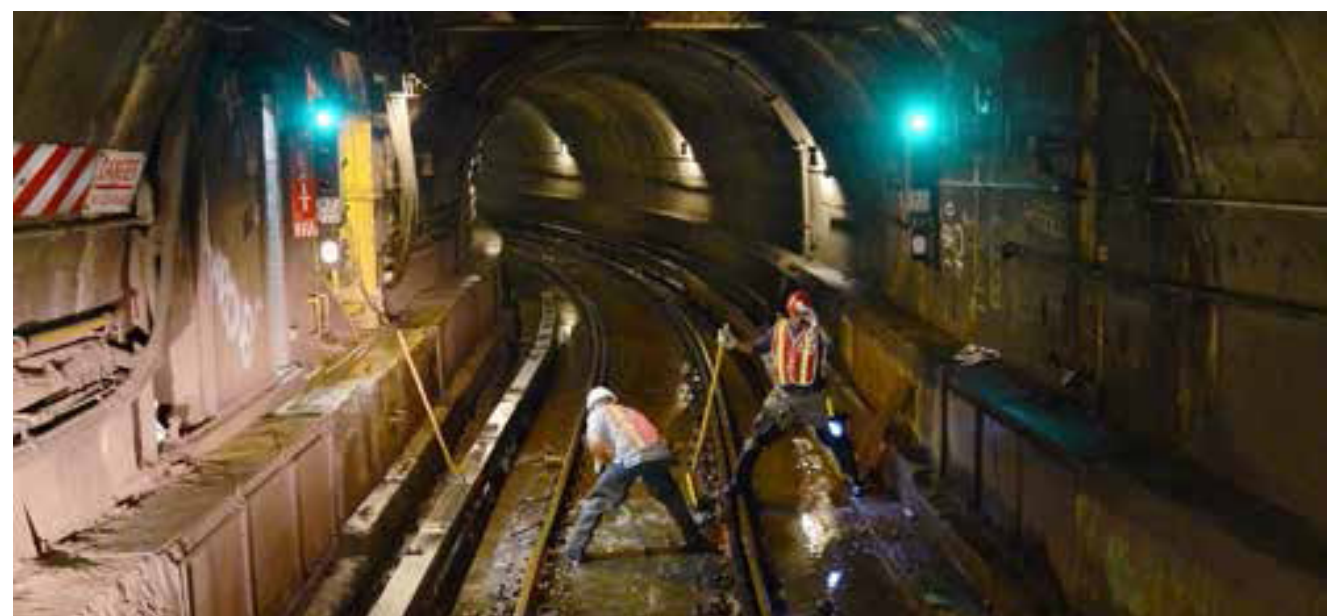


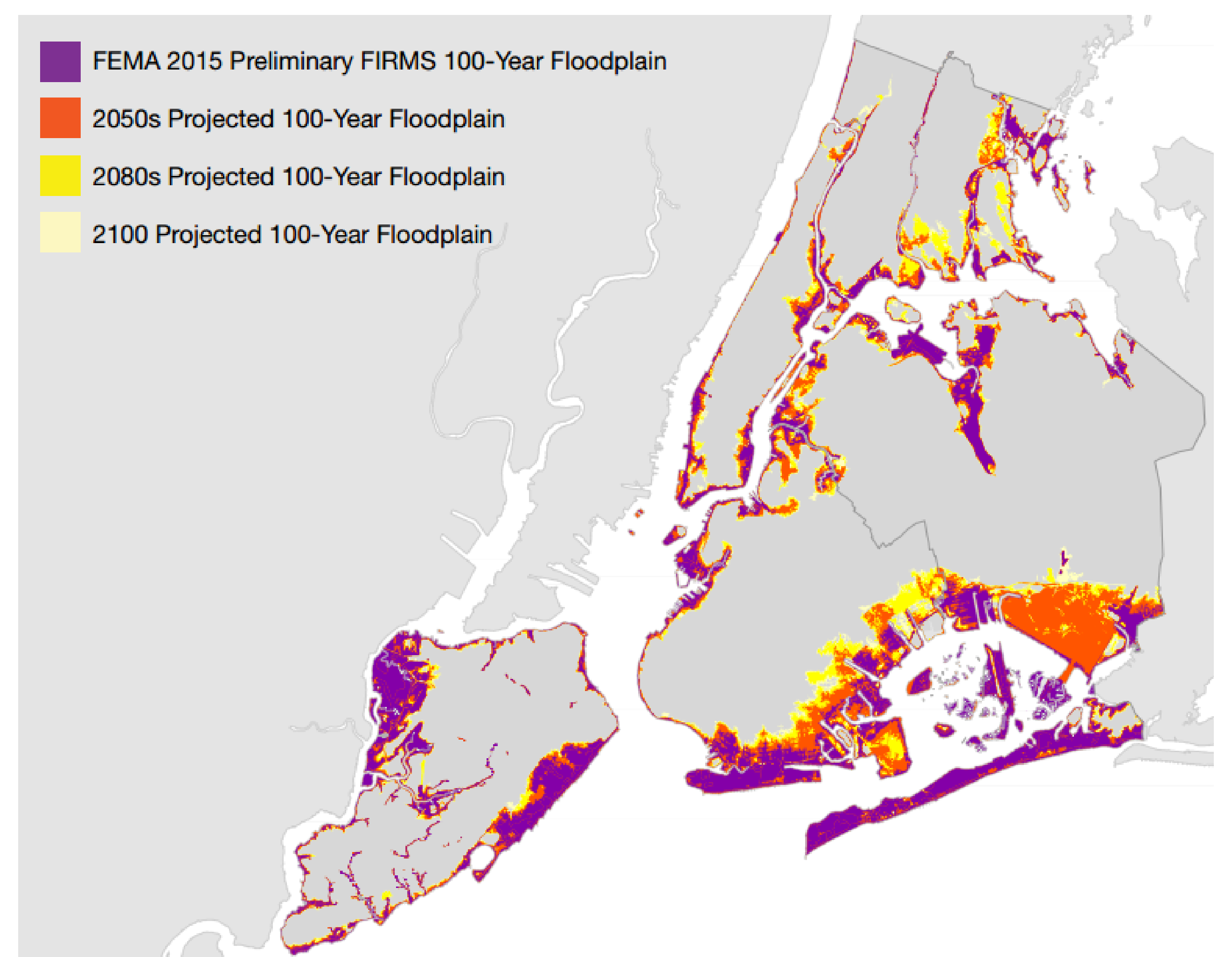
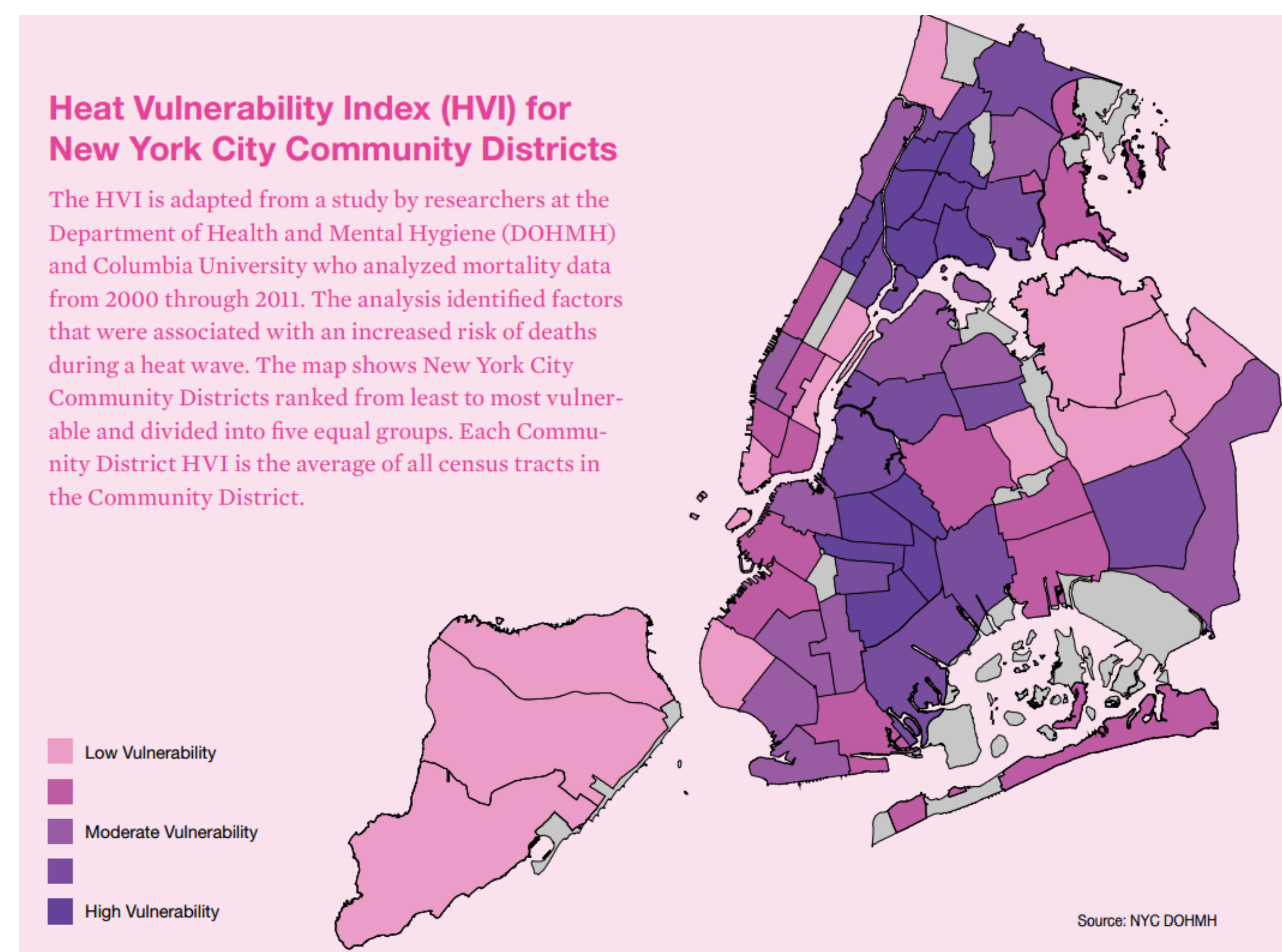
What is resiliency, and what does it mean for climate change?

Resiliency means neighborhoods, economy, and public services will be ready to withstand and emerge stronger from the impacts of climate change.

Many neighborhoods were devastated by Superstorm Sandy, homes and businesses were flooded, public services interrupted, and infrastructure damaged.



After the storm passed and the water receded, a new reality emerged: **New Yorkers must confront the implications of living in a coastal city.** As the city pushed ahead with a robust recovery effort, a new conversation began: Recovery must also result in a city better able to face a wider range of risks—not just the next Sandy.



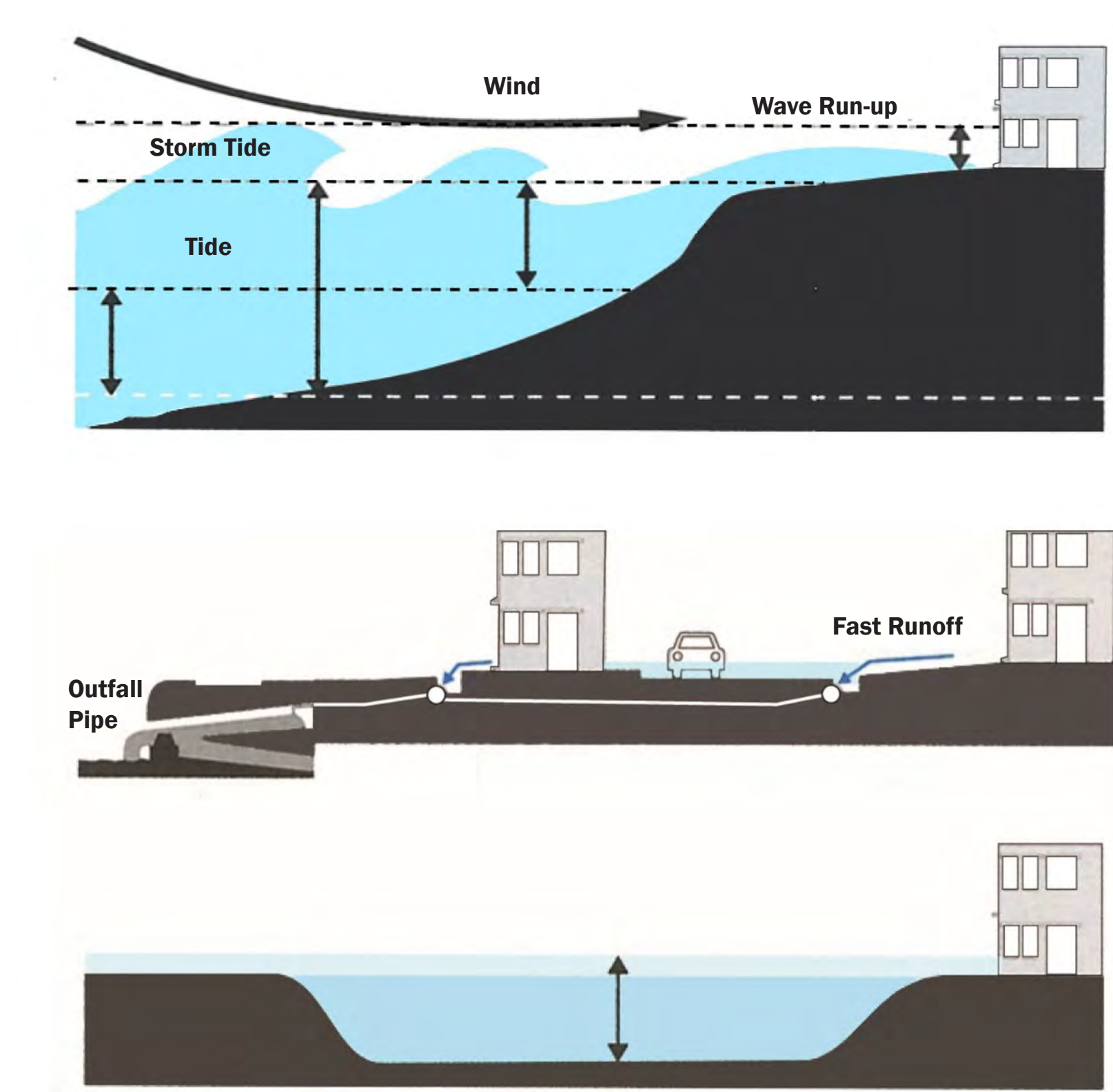
In a resilient city...

- Homes, businesses, community-based organizations, and public services are strengthened to reduce the impacts of disruptive events and promote faster recovery.
- Infrastructure like transportation, telecommunications, water, and energy can withstand severe weather events.
- Private and public buildings will be more energy efficient and resilient to the impacts of climate change.
- Coastal defenses are strengthened against flooding and sea level rise.

Flood Risk and Types of Flooding

Today's Risks

Across NYC, flooding can be caused by overflow of waterbodies into the coastal area, or by rainfall. In the Gowanus area, flooding due to overflow of the drainage system is a primary concern.



Coastal Flooding

Results from storm surge
(Superstorm Sandy is an example)

Urban Drainage / Flash Flooding

Results from heavy rains and overwhelming of urban drainage system
(Occurring in Gowanus)

Riverine Flooding

Results from heavy rains and overflowing of river system
(Not occurring in Gowanus)

Terms to Know

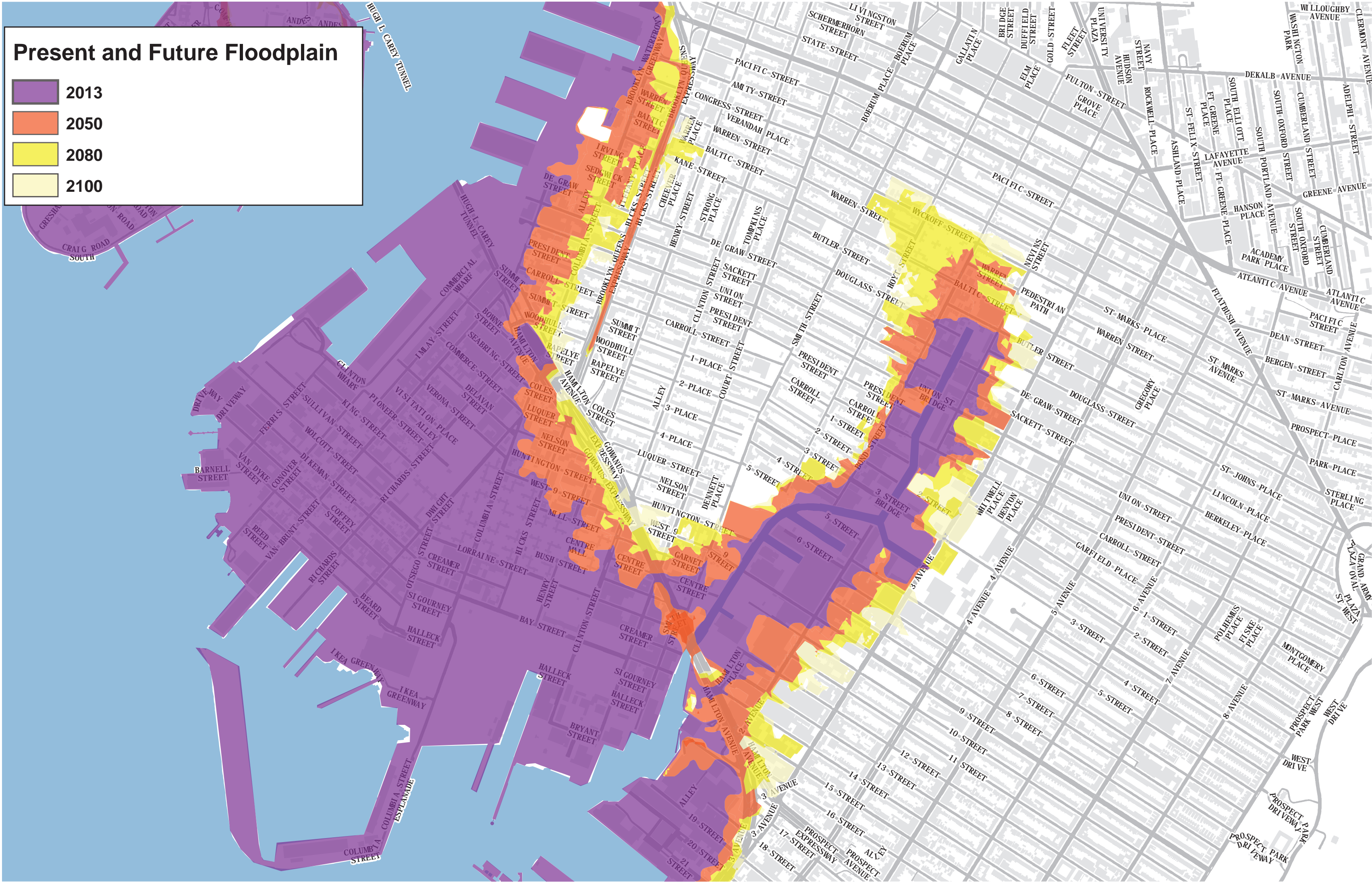
These are some key phrases used by the City, Federal Emergency Management Agency (FEMA), and others when planning for neighborhood flood risk and resiliency:

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.

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

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



Future Flooding

The risk of storm surges, intense rain, and high tides will increase in many coastal areas as a result of climate change. As a tidal waterway, the Gowanus Canal will experience additional flooding related to sea level rise and due to storms.



- Higher sea levels mean the future 1% annual chance flood will cover a larger area and affect more people. As shown in the map above, the area that floods during a 1% annual chance storm may expand by about 0-3 blocks in portions of Gowanus by 2100.
- The annual chance of major storms will also increase: a 1% annual chance storm today will have nearly a 3% annual chance of occurring in the 2050s.
- Sea levels in NYC have risen approximately one foot in the last 100 years. Ongoing sea level rise will lead to frequent, potentially daily, tidal inundation in some especially low-lying neighborhoods, such as Howard Beach and others on Jamaica Bay.

FEMA Preliminary Flood Insurance Rate Maps (PFIRMs)

What are flood zones?

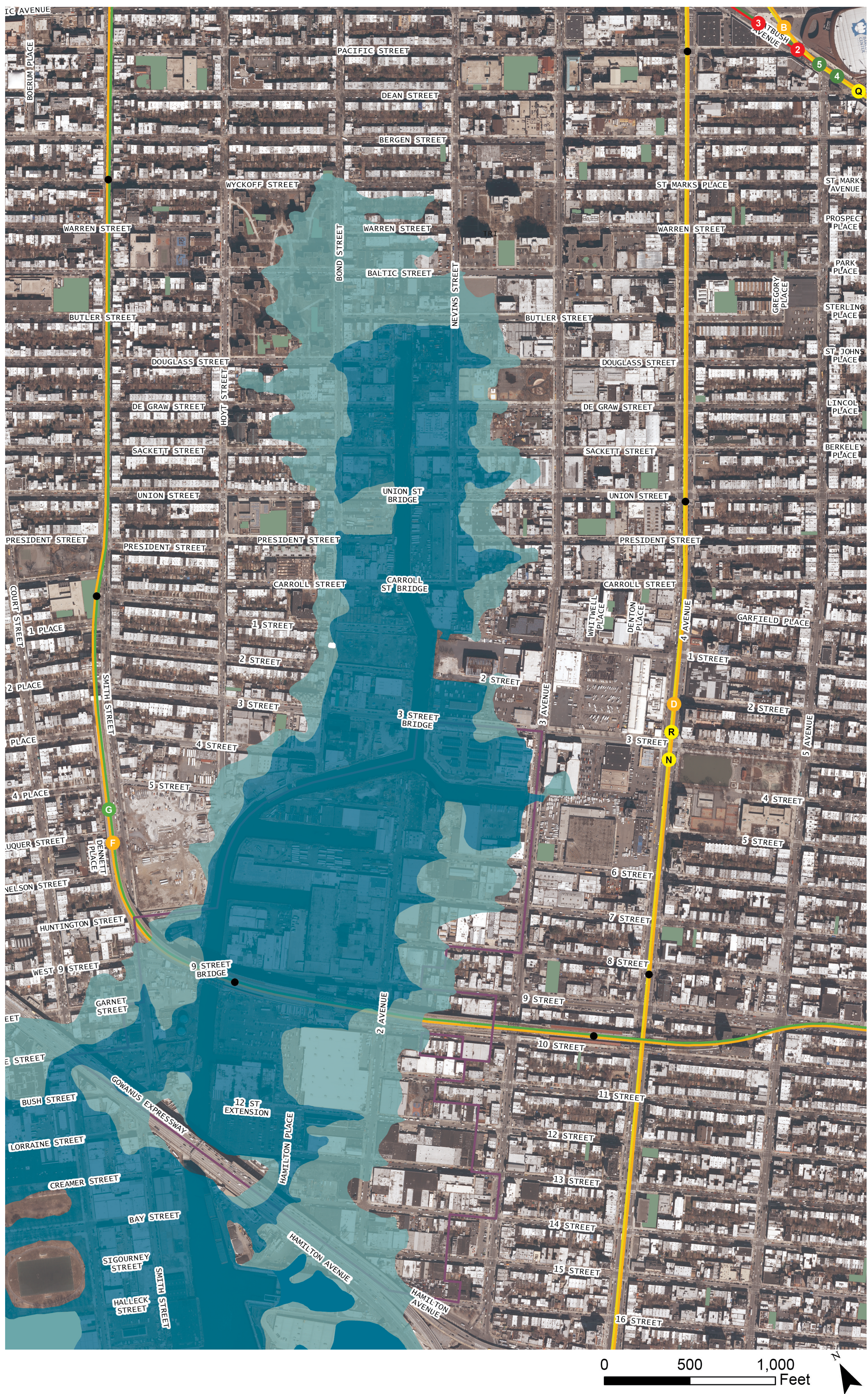
Flood zones are areas identified by the Federal Emergency Management Agency (FEMA). Each flood zone describes a land area in terms of its risk of flooding. FEMA releases Flood Insurance Rate Maps (FIRMs) that highlight this risk.

In 2015, FEMA released new **Preliminary Flood Insurance Rate Maps (PFIRMs)** for New York City. These maps are used to determine which properties must meet New York City building code and zoning requirements for properties at risk of flooding.*

-  A Zone (1% Annual Floodplain)
- A Zone:** A portion of the area subject to flooding from the 1% annual chance flood. These areas are considered high risk flooding areas. NYC Building code requires new and substantially improved buildings in the A Zone to be elevated or floodproofed.
-  Shaded X Zone
- Shaded X Zone:** The area of moderate flood risk outside the regulatory 1% annual chance flood.

*In October 2016 FEMA announced that the City of New York won its appeal of FEMA's 2015 Preliminary Flood Insurance Rate Maps and has agreed to revise New York City's flood maps. This will result in revised flood maps which will provide New York City residents with more precise flood risk data for current conditions, in addition to providing a new map product for future conditions that account for climate change. Until any new flood maps are issued, the city's building code will continue to reflect the 2015 Preliminary FIRMs to ensure that new buildings are better able to withstand flood risk.

What questions do you have on Flood Maps?



Base Flood Elevation (BFE)

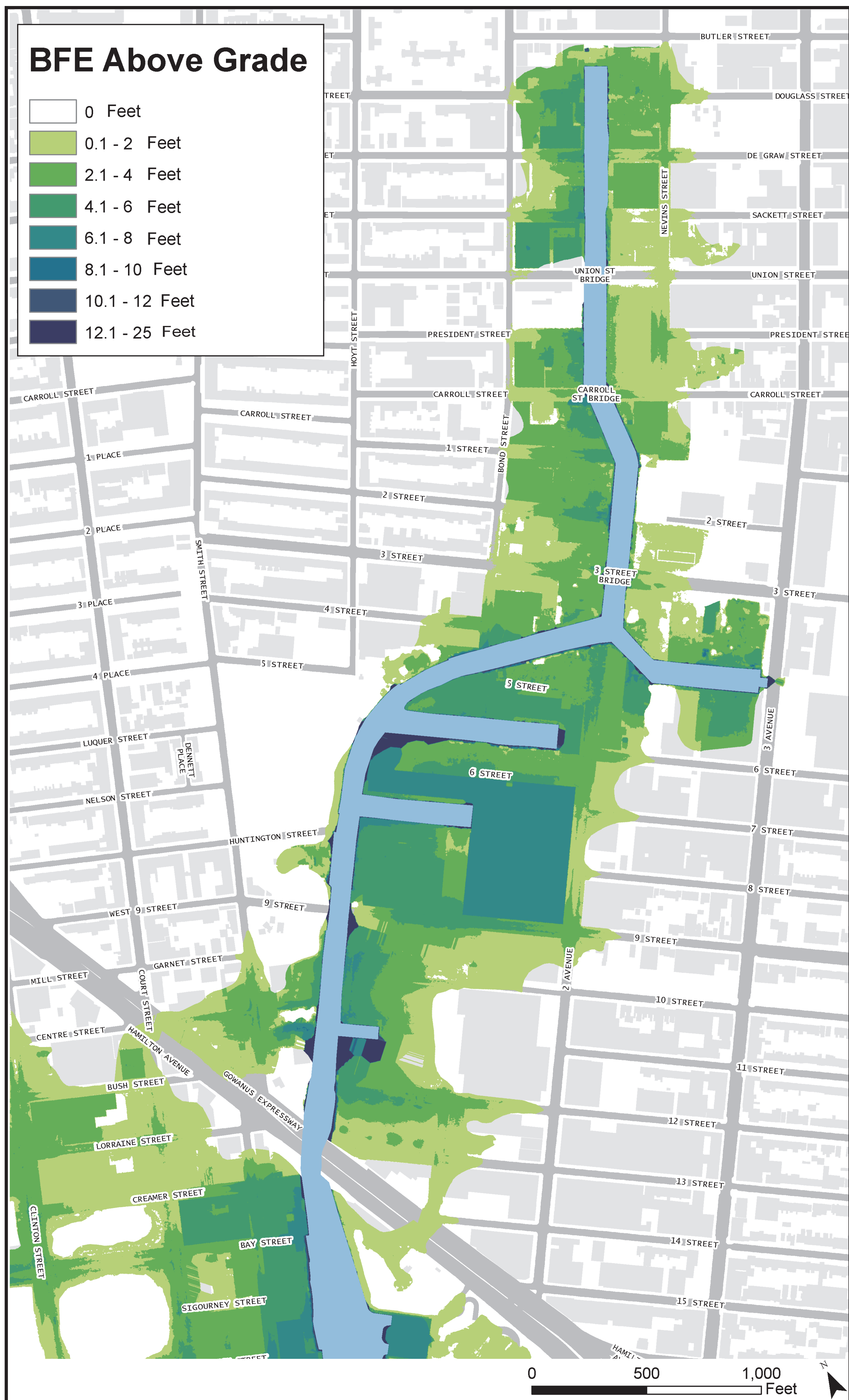
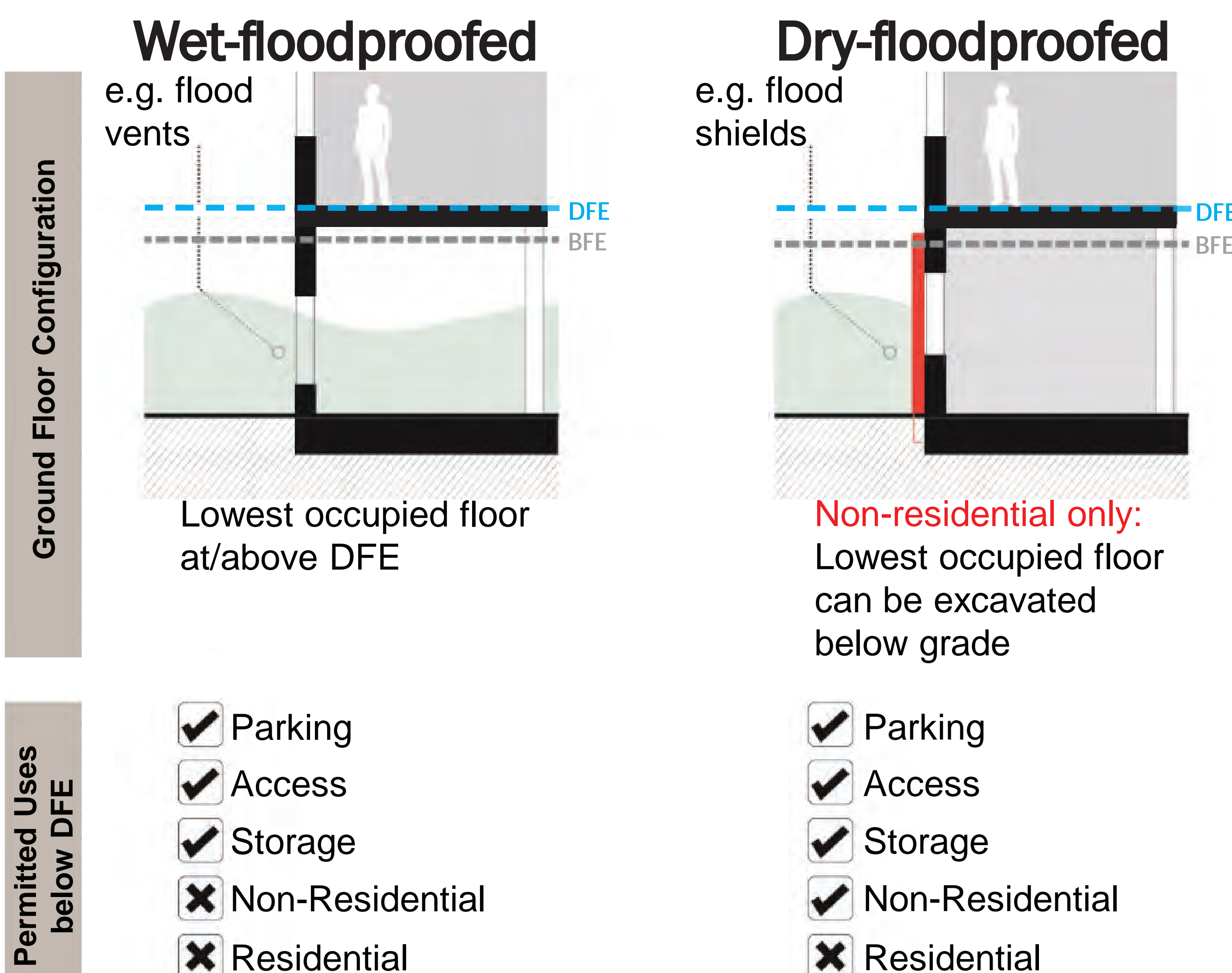
Sandy demonstrated that buildings built to withstand flooding can do so! New York City has been working hard to ensure that current building and zoning code allows property owners to retrofit or build structures that are appropriate for areas prone to flooding. For buildings, this means elevating living spaces and critical systems above the BFE.

What is BFE?

The Base Flood Elevation is the expected height of flooding from the 1% annual chance flood (a serious flooding event that has a 1% chance of occurring any given year). The map to the right shows the BFE above grade, the expected height of flood waters from sidewalk level during a 1% annual chance flood. In Gowanus, the BFE above grade ranges from 2 feet to over 12 feet along the edges of the canal.

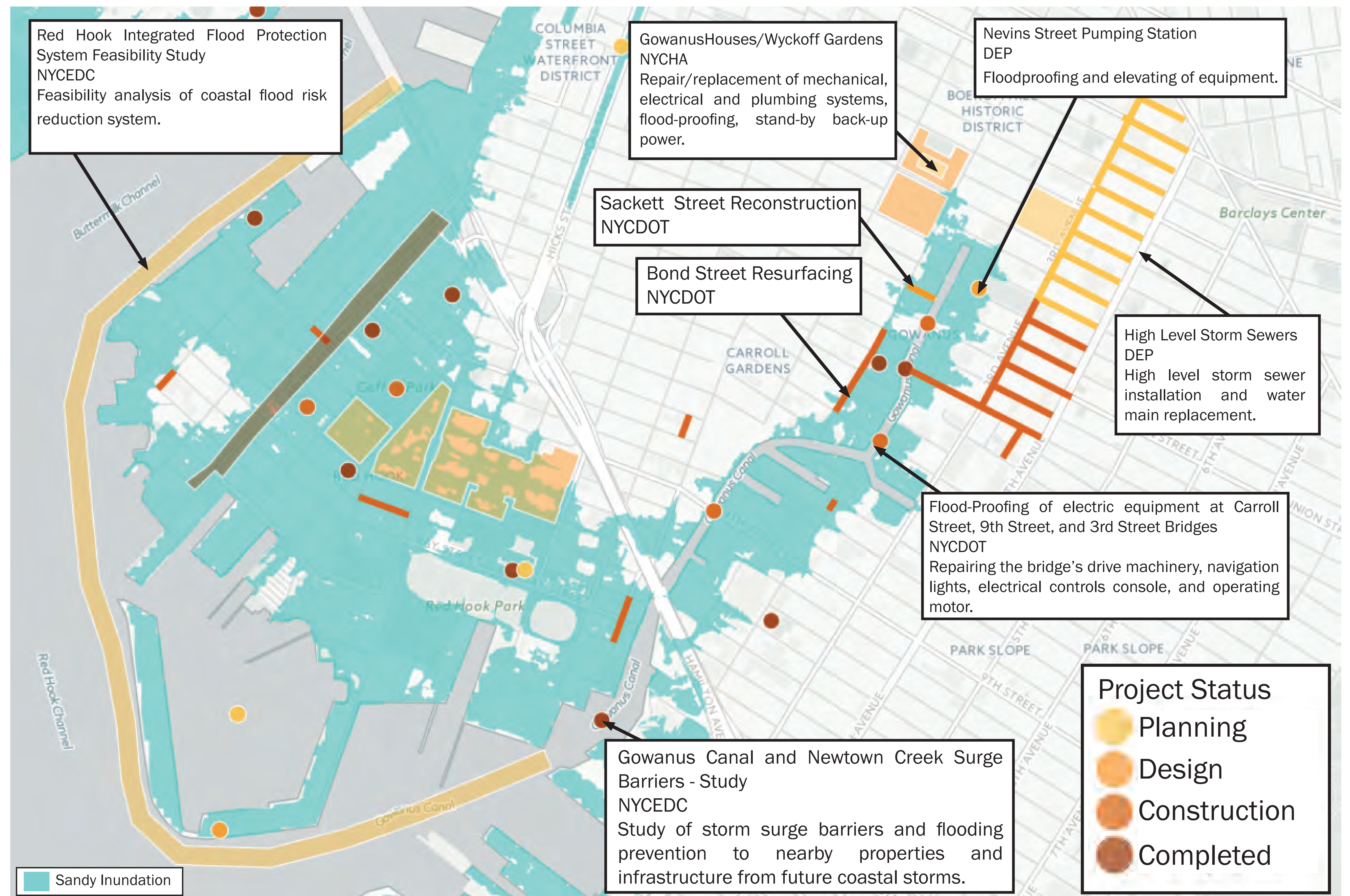
What are the standards for buildings in the flood zone?

In NYC, **new or substantially improved buildings must be elevated or retrofitted to the Design Flood Elevation (DFE), which is the BFE plus 1 to 2 additional feet to account for future flood risk from sea level rise.** Residential uses are not allowed below the DFE. Spaces below the DFE must be wet-floodproofed and can only be used for storage, access, or parking.



What is the City doing to make Gowanus more resilient?

Several agencies have undertaken resiliency initiatives in and around Gowanus. Major projects and studies are shown in the map below:



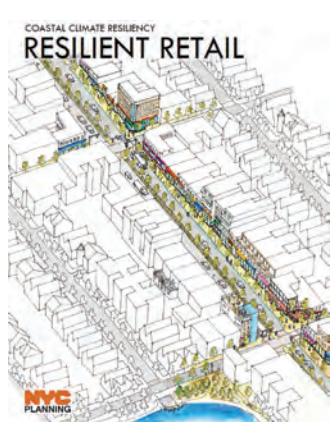
To learn more about these projects and others you can visit the Mayor's Office of Recovery and Resiliency project tracker at: <https://maps.nyc.gov/resiliency/>

DCP's resiliency efforts include the following work:

Flood Resilience Zoning Text Amendment I Following Sandy, the Department of City Planning developed a citywide Flood Resiliency Zoning Text Amendment which was adopted in 2013 on a temporary, emergency basis. The amendment modified regulations to allow buildings the flexibility to rebuild and retrofit according to FEMA and NYC Building Code standards. **Updates to the text to address lingering resiliency challenges will be part of a citywide outreach process launching next year.** The Gowanus study is also an opportunity to put forward ideas to inform this initiative.



Resilient Industry is a planning initiative to assess the vulnerability to flooding in industrial areas of New York City such as Gowanus and propose strategies that individual businesses and the City can pursue to make industrial areas and surrounding communities more resilient in the face of flooding.



Resilient Retail is a study that identifies strategies that business and property owners can employ in making their spaces more resilient, as well as zoning tools and federal regulatory reforms that may be needed to assist them in their resiliency efforts.



Resilient Art Spaces Guide provides information on how to reduce flood risk for art spaces and offers examples of practical adaptation measures that can be employed at the gallery, building, and district-wide scales.

Learn more by visiting DCP's resiliency and sustainability page at www.nyc.gov/planning