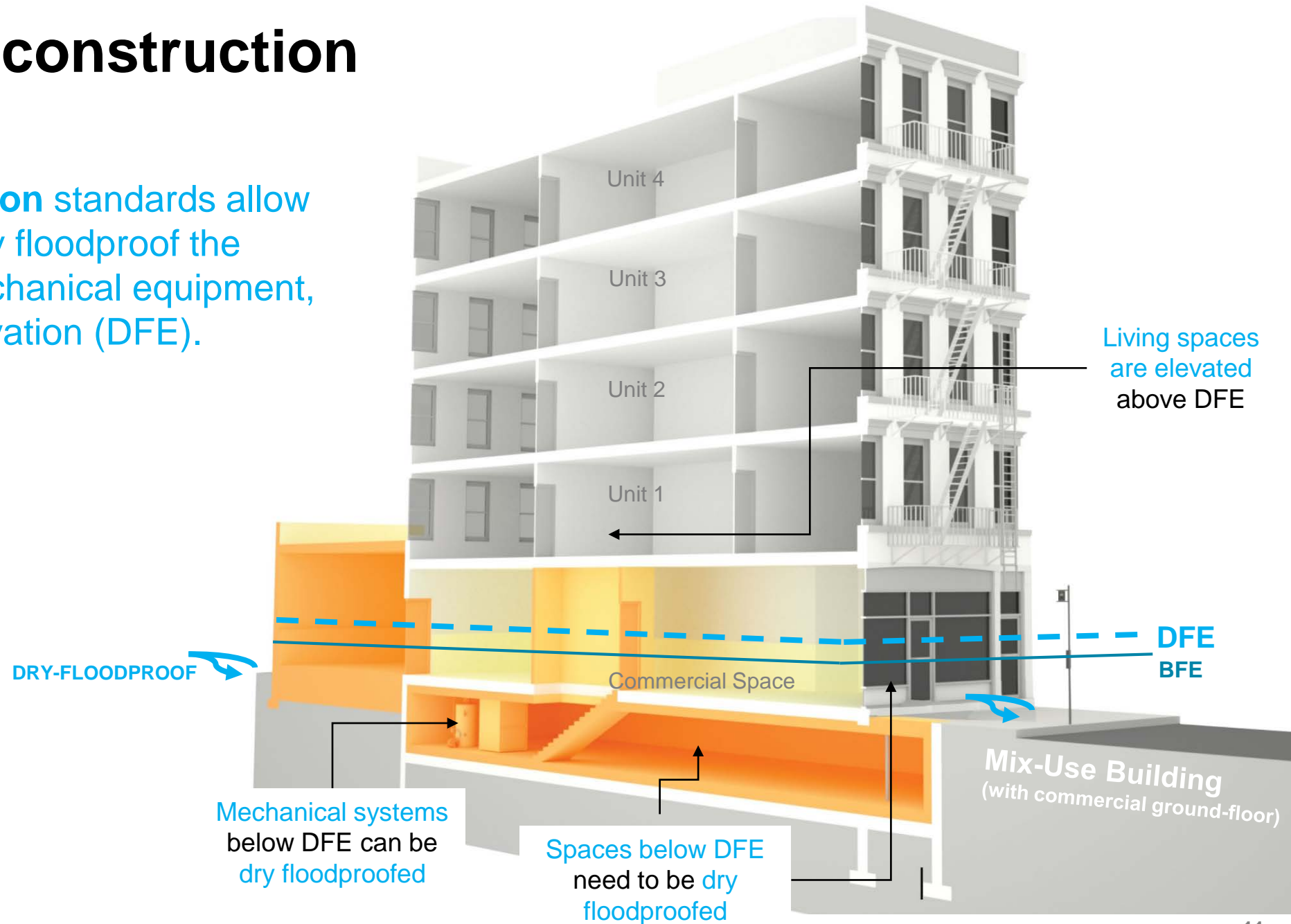
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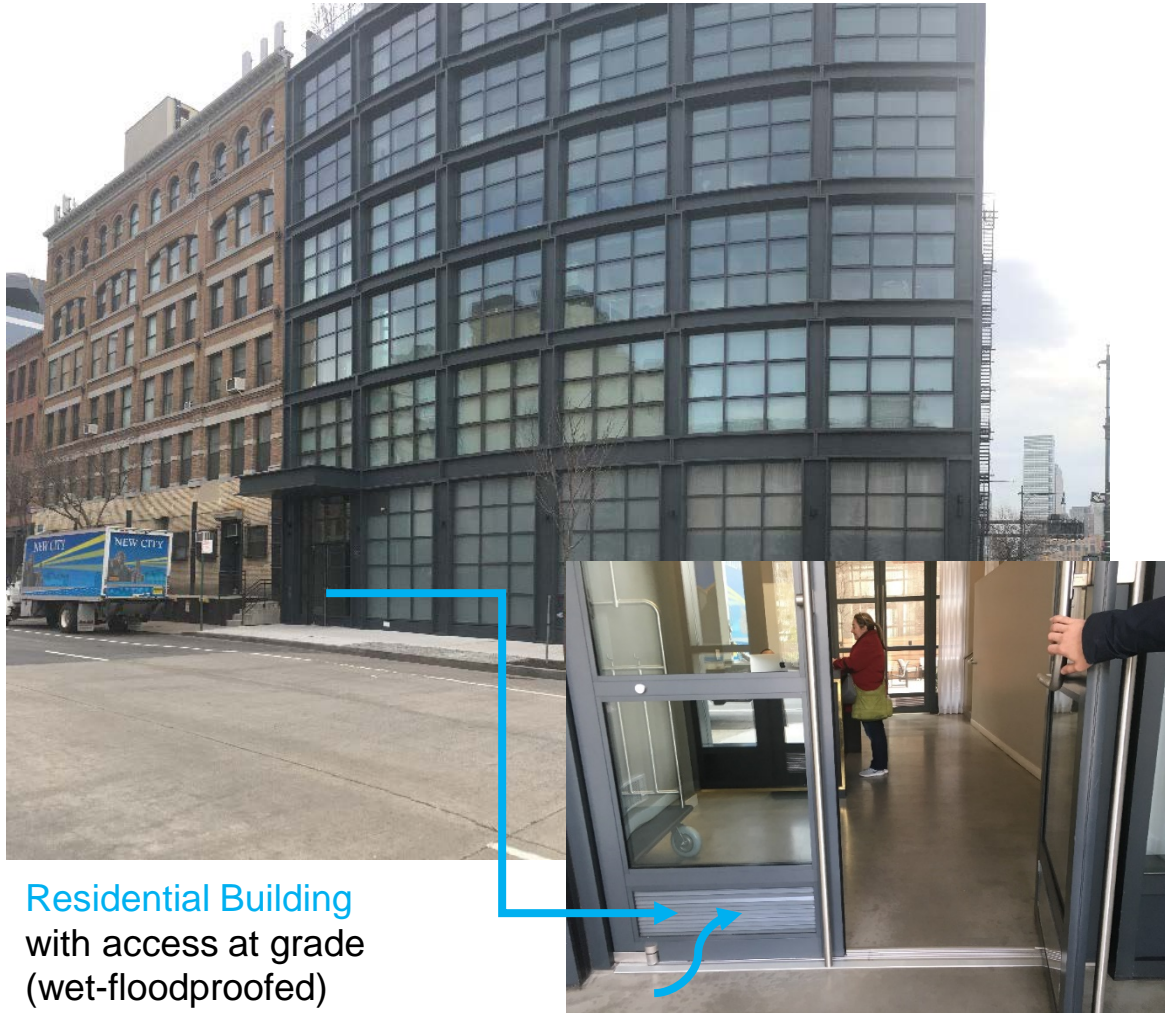
Flood-resistant construction Required by DOB

Flood resilient construction standards allow commercial buildings to dry floodproof the lowest floor, as well as mechanical equipment, below the design flood elevation (DFE).



Flood-resistant construction

Examples of Residential Buildings



Residential Building
with access at grade
(wet-floodproofed)



Residential Building
elevated to DFE

Flood-resistant construction

Examples of Commercial Buildings



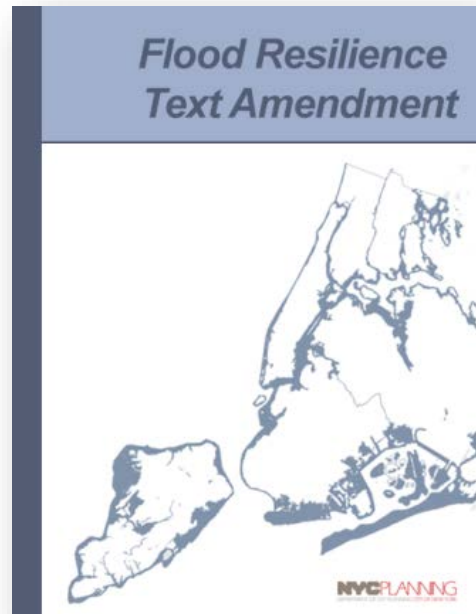
Commercial Building
with access at grade
(deployable flood shields)



Commercial Building
elevated to DFE

Flood resilience zoning

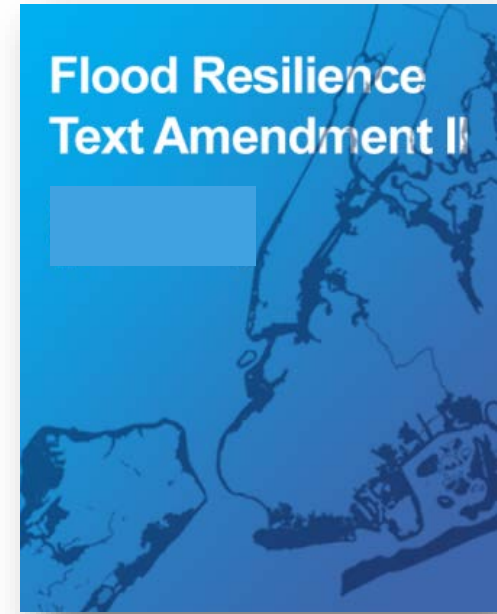
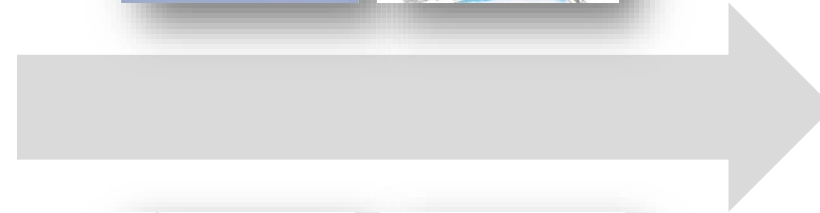
Projects at DCP



2013

“Flood Text”

initial temporary regulations
to facilitate recovery



2018

“Flood Text II”

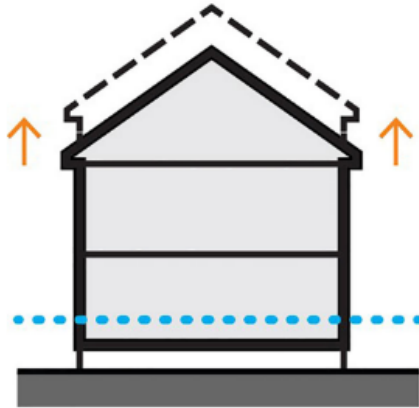
improve upon, and make
permanent, the Flood Text



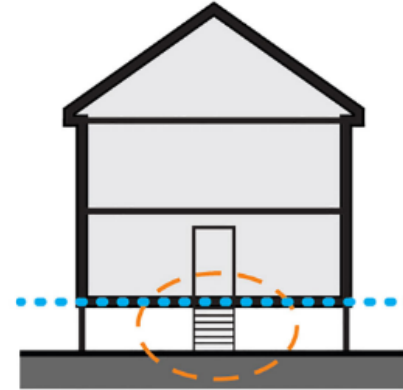
2013 Citywide Flood Text

Amended zoning in six key areas

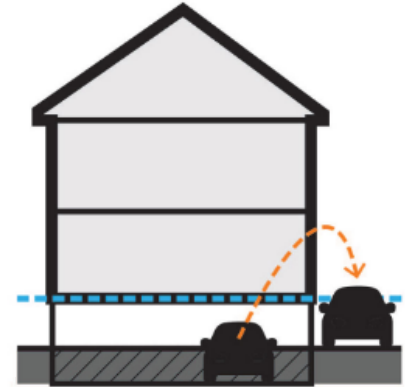
1
Height
Measured from
flood elevation



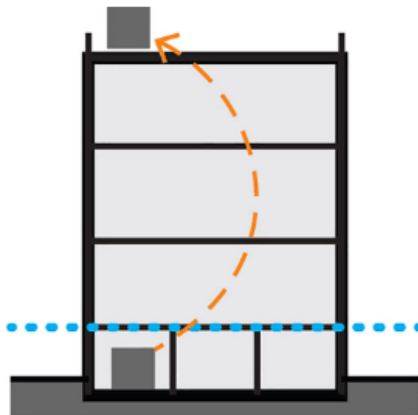
2
Access
Flexibility for
stairs, ramps, lifts



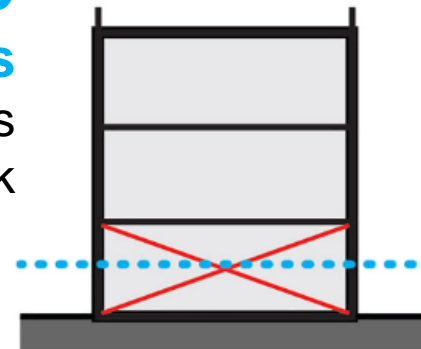
3
Parking
Flexibility to
relocate parking



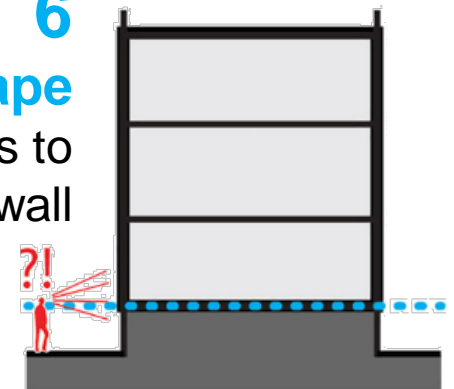
4
Systems
Flexibility to
relocate/elevate



5
Ground Floors
Account for costs
of new flood risk



6
Streetscape
Require features to
mitigate blank wall



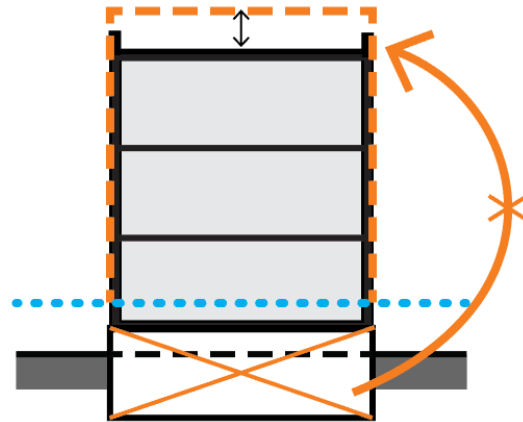
Flood Text II

Fix and improve provisions based on lessons learned

1

Height

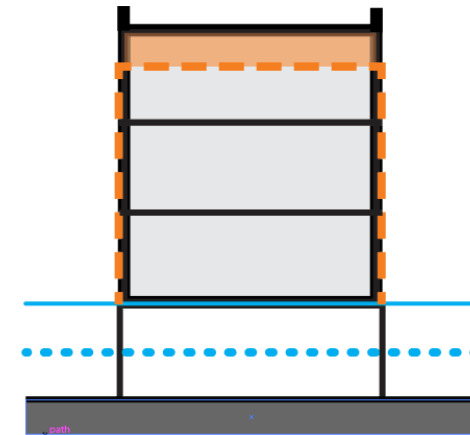
Homeowners may face the loss of subgrade spaces when retrofitting



2

Height

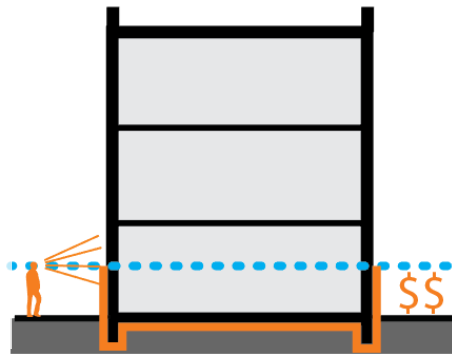
Properties owners may want to address future risk by over-elevating



3

Ground Floors

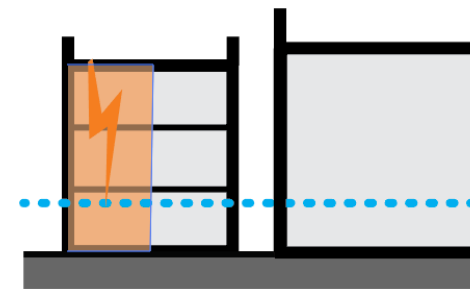
Current incentives to keep active ground floors may not be enough

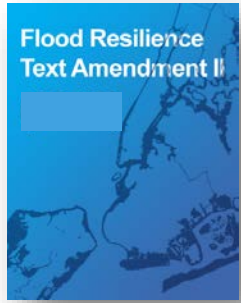


4

Homes in M Districts

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





Flood Text II Outreach

DCP plans a robust public engagement process:



As part of this outreach process, DCP will:

- **Partner 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

* Schedule is tentative and subject to change

Outreach Resources



NYC Flood Hazard Mapper

www.nyc.gov/floodhazardmapper

Info briefs on Flood Resilience Zoning, Flood Risk, Flood Resilient Construction, and Flood Insurance

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 federal risk flood zone of the 2007 FIRMs (see map 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 or outside a high-risk flood zone and those that received federal disaster assistance must maintain flood insurance up to the NFIP limits, or the outstanding mortgage balance, whichever is lower. Failure to do so may require mortgage servicers to purchase a private mortgage insurance policy at a higher price on 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-ops, multifamily buildings and business properties may be covered up to \$500,000. Business 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.

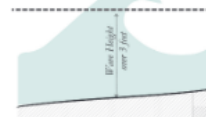
Flood Risks

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 Risk Rate Maps (PFIRMs).

- PFIRMs show the extent to which waters are expected to rise during an 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 is sometimes referred to as the 100-year floodplain. However, this term is misleading since these floods can occur more frequently than once in 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 is divided into two zones: V-Zone (Coastal High Water Flood) and AE-Zone (1% Annual Chance Flood). Properties in the V-Zone are required to purchase flood insurance.



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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 of 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 permanent and incorporate lessons learned during the rebuilding process.

Where is the Flood Text Applicable?

The Flood Text is available to buildings located entirely or partially within an annual chance floodplain.

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.

*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.

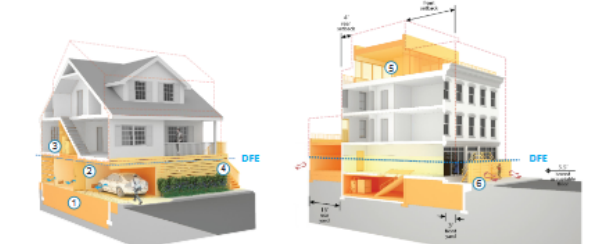
Overview

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 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

Thank you!

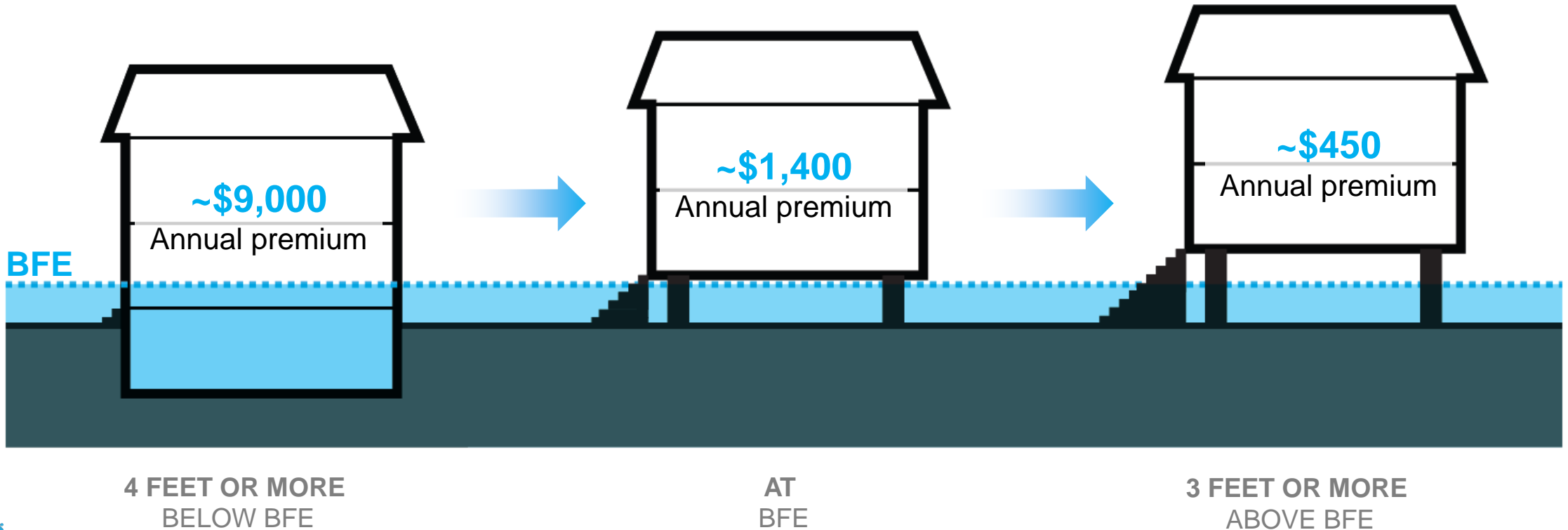
For more information, and to stay involved, email
resilientneighborhoods@planning.nyc.gov

Flood insurance rates

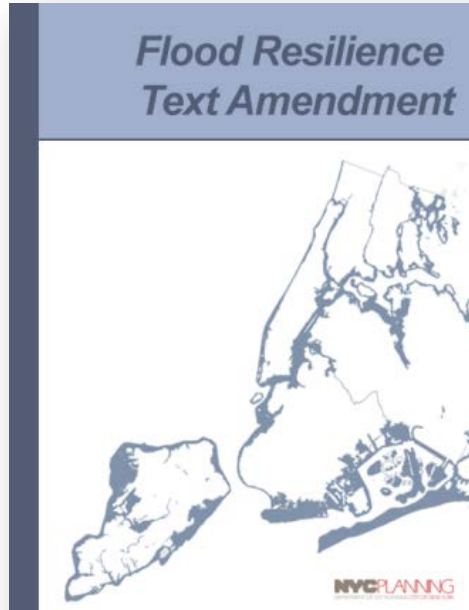
Set by FEMA

Raising or retrofitting your 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).



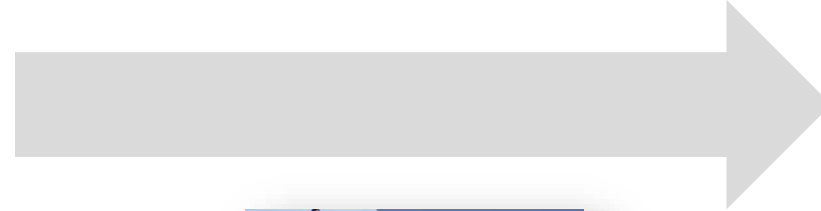
Flood resilience zoning Projects at DCP



2013

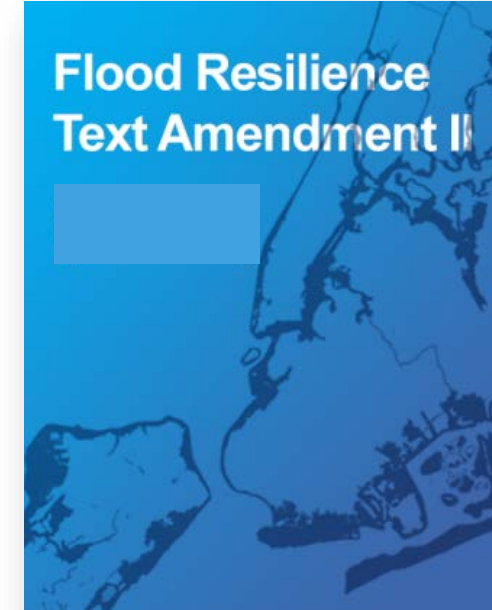
“Flood Text”

initial temporary regulations
to facilitate recovery



2015 “SRNR”

additional zoning relief
to expedite recovery



2018

“Flood Text II”

improve upon, and make
permanent, the Flood Text

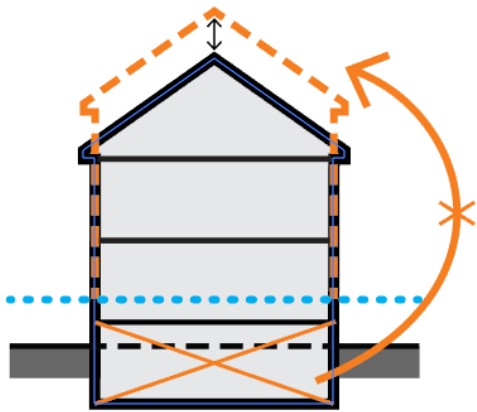
Flood Text II

Fix and improve provisions based on lessons learned

1

Height

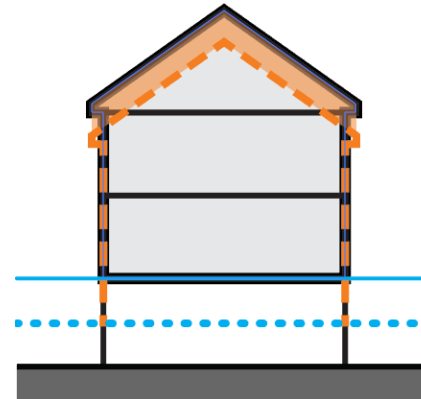
Homeowners may face the loss of subgrade spaces when retrofitting



2

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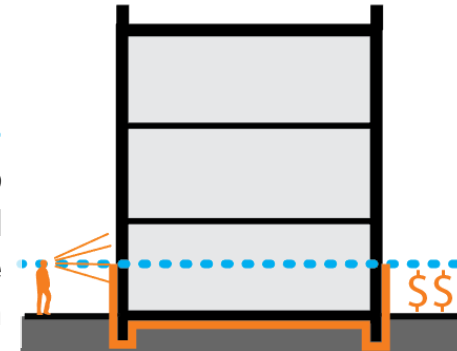
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3

Ground Floors

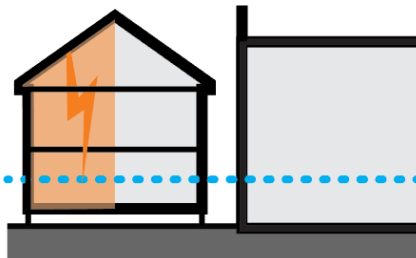
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4

Homes in M Districts

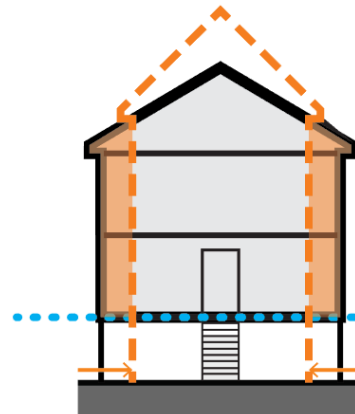
Existing homes in M. Districts, if damaged, may not be able to rebuild



5

Old Homes in Small Lots

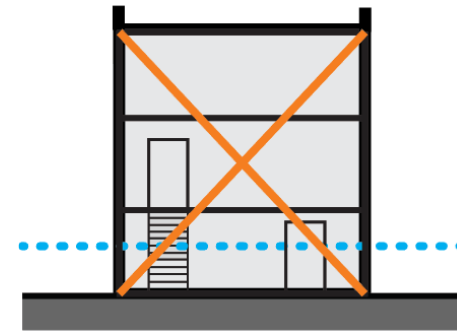
Old bungalow homes on small lots may need more flexibility to rebuild in the future



6

Highly Vulnerable Areas

Density may need to be limited in highly vulnerable areas



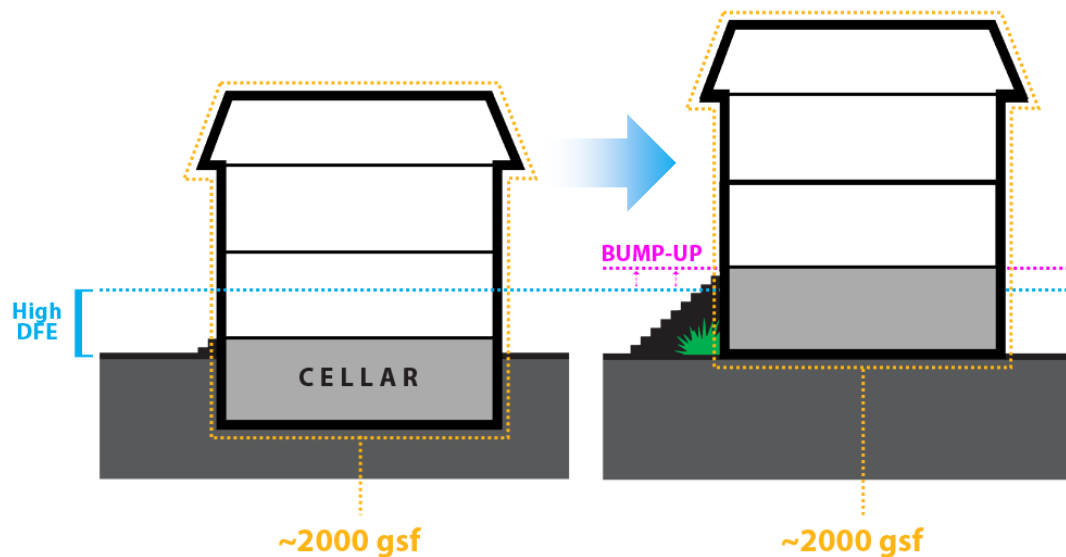
Flood Text II

Lesson learned: Cellar and Residential living space lost

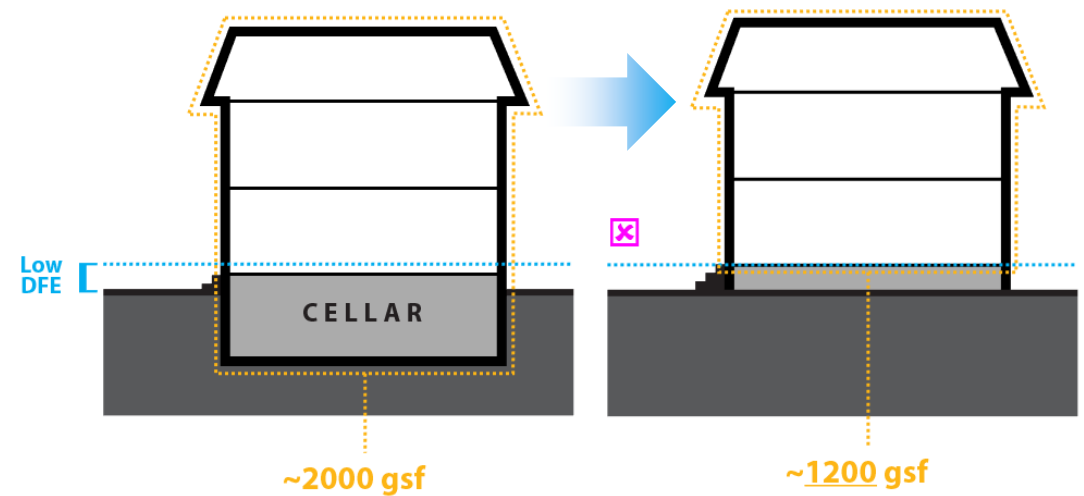
EXAMPLE ISSUE

The 2013 Flood Text allowed for adjustment of “zoning envelopes” to facilitate the retrofitting and replacement of living space above the DFE, out of harm’s way, but this flexibility applies unevenly:

Case study 1: Replacement of ‘cellar’ story in a high-DFE retrofit



Case study 2: Loss of living space in a low-DFE retrofit



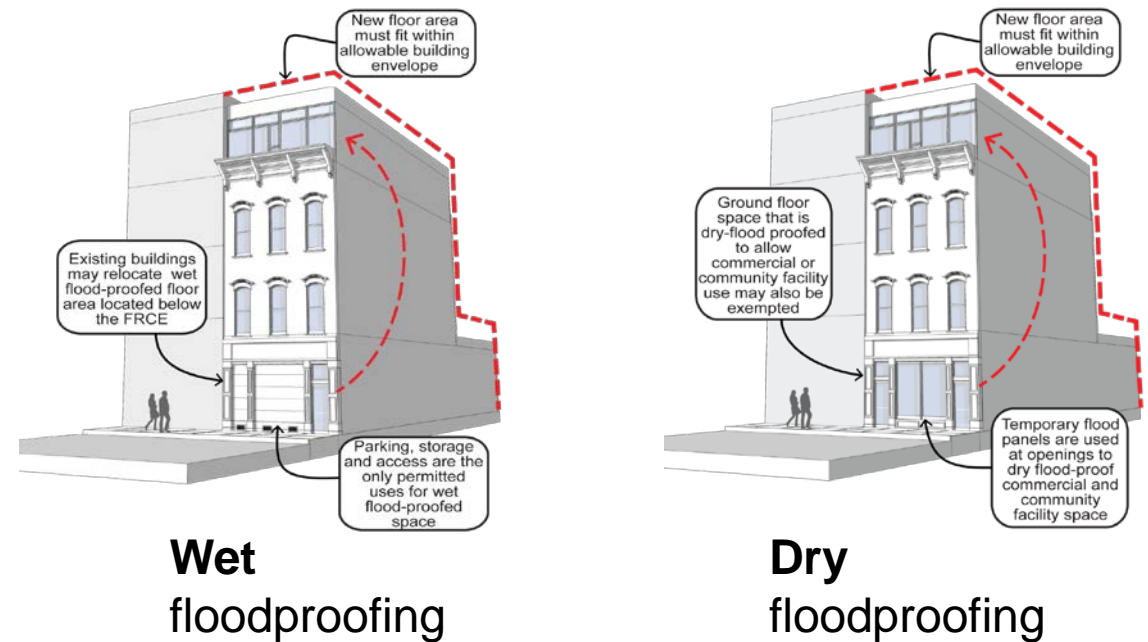
Flood Text II

Lesson learned: FAR incentive to retrofit buildings not effective

EXAMPLE ISSUE

The 2013 Flood Text allowed for floodproofed space to be exempted from floor area to incentivize the retrofitting of existing buildings but had the following issues:

- Analysis of DOB permitting indicates this incentive likely has not been used since it was introduced.
- Restrictions accompanying this flexibility (only applies in certain districts, up to 10,000 sq. ft., C space cannot be replaced atop R, prohibition against creating new units, requirement to provide new parking spaces) may be too onerous.
- Only applies to existing buildings – not new buildings.



Wet
floodproofing

Dry
floodproofing

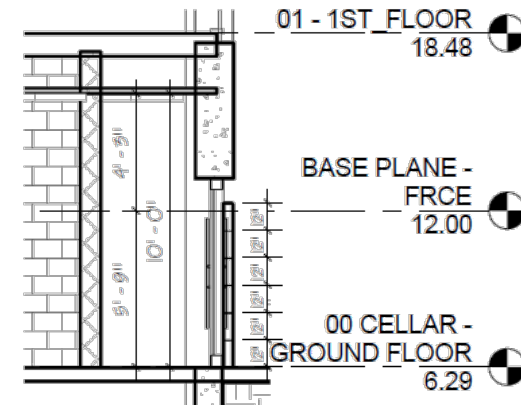
Flood Text II

Lesson learned: Desirable ground floor retail not being provided

EXAMPLE ISSUE

The 2013 Flood Text redefined “cellar” to exempt at-grade stories to incentivize the retrofitting of existing buildings but had the following issues:

- Bad urban design outcomes due to “squishing” – dark, low-ceilinged establishments.
- Causes lower-grade commercial stock, limits the types of retail tenants and services that can locate in the building, such as restaurants.
- Doesn’t apply to [at least half] of the floodzone.
- Doesn’t create a zoning incentive to prefer **dry floodproofing** implementations over wet floodproofing (active over passive).



④ TYP FLOOD SHIELD
3/16" = 1'-0"

Example of ‘squished’ retail
(1809 Emmons Ave., BK)

Flood Text II

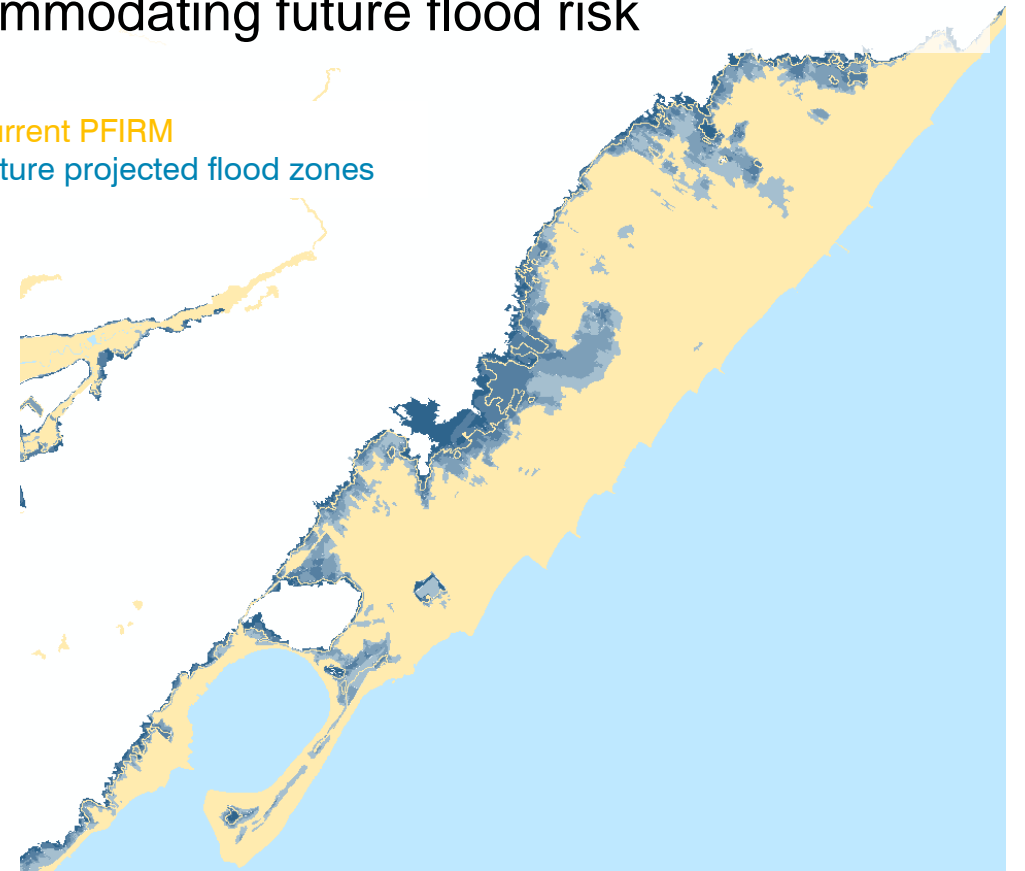
Lesson learned: Additional height not permitted for future flood projections

EXAMPLE ISSUE

The 2013 Flood Text doesn't provide zoning relief for accommodating future flood risk

- Zoning relief is “minimum necessary” to elevate only to the DFE – nothing higher.
- Some building owners may want to take sea level rise, future flood heights, or more powerful storms (e.g., Hurricane Sandy) into account when building. No incentives.
- Close coordination is necessary to align zoning with FEMA “Climate Smart” maps.

■ Current PFIRM
■ Future projected flood zones



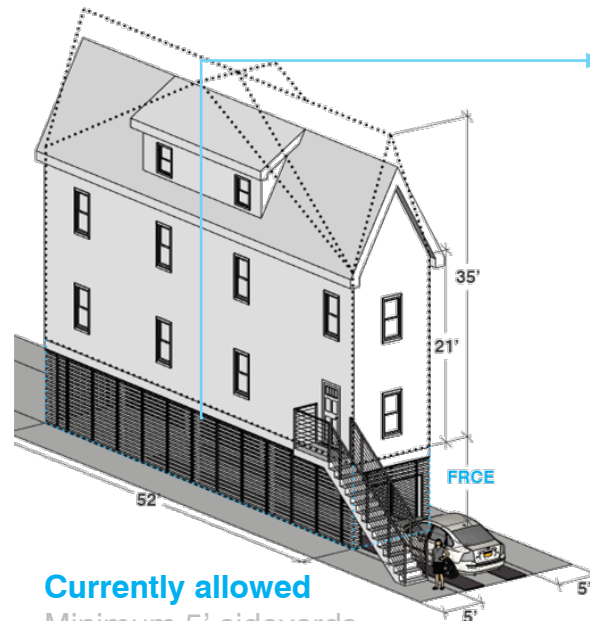
Flood Text II

Lesson learned: Cottage envelope is not permanent

EXAMPLE ISSUE

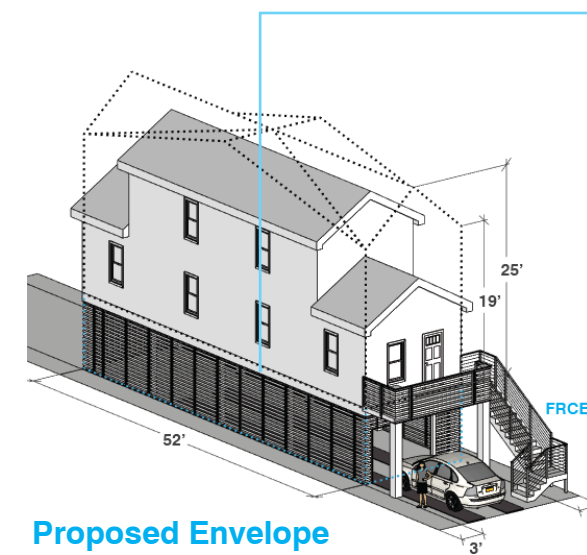
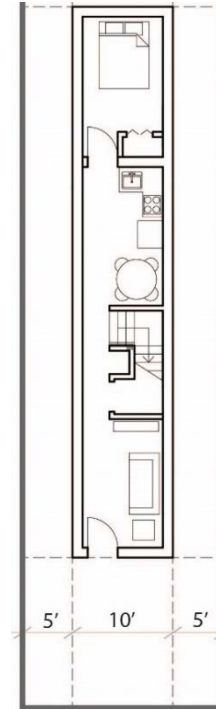
The 2015 SRNR created a new contextual envelope to facilitate the reconstruction of the very small homes on small lots, however these rules were temporary:

- Not available permanently (past 2022)
- Doesn't apply outside of "Neighborhood Recovery Areas"
- Doesn't prevent "candlesticks" on currently vacant lots



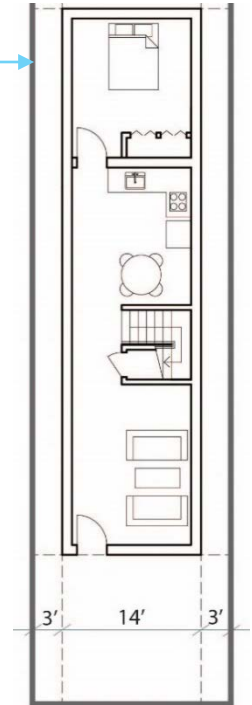
Currently allowed

Minimum 5' sideyards
21'/35' height
✓ Fits 0.6 FAR



Proposed Envelope

Minimum 3' sideyards
19'/25' height
✓ Fits 0.6 FAR





Flood Text II

Lesson learned: Not all existing buildings were grandfathered

EXAMPLE ISSUE

To facilitate the recovery of non-conforming and non-complying homes, the 2013 Flood Text gave greater relief to these homes, but 500+ residential buildings in C8/M Districts were left out.

- **Underlying Article V** rules always allow 1+2 family homes to be rebuilt, regardless of level of damage, **except R in C8/M**
- **FT I** allowed any non-conforming building damaged >50% by Hurricane Sandy to rebuild, **except R in C8/M**

100y Flood Zone - PFIRMS (2015) 
Non-Conforming Single-Two Family Lots 
Non-Conforming Multi-family Lots 