

# **Zoning for Coastal Flood Resiliency**

## ***Project Description***

### **1. INTRODUCTION**

The Department of City Planning (DCP) is proposing a zoning text amendment, Zoning for Coastal Flood Resiliency (ZCFR), to update the Special Regulations Applying in Flood Hazard Areas (Article VI, Chapter 4). The current zoning rules were adopted on an emergency basis to remove zoning barriers that were hindering the reconstruction and retrofitting of buildings affected by Hurricane Sandy and to help ensure that new construction there would be more resilient. ZCFR would improve upon and make permanent the relevant provisions of the current temporary zoning rules and provide homeowners, business owners, and practitioners who live and work in the city’s floodplain the option to design or otherwise retrofit buildings to: (a) reduce damage from future coastal flood events, (b) be resilient in the long-term by accounting for climate change, and (c) potentially save on long-term flood insurance costs. In addition, it would allow resiliency improvements to be more easily incorporated on waterfront sites at the water’s edge and in public spaces, as well as provide zoning regulations to help facilitate the city’s long-term recovery from the COVID-19 pandemic and other future disasters.

ZCFR was drawn from lessons learned and initiatives implemented through New York City’s recovery efforts after Hurricane Sandy and was developed based on analysis of resilient construction in the floodplain, through widespread coordination with partner City agencies, and community feedback received during an extensive public engagement process as laid out in *Zoning For Resiliency: Community Outreach Summary*, released in 2018. ZCFR would mostly affect New York City’s current 1% annual and 0.2% annual chance floodplains. However, select provisions would be applicable citywide (discussed in detail below), affecting all five boroughs and the city’s 59 Community Districts.

ZCFR also includes updates to other sections of the ZR, including the Special Regulations Applying in the Waterfront Area (Article VI, Chapter 2) and provisions within various Special Purpose Districts.

In the long term, ZCFR, in conjunction with coastal protection strategies and infrastructure improvements that are being pursued by the City and other state and federal agencies,<sup>1</sup> would help to fully realize the vision of a more resilient New York City.

### **2. BACKGROUND**

#### **The City’s Coastal Flood Risk**

With 520 miles of shoreline, there is no denying that New York City is a coastal city. Its large natural harbor, where the Hudson River meets the Atlantic Ocean, is one of the reasons that the city has become a center of commerce and culture. However, due to its extensive and varied shoreline, New York City is vulnerable to coastal flooding.

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<sup>1</sup> Coastal protection strategies and infrastructure improvements includes climate adaptation measures such as those identified in the City’s [Lower Manhattan Climate Resiliency Study](#) issued in March 2019, the [East Side Coastal Resiliency Project](#) that is projected to be completed by 2023, and [South Shore of Staten Island Hurricane and Storm Damage Reduction Project](#) being initiated by the US Army Corps of Engineers. Examples of such measures include floodwalls and deployable flip-up barriers to protect upland areas from storm surges. For more information, refer to the Lower Manhattan Climate Resiliency Study.

While there are many sources of flooding that pose issues in New York City, including flooding from severe rain storms or due to impaired infrastructure, coastal storms present the most significant flood risk in terms of compromising human safety, property damage, and business disruption. Therefore, in 1983, the City joined the National Flood Insurance Program (NFIP) allowing homeowners to purchase flood insurance and receive assistance following flood events. This program, administered by FEMA, is a voluntary program based on an agreement between the federal government and local communities. FEMA identifies areas at risk of flooding through the development of flood-risk maps. Local authorities adopt these maps to implement and enforce floodplain management regulations. In exchange, local communities get access to federally backed flood insurance, which is made available to property owners and renters throughout the floodplain. The rates for this flood insurance vary depending on the property's location, height above sea level and general building characteristics. These rates can be substantially reduced when subgrade spaces, such as basements and cellars are filled in residential buildings, and when living spaces are elevated above the base flood elevation (BFE).<sup>2</sup>

Areas at risk of a 1% or 0.2% annual chance of flood are commonly known as the floodplain and are currently designated on FEMA's FIRMs and Preliminary FIRMs (PFIRMs). New York City's 1% annual chance floodplain covers approximately 15 percent of the city's land area, touching 50 of the city's 59 Community Boards and 45 of its 51 Council Districts. This vast geography contains over 80,900 buildings housing 434,500 residents that are currently at high risk of flooding by coastal storms. In commercial areas, the floodplain contains roughly 14,500 private businesses that employ approximately 270,000 people.<sup>3</sup> In industrial areas, roughly 3,600 private businesses that employ approximately 87,000 people are located in the floodplain.<sup>4</sup> The city's 0.2% annual chance floodplain encompasses an additional four percent of the city's land area, which includes approximately 44,600 buildings that are at moderate risk of being flooded today and houses an additional 348,000 residents. Combined, there are a total of 125,500 buildings and 782,800 residents in the city's floodplain.

No single flood event has made New York City's vulnerability clearer than Hurricane Sandy in 2012. This event created a historic storm surge that flooded neighborhoods well beyond the 1% annual chance floodplain, inundating approximately half of the lots in the 0.2% annual chance floodplain and illustrating how these areas are at risk today and will continue to be at risk in the future.

## **The City's Regulatory Framework in the Floodplain**

The need to quickly recover from Hurricane Sandy revealed several regulatory conflicts between the construction standards in Appendix G of the NYC Building Code, which are overseen by the New York City Department of Buildings (DOB) as a requirement of the NFIP, and zoning regulations located within the ZR, which is administered by DCP and enforced by DOB. Within the 1% annual chance floodplain, Appendix G currently requires all habitable spaces of new construction, and existing buildings that were substantially damaged or are undertaking substantial improvements<sup>5</sup>, to be raised above the Design Flood Elevation (DFE).<sup>6</sup> All spaces below the DFE must be either wet-floodproofed, if the building is used solely

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<sup>2</sup> The elevation to which floodwater is anticipated to rise during a 1% annual chance storm as shown on FEMA's FIRMs and PFIRMs, as measured from sea level.

<sup>3</sup> NYC Planning, *Resilient Retail* (2016). New York City, NY. Source: [www.nyc.gov/resilientretail](http://www.nyc.gov/resilientretail)

<sup>4</sup> NYC Planning, *Resilient Industry* (2018). New York City, NY. Source: [www.nyc.gov/resilientindustry](http://www.nyc.gov/resilientindustry)

<sup>5</sup> Substantial damage is damage to a building for which the total cost of repair is 50 percent or more of the building's current market value before the disaster occurred, regardless of the cause of damage. Substantial improvement is any repair, reconstruction, rehabilitation, addition, or improvement with a cost equaling or exceeding 50 percent of the current market value of the building.

<sup>6</sup> The DFE is the minimum elevation to which a building in the 1% annual chance floodplain must be elevated or floodproofed, determined by adding freeboard (additional height for safety, either one or two feet depending on the use occupancy type) to the base flood elevation (BFE) as determined by Appendix G.

for residential use, or dry-floodproofed, if the building contains non-residential uses.<sup>7</sup> Spaces that are wet-floodproofed only can be used as crawl space, or for parking, storage and building access, and spaces that are dry-floodproofed can be used for non-residential uses. Additionally, residential buildings are not allowed to provide spaces, such as basements and cellars, below grade and mechanical equipment must be located above the DFE.

These requirements have, at times, posed conflicts with certain zoning regulations, as they change the way that most buildings in New York City are structurally designed and internally configured. In New York City, aside from land use, zoning also establishes limits on the size and shape of buildings, with a range of zoning districts mapped to reflect their varying density and character of waterfront areas. These limits include height and floor area restrictions, which may hinder buildings from elevating their spaces to comply with Appendix G.

Historically, the ZR generally did not account for the issues caused by coastal flooding. The floodplain was first introduced to the ZR as part of the Lower Density Contextual Zoning (N 890552 ZRY) text amendments adopted in 1989 when architects and residents of waterfront communities raised concerns about achieving permitted height and floor area in the floodplain. As a result, underlying zoning regulations now allow for buildings in the floodplain to measure building perimeter wall, roof and cellar heights from the BFE rather than from the adjoining grade.

After Hurricane Sandy in October 2012, the Mayor signed Executive Order No. 230, suspending height and other restrictions to the extent necessary to allow buildings to be rebuilt to the Appendix G requirements. The Executive Order was by its nature an interim measure that needed to be codified by a zoning text amendment. As a result, the City had to adopt two zoning text amendments - the 2013 Flood Text (N 130331(A) ZRY) and the 2015 Recovery Text (N 150302 ZRY). These were intended to remove regulatory barriers that would hinder or prevent the reconstruction of storm-damaged properties and to enable new and existing buildings to comply with new, higher flood elevations issued by FEMA, and to new requirements in the New York City Building Code.

In removing regulatory obstacles from the ZR, the 2013 Flood Text allowed buildings within the 1% annual chance floodplain to meet the requirements of Appendix G by, for example, allowing height to be measured from the DFE (rather than from grade). The subsequent 2015 Recovery Text simplified the process to document non-compliances,<sup>8</sup> and established new rules to allow the reconstruction of damaged homes located on narrow and small lots.

The two text amendments were adopted on a temporary, emergency basis and were not subject to environmental review, as determined to be Type II per New York Codes, Rules, and Regulations (NYCRR) Part 617.5 (33): “*adoption of regulations, policies, procedures and local legislative decisions in connection with any action on this list.*” The zoning changes are set to expire in the next few years: the 2013 Flood Text expires within one year of the adoption of new FIRMs, which are expected to be revised by FEMA in the next few years, while applicability of the 2015 Recovery Text expired in July 2020.

Both 2013 and 2015 zoning changes also supported the City’s land use strategy for the floodplain. With such a vast and populous area subject to varied risks of flooding, it is evident that the city cannot simply retreat from the entire shoreline. Therefore, the City’s local land use policies across the 1% and 0.2% annual chance floodplains vary based on the degree of flood risk that exists in different parts of the city. As an example, in 2017, the City established Special Coastal Risk Districts in Broad Channel and Hamilton

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<sup>7</sup> Wet-floodproofing is a method designed to allow the passage of water within parts of the structure that are located below the flood elevation, while ensuring that the structure resists water loads. Dry-floodproofing is a method designed to seal a building’s exterior walls to flood waters while ensuring that the building can resist water loads below the expected level of flooding.

<sup>8</sup> A non-complying building is any structure that does not adhere to bulk regulations of the applicable zoning district. A non-conforming use is any land use that is not permitted under applicable zoning regulations.

Beach, Queens to limit future density in these areas due to their exceptional vulnerability to coastal storms and projected daily tidal flooding due to sea level rise. On a citywide level, the City's land use strategy has aimed to maintain prevailing land uses and the planned density across neighborhoods in the floodplain while encouraging buildings and neighborhoods of all types to become resilient in the long-term.

### **COVID-19 Pandemic**

New York City encountered its first case of COVID-19 on March 1, 2020 and, on March 7, Governor Andrew Cuomo declared a State disaster emergency for the entire state to address the threat the virus posed to the health and welfare of New York residents and visitors. With cases quickly increasing over the next few weeks, the Governor announced a full stay-at-home order for all non-essential workers on March 20 and halted all non-essential construction on March 27. The City's Uniform Land Use Review Procedure (ULURP) was suspended from March 16 through September 14.

As of October, over 240,000 cases and nearly 24,000 deaths were reported in the city making it one of the global centers of the pandemic. In addition, the city's economy was greatly impacted by the shutdown, losing nearly one million jobs in the span of only a few weeks.

To help address these issues, Mayor Bill de Blasio issued Emergency Executive Order No. 98 on March 12 which included a declaration of a state of emergency in the city due to the virus. This order was updated repeatedly and soon also addressed provisions of the ZR including legally imposed deadlines for the filing of certain documents or for the completion of other required actions since the measures taken to combat the spread of the virus could prevent individuals, business and other entities from meeting them. These measures were generally intended to provide more time for businesses to reopen and builders to complete construction projects. However, these allowances cannot be extended beyond the timeframe of the Emergency Order without a zoning text amendment

## **3. DESCRIPTION OF THE PROPOSED PROJECT AREA**

ZCFR would be applicable to all lots located wholly or partially within both the current 1% and 0.2% annual chance floodplains (the latter serving as a proxy for the projected 2050 1% annual chance floodplain).<sup>9</sup> This contrasts with the 2013 Flood Text and 2015 Recovery Text, which have a more limited geography as they only apply to buildings located wholly or partly within the 1% annual chance floodplain. However, to help the city prepare for or respond to other disasters, select provisions in ZCFR would be applicable throughout the city.

### **1% Annual Chance Floodplain**

The 1% annual chance floodplain encompasses a significant portion of land coverage in New York City, including approximately 65,600 lots and 80,900 buildings across the city's five boroughs.

### **0.2% Annual Chance Floodplain**

The 0.2% annual chance floodplain encompasses a large portion of land in New York City, including approximately 36,700 lots and 44,600 buildings across the city's five boroughs.

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<sup>9</sup> The applicable area would be automatically updated when maps or map data reflecting new flood risks are adopted in the New York City Building Code.

## 4. PURPOSE AND NEED

ZCFR builds upon the 2013 Flood Text and the 2015 Recovery Text which were approved in the aftermath of Hurricane Sandy. These temporary zoning rules, adopted on an emergency basis, removed many of the zoning barriers hindering the reconstruction and retrofitting of buildings affected by the storm and helped ensure that new construction in these locations would be more resilient. The 2013 Flood Text provisions are set to expire with the adoption of new and final FEMA Flood Insurance Rate Maps, anticipated to occur in the next few years. Applicability of the 2015 Recovery Text expired in July 2020. If these rules are not made permanent, it would limit the ability of owners to protect existing vulnerable buildings from flooding and would disincentivize more resilient construction in the floodplain.

Therefore, ZCFR would make permanent the temporary zoning rules of these previous actions, but also improve upon them based on lessons learned since their original implementation through DCP's analysis of resilient construction in the floodplain, coordination with partner City agencies, and community feedback received during public engagement since Hurricane Sandy.

Most critically, the 2013 Flood Text and the 2015 Recovery Text focused on modifying zoning regulations so that buildings could be constructed or modified to meet minimum requirements set forth in Appendix G of the Building Code. However, the city's flood risk will continue to increase with climate change, since sea level rise will increase the potential height of storm surges. For that reason, current building code standards that are tied to today's storm surge projections may not be sufficient to protect buildings from being damaged by future storms. In addition to increasing the potential height of storm surges, sea level rise will also cause the floodplain to expand over time.

To supplement and inform future flood risk, the City relies on the findings of the New York City Panel on Climate Change (NPCC). The NPCC is a group of scientists and private sector experts that provides climate change projections for the city. NPCC's most recent report, released in early 2019, provides the latest estimates for sea level rise (SLR) in the city. The projections take into account different climate change scenarios and inputs to arrive at high- and low-range SLR projections for the 2020s, 2050s, 2080s, and 2100. The NPCC projects that the city could experience 28 inches of sea level rise at the 90th percentile of its estimation in the 2050s. The City uses the NPCC's high-range sea level rise projections for the 2050s as its actionable data to inform land use and capital planning considerations, including ZCFR. The City continues to monitor the NPCC's projections as they evolve over time because the science and underlying data are not static and will continue to advance.

Based on data provided by the NPCC, the 1% annual chance floodplain is projected to cover one-quarter of the city's total landmass by the 2050s.<sup>10</sup> This area, which closely overlaps today's 0.2% annual chance floodplain (whose full geographic extent includes the area of the 1% annual chance floodplain), currently contains twice the number of residents as today's 1% annual chance floodplain: approximately 780,000 residents and 122,100 buildings. As a result, current zoning rules need to be modified to take into consideration future flood risk, so that long-term adaptation can be achieved across the city's entire floodplain.

Beyond this, there are other issues that need to be addressed to ensure that the zoning regulations applicable in the floodplain allow for all types of buildings in neighborhoods across the city to be resilient in the long term. Each neighborhood in the floodplain faces different challenges to adapt to climate change. For instance, most of the floodplain is characterized by low-density communities that contain a prevalence of single- and two-family homes that are highly vulnerable to flooding but are also easier to retrofit since they often can be physically elevated. There are also medium- and high-density neighborhoods in the floodplain,

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<sup>10</sup> The 1% annual chance floodplain for the 2050s is based on FEMA's PFIRMs and the NPCC's 90th Percentile Projection for Sea Level Rise (30 inches).

which contain larger multi-family structures that make it more difficult and more expensive to fully comply with resiliency standards but can be protected over time through incremental resiliency improvements. The floodplain also hosts different types of commercial corridors and industrial areas that need to be protected. These areas play an important role in providing services to residents in the floodplain, and in serving critical functions that support the city's overall population and economy. However, businesses face challenges to incorporate resiliency improvements while keeping a functional operation that largely depends on being at grade. These uses will therefore have to explore incremental resiliency improvements and creative solutions to increase the building's safety over time.

Through its public outreach efforts and analyses, DCP has identified that the current zoning regulations are predominantly focused on low-density residential areas – which were heavily impacted by Hurricane Sandy – and they less effectively address the wider variety of conditions found in the city's floodplain. This makes it less likely that other areas, such as retail corridors, can become resilient over time. In addition, some of the regulations themselves have been found to be not always well calibrated, sometimes hampering the ability to conduct resiliency improvements while at other times leading to buildings out of scale with their surroundings or with unwelcoming blank walls at street level. These inconsistencies sometimes even occur along the same streets. This is an outcome of the necessarily fast-paced nature of the response to the 2012 hurricane, with DCP and other agencies making their best attempt to create zoning regulations to address situations never before seen in the city. With more than seven years of experience under the current floodplain regulations, some of these inconsistencies have become clear and must be addressed so that buildings and, by extension, neighborhoods in the city's floodplain can become resilient.

It will take time for New York City's building stock to adapt to climate change because only a small portion of these buildings currently meet the requirements of Appendix G of the Building Code. Nevertheless, the City believes that resilient construction should become the new normal in the floodplain. By making the current regulations permanent and addressing the various identified issues with them, ZCFR would facilitate this goal and make for more resilient neighborhoods, since places with a resilient building stock would be able to bounce back more quickly from a coastal flood event. In conjunction with coastal protection strategies and infrastructure improvements that are being pursued by the City collectively with other state and federal agencies, this will help the City to fully realize the vision of a more resilient New York City.

Finally, the city's experience recovering from Hurricane Sandy and the current COVID-19 pandemic makes clear that zoning should include rules that can help facilitate long-term disaster recovery. While the storm pointed out the need for provisions that make it easier to reconstruct damaged buildings after a disaster like a hurricane, there is also a need for zoning regulations to address the associated effects from disasters like the pandemic, even if they do not cause physical damage. All rules should be able to be made applicable quickly after a disaster strikes the city, as with the COVID-19 pandemic, but should last no longer than necessary to facilitate the recovery. Beyond this, the city can be made less susceptible to future disasters by undertaking zoning changes that keep vulnerable populations in nursing homes out of harm's way and by allowing for a more resilient energy grid.

## **Goals of ZCFR**

Given the issues currently facing New York City's coastal neighborhoods under the existing zoning framework and the possibility for future disasters beyond the floodplain, DCP has developed the following core goals to assist the city and its residents to be resilient over the long-term.

### **Goal 1. Encourage resiliency throughout the current and future floodplains.**

All building owners in areas subject to flood risk should have the option to proactively incorporate resiliency standards into their buildings, even when these standards are not required by FEMA and Appendix G of the New York City Building Code.

**Goal 2. Support long-term resilient design of all building types.**

Zoning rules in the floodplain should facilitate protection from coastal flooding for all buildings, independent of their age, typology or specific location.

**Goal 3. Allow for adaptation over time through incremental retrofits.**

Building owners should be able to incrementally incorporate resiliency improvements into all buildings and waterfront sites, including existing structures that are not able to fully meet Appendix G.

**Goal 4. Facilitate future recovery by reducing regulatory obstacles.**

Zoning rules should assist vulnerable populations and the recovery process after a future storm or other type of disaster, including the ongoing COVID-19 pandemic.

While ZCFR includes a range of zoning changes to meet these four goals, it would continue the overarching goal of the 2013 Flood Text to maintain prevailing land uses and the planned density in neighborhoods across the floodplain, while helping buildings and neighborhoods of all types to be resilient in the long-term. The following section gives an overview of the proposed text amendment, categorized by the four goals outlined above.

## 5. PROJECT DESCRIPTION

Like the 2013 Flood Text and the 2015 Recovery Text, ZCFR would generally provide optional zoning rules in the floodplain for buildings to fully incorporate “flood-resistant construction standards,”<sup>11</sup> but also for those who may want to incorporate incremental resiliency improvements to protect their buildings against flooding over time, as described in more detail below. Given the scale and variety of the city’s floodplain, ZCFR necessarily includes modifications to many existing zoning regulations. These changes generally allow habitable spaces and other building support features to be better protected and raised out of harm’s way and address the effect these elevated spaces can have on the city’s streetscape. ZCFR also includes provisions with applicability beyond the floodplain to help address a wider variety of situations.

**Goal 1. Encourage resiliency throughout the current and future floodplains.**

ZCFR would modify zoning regulations to allow building owners throughout the floodplain to proactively incorporate resiliency improvements in their buildings by expanding the applicability of the optional rules.

*Expanding beyond the current 1% annual chance floodplain*

ZCFR would greatly expand the current availability of optional regulations to allow more building owners to design or retrofit their buildings to meet “flood-resistant construction standards” proactively. The existing 2013 Flood Text only applies in the 1% annual chance floodplain. As a result, for buildings in the 0.2% annual chance floodplain, there are no zoning regulations to facilitate or encourage resiliency improvements. While most uses in this area are not required to comply with Appendix G, the current 0.2% annual chance floodplain will become more vulnerable to flooding in the future as sea-level rise projections

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<sup>11</sup> “Flood-resistant construction standards” are the construction standards set forth in Appendix G of the NYC Building Code for “Post-FIRM Construction” (as defined therein) applied up to the flood-resistant construction elevation or higher to aid in protecting buildings in the floodplain from flood damage, governing both buildings that are required to comply with such standards and those that voluntarily comply.

show flood risk increasing over time. To address this, ZCFR would apply to both the 1% annual chance floodplain and the 0.2% annual chance floodplain.<sup>12</sup> The City believes that the 0.2% annual chance floodplain geography is a valid proxy for the projected 1% annual chance floodplain in the 2050s and that this geographic expansion is a sensible precautionary approach that would allow the city to proactively adapt to future flood risk. Eligibility within these two geographies would be determined at the time of a building permit application.

#### *Expanding to lots*

ZCFR would simplify the design process and encourage more building owners to proactively meet “flood-resistant construction standards” by determining applicability based on their zoning lot. The 2013 Flood Text provisions are currently applicable only to buildings located wholly or partially within the 1% annual chance floodplain. For example, in a residential campus with multiple buildings where only some of which are in the 1% annual chance floodplain, the 2013 Flood Text zoning allowances and flood protection standards cannot be applied to all buildings, making the design process more complex—and ultimately costly—since each building would have to follow different zoning rules. Along streets, this standard produces inconsistent results where only some specific buildings touch the floodplain edge. By determining eligibility based on whether the zoning lot is both wholly or partially within the floodplain, ZCFR would produce a more consistent outcome and be more in line with applicability requirements in the rest of the ZR.

### **Goal 2. Support long-term resilient design for all building types.**

ZCFR would include optional zoning regulations that better enable building owners to make their buildings more resilient by physically elevating habitable spaces and other building support features above expected flood elevations. These would generally modify existing regulations for building envelopes and ground floors, as well as address more unique situations. When these allowances are used, buildings would have to comply with “flood-resistant construction standards” and a new set of streetscape regulations.

#### Building Envelope Modifications to Promote Resiliency

ZCFR includes optional modifications of various building envelope regulations to better allow habitable spaces to be raised above flood levels.

#### *Flood-resistant construction elevation*

ZCFR would continue to provide additional building height where building owners are required or are opting to meet Appendix G floodproofing standards.

All zoning districts have height and setback regulations that govern the size and shape of buildings. Their heights are measured from different starting points depending on the type of building and the zoning district. For example, the maximum height of a single-family residence in a lower-density contextual Residence District (typically 35 feet) is measured from the “base plane,” which is generally located between the elevation of the curb and the average natural grade along the building facade.

Since 1989, in the 1% annual chance floodplain, required heights in the ZR can be measured from the BFE to allow building owners to construct habitable space above the elevations which FEMA projects would be inundated by flooding without losing buildable space. However, it has been identified that pre-1989

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<sup>12</sup> In the proposed text amendment, the 1% annual chance floodplain is defined as the “high-risk flood zone” and the 0.2% annual chance floodplain is defined as the “moderate-risk flood zone.”

buildings could utilize this extra height for enlargements without providing any floodproofing, as long as the improvement did not trigger compliance with Appendix G.

In the aftermath of Hurricane Sandy, DOB changed the Building Code to require that buildings in the 1% annual chance floodplain locate all living spaces at or above the DFE which, depending on building type, requires an extra one or two feet above the BFE as an extra measure of safety. The 2013 Flood Text embedded this rule into the ZR by allowing heights in all zoning districts to be measured from the “flood-resistant construction elevation” (FRCE), which is generally synonymous with the DFE in the current rules. The underlying building envelope associated with building types and zoning districts did not change; the only change was to the height from where the envelope was measured. With this modification, building owners can meet the requirements of Appendix G without sacrificing living space.

ZCFR would continue to allow building envelopes across all zoning districts to be measured from the FRCE. In addition, such term would be revised to add certain clarifications. The FRCE will be required to not be lower than two feet above lowest adjacent grade to ensure a minimum level of floodproofing. In the 0.2% floodplain, where compliance with Appendix G is voluntary and no DFEs exist, this two foot minimum level of protection would also apply. Coupled with required compliance with the “flood-resistant construction standards,” this would mean that no living space would be located below the FRCE, and below grade basements and cellars would not be built in residences. In addition, essential facilities (such as hospitals) would be able to measure height from the 500-year flood elevation, which is required by Appendix G. Finally, the allowance to measure height from the BFE would be removed to ensure a consistent framework and any additional height would be tied to flood-resistant improvements.

#### *Reference plane*

ZCFR would include a consistent framework for additional building height to encourage building owners to address long-term climate change, lower insurance costs and provide usable spaces at grade.

Acknowledging that there may be situations where the FRCE height could result in spaces with awkward heights that could deleteriously impact the streetscape, the 2013 Flood Text allows the reference point at which heights are measured to be adjusted upwards to create more practical and viable ground floor spaces. This alternate reference plane is available in areas where the BFE equals or exceeds four feet, and the plane’s maximum height (ranging from 9 to 12 feet) is dependent on the zoning district and building use.

While the notion of an alternative reference plane has proven sensible, there are issues with the specific ways it is applied. First, varying the reference point based on the building type and zoning district creates a highly complex framework that benefits some buildings more than others. This leads to inconsistent outcomes, sometimes even along the same street due to minor changes in the topography. Additionally, the BFE height necessary to use the reference plane limits its applicability since most of the buildings in the 1% annual chance floodplain are subject to a lower BFE. This means that most building owners in the floodplain can only measure building height from the FRCE, whose lower height only encourages compliance with the minimum construction standards set forth in Appendix G, making it difficult for building owners to over-elevate their buildings without sacrificing living space. This means that building owners cannot easily incorporate sea level projections into their building design (the NPCC projects that New York City would be subject to approximately 30 inches of sea level rise by the 2050s)<sup>13</sup> or maximize their flood insurance reduction (which is generally achieved when the first occupiable floor is placed four feet above the BFE).

To create a consistent framework for height measurement that addresses these issues, ZCFR would allow building heights to be measured from a new “reference plane” that is up to 10 feet above the base plane or

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<sup>13</sup> [“Climate Resiliency Design Guidelines – Version 3.0.”](#) New York City Mayor’s Office of Recovery and Resiliency (March 2019). Appendix 2.FFDGGGHGG

curb level in the 1% annual chance floodplain and up to five feet in the 0.2% annual chance floodplain. To ensure that the additional height is tied to actual improvement in the building's resiliency, the building would have to comply with "flood-resistant construction standards" and its "first story above the flood elevation" (FSAFE) would have to be located at or above the chosen "reference plane" height. The FSAFE would be defined as the level of the finished floor of the first story located at or above the level to which the building complies with "flood-resistant construction standards." In areas where the FRCE is higher than 10 feet, the higher FRCE could continue to be used.

#### *Other envelope modifications*

To help offset the effects of the proposed additional height that would allow construction at or above the FRCE, ZCFR would include several allowances intended to break down the building massing in the upper portions of buildings.

For lower-density residential areas, ZCFR would continue to encourage sloped roof design in areas where that type of roof is the prevailing context. However, there would be a minor modification to the existing "attic allowance," which allows a 20 percent floor area bonus in exchange for a sloped roof in R2X, R3, R4, R4A and R4-1 Districts. The current regulations require that the additional floor area be located directly under the roof, which often results in taller roofs and building heights to accommodate a usable attic. If these rules were applied to the floodplain, the height of these buildings could be exacerbated, as building heights would be measured from the FRCE or the "reference plane." To address this, ZCFR would instead allow the additional floor area to be located in any portion of the building which would encourage a lower roof slope and overall building height. In Lower Density Growth Management Areas (LDGMA) the rule would not change, since the ability to locate the additional floor area is already permitted (albeit with a steeper roof pitch). However, "cottage envelope" buildings, described below, would be able to use the lower pitch in LDGMAs since it is more reminiscent of bungalow homes.

In medium- and high-density contexts, ZCFR would make two modifications to promote lower building scale. First, while maximum base heights and overall heights in Quality Housing buildings may be measured from the FRCE or the "reference plane," ZCFR would allow minimum base heights to continue to be measured from the base plane. This would allow setbacks in buildings to be made closer to the ground and keep the base heights lower. The provision was adopted as part of the 2013 Flood Text and would be maintained in ZCFR. Additionally, ZCFR would modify the underlying dormer allowances to provide an alternative that could break up the bulk in the upper portion of the building. The underlying dormer allowance permits 60 percent of the width of the building as a permitted obstruction in the building setback above the maximum base height, but this must diminish in width as the building rises. ZCFR would allow a dormer that extends up to 40 percent of the building width without any diminishing.

#### Accommodating "flood-resistant construction standards" on Ground Floors

ZCFR includes a series of regulations intended to incentivize the floodproofing of ground floors, encourage active uses to be kept at the street level to promote more resilient neighborhoods, and encourage internal building access. These regulations build on the standards included in the 2013 Flood Text but aim to provide more consistent outcomes throughout the floodplain. These are described below under five categories: wet-floodproofed spaces, dry-floodproofed spaces, cellars, street wall location, and ground floor use requirements.

#### *Wet-floodproofed spaces*

ZCFR would provide a consistent floor area exemption for wet-floodproofed ground floor spaces for all buildings to promote long-term resiliency improvements.

“Flood-resistant construction standards” require the ground floor of residential buildings to be wet-floodproofed, thereby limiting the use of this ground floor space solely to parking, storage and/or building access. While accessory parking is generally not counted toward zoning floor area calculations, spaces used for storage or building access typically count and therefore can act as a severe disincentive to floodproofing. The 2013 Flood Text addressed this by allowing all existing structures to fully exempt a wet-floodproofed ground floor. For new buildings, the exemptions are limited to entryway areas used for enclosed ramps and stairs to encourage access to be kept within the building.

ZCFR would provide the full ground floor exemption for wet-floodproofed spaces to new and existing buildings. This would provide more consistent results and incentivize internal access at grade, while encouraging living spaces to be elevated above the FRCE in new and existing buildings, including those that cannot be physically elevated.

#### *Dry-floodproofed spaces*

To promote a safe and lively pedestrian environment, ZCFR would encourage active dry-floodproofed ground floor spaces along the City’s retail corridors.

“Flood-resistant construction standards” allow non-residential ground floor uses to be dry-floodproofed. While this method allows active uses to be kept close to grade, which is beneficial in maintaining retail continuity along the city’s commercial streets, this method has proven to be quite costly. The 2013 Flood Text attempted to incentivize dry-floodproofing by allowing up to 10,000 square feet of non-residential uses in existing buildings to be exempted from floor area calculations if they are dry-floodproofed. However, this provision has seen limited use to date due to both the high cost of dry-floodproofing as well as existing restrictions on the use of relocated space that make the resiliency investment less viable. But if the 2013 provision was utilized, the large size of the floor area exemption could lead to out-of-scale development on small lots. For new buildings, the exemptions are limited to entryway areas used for enclosed ramps and stairs, to encourage access to be located within the building.

ZCFR would modify these incentives to better encourage dry-floodproofed spaces in appropriate locations. The provision would be available for both new and existing buildings facing “primary street frontages” (as defined in the ZR) in Commercial Districts and M1 Districts paired with Residence Districts. The floor area exemption would only be available for the first 30 horizontal feet of the non-residential floor space as measured from the street wall of the building, since this is the most critical space to maintaining retail continuity. The exemption would come with design requirements to ensure quality ground floors. These would require the ground floor level be within two feet of the adjacent sidewalk and follow transparency requirements. In addition, ZCFR would maintain the existing floor area exemption for access, to encourage ramps and stairs be located within the building.

#### *Cellars*

ZCFR would ensure that floor area exemptions are given only when buildings are floodproofed and remove incentives to build low-quality ground-floors.

The 2013 Flood Text included some limited modifications to the definition of “cellar” to help ensure that buildings with moderate and high FRCE levels (especially those that equal or exceed four and a half feet above grade) can achieve their fully permitted floor area. However, this provision has unexpectedly resulted in low-quality spaces, since it encourages low ground floor heights to obtain the floor area exemption, and the outcome can be out of scale with the neighborhood context, since an entire floor can be discounted from floor area calculations even when the space is used for active uses. In addition, where allowed, this provision has also encouraged the construction of sunken retail ground floors. While these floors would have to be

dry-floodproofed, they could become vulnerable as sea levels rise, making it harder to further retrofit these buildings in the future.

ZCFR would limit these exemptions by not allowing the FRCE to be used as the measurement threshold for cellars and basements. In addition, as noted in the “flood resistant construction elevation” section above, ZCFR would modify the “base plane” definition to remove references to the BFE. Taken together, this would restrict the owners of buildings subject to a high BFE from taking significant floor area exemptions for these low-quality below-grade spaces. With this proposed change, floor area exemptions would only be tied to the floodproofing of the building. However, existing buildings would have the option to determine floor area calculations using either the definition prior to or after the change to ensure that significant new non-compliances are not caused for these sites.

#### *Street wall location*

ZCFR would include limited street wall modifications when access or flood protection measures are provided outside of the building.

Many zoning districts have street wall location provisions that ensure new development will be constructed close to the property line to reflect the character of their area. While these regulations promote best practices in streetscape design, they can conflict with the ability to provide sufficient outdoor access from the sidewalk into buildings in the floodplain since stairs and ramps can occupy considerable space and may not fit in the permitted area.

The 2013 Flood Text provided street wall modifications in the highest-density Commercial Districts to allow stairs and ramps in recesses that occupy up to 30 percent of the street wall width. However, this allowance is not applicable to buildings in lower-density districts and does not fully accommodate stairs and ramps serving narrow buildings, or buildings with high flood elevations, because of the limited recess percentage allowance. The 2013 Flood Text also did not provide any street wall location modifications for installing flood protection measures, which has been identified by practitioners as hampering flood resiliency. While ZCFR is particularly intended to facilitate interior entrances to improve the streetscape around flood-resilient buildings there are situations where exterior access may be necessary and existing street wall location provisions may make this impossible. Provisions governing these types of locations may also hamper the implementation of flood protection measures such as flood gates.

ZCFR would instead allow sufficient space to accommodate exterior stairs and ramps, as well as flood panels, in all zoning districts that require street walls be located on or near the street line. To incorporate these measures, street walls could be located up to eight feet from the property line and, to allow ramps that run perpendicular to the street, up to 50 percent of the street wall could be located beyond eight feet. In acknowledging the access challenges for narrow lots (less than 50 feet), ZCFR would allow the remaining 50 percent of the street wall to be recessed at the ground floor level. The possible visual impact of the access measures would be limited by requiring planting if the access extended along 70 percent or more of the street wall.

#### *Ground floor level requirements*

ZCFR would accommodate resilient buildings and raised first floors by addressing conflicts with existing ground floor level zoning requirements.

To promote walkability and enliven retail corridors, some zoning districts have ground floor use regulations that typically require non-residential uses (i.e., commercial and community facility) on the ground floor level in close proximity to the sidewalk level (often between two and five feet), and that the building facade adjoining these uses would be transparent to promote the feel of shopping districts with large show

windows. In the floodplain, that ground floors and transparency be located close to the sidewalk level would often preclude floodproofing strategies, which could become extremely onerous in areas with a high FRCE. In addition, Commercial and Manufacturing Districts include accessory signage regulations to promote businesses on the lot that include size and height limitations measured from grade which may lead to impractical outcomes in the floodplain given the need to sometimes elevate these uses.

To address issues in applying these rules at the sidewalk level in the floodplain, the 2013 Flood Text allowed these ground floor measures to be elevated to the FRCE so that buildings could comply with Appendix G. For example, if the FRCE of the building was five feet above grade, the measurement elevation for required non-residential uses could be elevated to the FRCE along with associated transparency rules. Accessory signage could also be measured from this elevation. With these changes, owners can consider a wide variety of resilient design strategies including ground-floor elevation, dry-floodproofing, or the creation of wet-floodproofed “show pits.”

ZCFR would continue to allow this, with small additions. In all areas, any blank walls created along retail corridors would now be subject to streetscape rules and would need to be addressed by adding elements such as planting, street furniture, or artwork. Additionally, in V zones and Coastal A zones identified by FEMA, ground floor use regulations would be made optional because dry-floodproofing is prohibited and FRCEs are often extremely high above the sidewalk.

#### Improving Streetscape in the Floodplain

ZCFR would require buildings using any of the regulations provided to comply with “flood-resistant construction standards” to also comply with streetscape requirements meant to help ensure flood-resistant buildings contribute to their surroundings.

Leading up to the 2013 Flood Text, there were concerns that elevating buildings and restricting the use of ground floor space would have deleterious effects on the neighborhood streetscape. To address this, the 2013 Flood Text included ground level design requirements for those buildings that utilized its zoning regulations. These requirements are dependent on the height of the FRCE, the building’s use and the applicable zoning district. They require that a minimum number of elements be incorporated into the building’s design from a small menu of options. For instance, single- and two-family homeowners that elevate their first occupiable floor five feet above grade must incorporate one of four design treatments, including front yard plantings or a front porch.

While this system laudably attempts to provide design flexibility while ensuring an appropriate level of streetscape consideration, its workability has proven challenging in practice. This has mainly been due to the requirements and thresholds being overly focused on residential buildings, particularly in low-density areas. For example, buildings in Commercial Districts are rarely required to meet any streetscape requirements because their applicable flood elevation threshold is so high, while many buildings in Residence Districts are required to comply because the thresholds there are lower. In addition, the actual design options in the menu are rather limited, particularly for buildings other than single- and two-family residences. For example, while these buildings have four design options to choose from, multi-family buildings typically have only one. In addition, practitioners have identified that some of the options are inadvertently restricted by unrelated zoning regulations, further limiting the number of available design features.

ZCFR would continue to require design features to address concerns about building elevation and blank walls but would address the issues raised with the current rules. Specifically, this would create a more consistent framework of requirements, with more design options, to better address the wide variety of building conditions found in the floodplain.

The framework would include a points system, like the 2013 Flood Text. Points would now be available in two broad categories: Building Access and Ground Floor Level. Building Access would be focused on how users reach the building's elevated first story, while Ground Floor Level would be focused on the design of the ground floor itself. Generally, for buildings with a "first story above the flood elevation" (FSAFE) that is less than five feet above grade, one point would be required and may be fulfilled within either category. Where the building's FSAFE is five feet or higher, the building would have to meet a total of three points, with at least one point coming from each of the two categories. These requirements would be applicable in all zoning districts other than M2 and M3 districts. Additionally, in M1 districts, they would not apply to heavy industrial uses. A much-expanded menu of design options would be available for each category to better address different building types and scales found in the floodplain. For example, the Building Access category would include nine options such as front porches, stair turns, entrances close-to-grade, and multiple entrances along a facade. The Ground Floor Level category would include 14 options, including planting and raised yards (included in the 2013 Flood Text), as well as wall treatments such as decorative latticework, street furniture, and ground floor level transparency. This expanded menu would give designers the toolkit to better reflect conditions found in the floodplain, such as locations along commercial corridors or in higher-density residential neighborhoods.

In addition, ZCFR would ensure that these design options can be more easily utilized. It would classify steps and covered porches as permitted obstructions in front yards and modify the maximum height of retaining walls to three feet to address those practical construction constraints caused by the previous maximum height of two and a half feet. In low-density Residence Districts, ZCFR would also exempt buildings on narrow lots from existing front yard planting requirements that inadvertently limit the use of the other available design options. Finally, for all buildings subject to these provisions, all group parking facilities provided on the ground floor level would be required to be either wrapped by usable building space, or screened by treatments such as latticework, vertical plantings, or artwork.

#### Accommodating Current and Future Flood Elevations in Special Conditions

ZCFR includes more tailored zoning regulations to address special situations found in the city's floodplain, including small or narrow lots, as well as for existing buildings that do not meet current zoning requirements. While these conditions exist throughout the floodplain, they are often concentrated in certain neighborhoods, such as the bungalow communities often found along the water's edge.

##### *Substandard lots (cottage envelope)*

ZCFR would expand the availability of the popular cottage envelope option, first created in the 2015 Recovery Text, to small lots throughout the floodplain. This would allow for the construction of resilient buildings that better match their surroundings and accommodate better layouts.

Following the 2013 Flood Text, many neighborhoods with a prevalence of small, high-lot coverage bungalow homes on substandard zoning lots had concerns about the taller heights of recently constructed flood-resistant buildings. This issue was partially a result of zoning regulations that were designed with larger lots in mind. For instance, when traditional yard regulations were applied on narrow and/or shallow lots, the resulting building footprint was extremely small and forced the permitted floor area into a taller building than would have otherwise been expected. To make matters worse, the interiors of these narrow homes were also undesirable and inefficient, so both neighbors and the homeowners themselves were often dissatisfied with the outcome.

To better reflect the scale of surrounding buildings,<sup>14</sup> the 2015 Recovery Text provided an alternative cottage envelope option for single- and two-family detached residences reconstructed in the special Neighborhood Recovery Areas. This envelope came with decreased yard requirements and increased permitted lot coverages on substandard lots, in exchange for a shorter overall building height. The resulting building form mimics the wider and deeper bungalow homes and has provided homeowners the opportunity to create a more practical design and interior layout. While this provision has been well received, it was limited to reconstructions in the specific recovery areas.

ZCFR would expand the 2015 Recovery Text provisions by allowing all new and existing single- and two-family detached residences in R1 through R5 districts in the floodplain to use the cottage envelope option when the building is designed to “flood-resistant construction standards.” Specifically, the maximum permitted building height would be reduced to 25 feet, as measured from the “reference plane,” instead of the typical maximum height of 35 feet. In exchange for this reduction, the applicable yard and lot coverage requirements would be modified: the minimum front yard would be reduced to the depth of neighboring homes, while minimum side and rear yards would be reduced at a rate proportional to the narrowness and shallowness of the lot (up to a minimum of three and 10 feet respectively). In addition, any applicable lot coverage and open space requirements would not apply because the modified yard regulations effectively control the building’s footprint. Corner lots would be able to consider one of their front yards a (narrower) side yard to allow for a more contextual corner building.

#### *Parking on narrow lots*

ZCFR would continue to encourage single- and two-family residences on narrow lots to have parking be located below the building.

Several low-density Residence Districts restrict the location of parking spaces and curb cuts on a property. For instance, in many contextual districts, parking is only allowed within the side lot ribbon on lots less than 35 feet wide, and curb cuts must be at least 16 feet from other curb cuts on the same or an adjoining zoning lot. While the combination of these regulations works well to preserve the streetscape in many neighborhoods, they may be particularly difficult to comply with in the floodplain due to the prevalence of narrow lots found there and the inability to use ground floors for habitable spaces.

To address these issues, the 2013 Flood Text included modified curb cut spacing and parking location requirements, particularly for narrow lots. These have allowed narrow residences to be elevated and parking to be located below the building provided that at least two parking spaces are located there. ZCFR would maintain these allowances, with small modifications to better align the number of parking spaces that may locate under an elevated building to what is required by the zoning district (which may be less than two spaces) and to only allow the curb cut spacing for narrow lots. Specifically, in providing parking spaces beneath the building single and two-family residences in R1 through R5 districts (except R4B and R5B districts) would be able to disregard underlying parking location and curb cut location rules to allow parking spaces be located under the building. On existing zoning lots with widths of less than 35 feet, the curb cut spacing regulations would become optional if four feet of curb space is provided between the new and existing curb cuts. In either case, the site would have to comply with the underlying front yard planting requirements.

#### *Non-complying and non-conforming buildings*

ZCFR would promote resiliency for the large number of existing buildings and land uses that do not adhere

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<sup>14</sup> For more information on the cottage envelope, see report outlining the City’s proposal, [Zoning for Coastal Flood Resiliency: Planning for Resilient Neighborhoods](#), issued by the NYC Department of City Planning. Page 20.

to the zoning rules that are currently applicable.

These conditions exist because the buildings or uses were constructed before zoning existed or because they were legally built under the provisions in effect at the time and the regulations have since changed. These non-complying buildings or non-conforming uses can stay in place but there are limits on their reconstruction, enlargement or alteration. Most importantly, if these buildings or uses are demolished or damaged, such that more than a specified amount of floor area is removed — (75 percent for most non-compliances, 50 percent for most non-conformances) — they cannot be put back, although single- and two-family residences located in districts that permit them can be fully demolished and replaced. This longstanding policy was intended to ensure that properties comport with the applicable zoning regulations over time.

However, these restrictions became immediately problematic in the aftermath of Hurricane Sandy. The drafters of the ZR in 1961 did not anticipate the significant destruction of non-conforming uses or non-complying buildings caused by the storm, which meant that many uses and buildings could not be rebuilt since they were damaged beyond the applicable thresholds. Nor did the drafters anticipate that these buildings would need to be elevated to become more resilient, therefore potentially creating, or increasing, non-compliance with several bulk regulations.

To ensure that building owners could rebuild and get their properties out of harm's way, the 2013 Flood Text allowed non-conforming uses and non-complying buildings damaged in Hurricane Sandy beyond the applicable thresholds to be reconstructed while still retaining their previous non-conformances or non-compliances. It also encouraged buildings to be elevated or reconstructed up to the FRCE by permitting new and increasing existing non-compliances. Subsequently, the 2015 Recovery Text created two additional allowances to address situations that building owners encountered when rebuilding their homes. First, it permitted non-conforming two-family residences in single-family Residence Districts and single- and two-family residences in Manufacturing Districts to rebuild or vertically enlarge if they were in Neighborhood Recovery Areas, neither of which had been permitted under the 2013 Flood Text. Additionally, it allowed all habitable space in existing single- and two-family residences, including space in basements, to be elevated above the FRCE and accommodated all associated non-compliances.

These special rules have facilitated reconstruction of properties damaged by Hurricane Sandy, but building owners and practitioners have identified issues that deterred some owners from making their buildings more resilient. For example, the non-compliance allowances only permitted buildings to be elevated to the FRCE, which limited the ability to over-elevate to lower insurance premiums or plan for projected sea level rise. Additionally, buildings being elevated have to keep within their existing footprint to maintain existing yard and open space non-compliances, which has proven to be challenging for those on small or awkwardly configured lots. Finally, many of the provisions were only applicable in the Neighborhood Recovery Areas for a limited time period, even though similar issues are found throughout the floodplain.

In response, ZCFR would allow nearly all non-conforming uses and non-complying buildings to be elevated, retrofitted, or reconstructed to meet “flood-resistant construction standards” and measure height from the “reference plane” while retaining existing non-conformances and non-compliances. This allowance would come with the condition that less than 75 percent of the floor area be damaged or demolished (single- and two-family residences in districts that permit them would maintain their higher threshold). Relief beyond this threshold would be available for non-conforming uses and non-complying buildings damaged in any future disaster, as described in the “Disaster Recovery Rules” section of Goal 4 below.

In addition, non-compliances could be created or increased as long as the change to the building does not exceed specified parameters. For example, it would be possible to retain and relocate non-complying floor area (often located in basements) above the “reference plane”, provided that the floor area does exceed the

maximum allowed in the applicable zoning district by 20 percent. Similarly, it would be possible to increase the height of a building with non-complying height (as measured from the lowest floor to the highest point of the roof), provided that the elevated building does not exceed the maximum height allowed by the applicable zoning district by 10 percent or 10 feet, whichever is less, as measured from the “reference plane”. Non-compliances could also be created or increased for open areas (yards, courts, and open spaces, including minimum distance between buildings) to accommodate resiliency measures on constrained sites. For instance, a building’s previous footprint could be shifted or altered provided that the building’s lot coverage is not increased and that any new encroachment into required yards does not get too close to surrounding lot lines (five feet from the rear lot line and three feet from the front and side lot lines).

Building on the provisions of the 2015 Recovery Text, ZCFR would also allow non-conforming residential buildings in heavy Commercial (C8) Districts and in all Manufacturing Districts throughout the floodplain to be elevated, retrofitted, or reconstructed to meet “flood-resistant construction standards” and measure height from the “reference plane” as long as the buildings are located within predominantly residential areas in these districts. In addition, the residential floor area in these buildings could not be increased and the maximum height for single- and two-family residences would be 35 feet (multi-family buildings, generally rare in these areas, would be able to use the applicable zoning district height).

#### Providing Discretionary Actions to Address Special Situations

ZCFR would modify the existing special permit that can be granted by the New York City Board of Standards and Appeals (BSA) to facilitate resiliency improvements in unique conditions and also create a new BSA special permit to allow alternative uses on ground floors in Residence Districts.

##### *BSA resiliency special permit*

ZCFR would expand upon the existing BSA special permit to allow it to better fulfill its original mission of promoting compliance with Appendix G. ZCFR would also move the text to ZR Section 73-71.

There are often building or site conditions that cannot be fully addressed by modifications to zoning regulations and therefore require review on a case-by-case basis. The 2013 Flood Text recognized this by including a resiliency special permit (ZR Section 64-81, “Special Permit for Modification of Certain Zoning Resolutions”) whereby the BSA could modify zoning regulations (predominantly related to the building envelope) if it found that the existing rules created practical difficulty in complying with Appendix G. While this special permit has proven necessary in many situations, some of the limits placed on the possible modifications available have made it difficult to undertake resiliency improvements. For example, maximum height regulations could not be increased by more than 10 percent or 10 feet (whichever is lower), which proved inconsequential in many low-density zoning districts given their low maximum height. Additionally, regulations for use, parking or floor area were not available for modification even though these were found to be necessary in many situations, particularly through the City’s *Build It Back* program.

The modifications in ZCFR would change the maximum height limitations to 10 percent or 10 feet (whichever is higher) to help accommodate different retrofitting needs, which often require a building’s ground floor to be evacuated and the floor space relocated to the top of the structure. While continuing to allow yard and permitted obstruction modifications, a wider range of zoning regulations could also be modified through the special permit. For example, floor area regulations could be modified to encourage below-grade spaces (typically exempted from floor area calculations) to be raised above the FRCE (where they would not be exempted). This allowance would be limited to a maximum increase of 20 percent above what is permitted in the zoning district or 10,000 square feet, whichever is less. In addition, some parking and use regulations could also be requested. For all these modifications, the BSA would have to find that

there would be practical difficulty in meeting “flood-resistant construction standards” absent the modifications. The special permit would also be moved to ZR Section 73-71.

*BSA ground floor use special permit*

ZCFR would create a new discretionary action to permit ground floor offices in Residence Districts, where appropriate, to encourage dry-floodproofing and benefit the streetscape in these areas.

While ZCFR includes strategies to encourage buildings to become more resilient, public input has noted the limited options available for residential buildings, since Appendix G requires their ground floors to be wet-floodproofed and therefore limited solely to parking, storage or access. This is a particular issue in Residence Districts, where the only permitted option for dry-floodproofed ground floors are community facility uses.

ZCFR would therefore create a separate BSA special permit for buildings located in Residence Districts in the floodplain. This special permit would allow office uses (Use Group 6B) on the ground floor if the space is dry-floodproofed and meets certain conditions focused on ensuring that the use fits into its residential context. Parking and signage regulations typically applicable to doctor’s office would apply to the use. The new special permit would be found in ZR Section 73-72, “Special Permit for Ground-Floor Uses in Residence Districts.”

**Goal 3. Allow for adaptation over time through incremental retrofits.**

While the proposal is primarily focused on encouraging all buildings in the floodplain to fully meet “flood-resistant construction standards,” there are situations where specific conditions, such as regulatory obstacles or cost constraints, may prevent a building from reaching that level of resiliency. ZCFR includes optional modifications that would encourage buildings to become more resilient over time without having to comply with those standards. These modifications, which would also be available to buildings that meet flood-resistant construction standards, include provisions to facilitate location of mechanical equipment and other critical spaces above the flood-resistant construction elevation (FRCE), allowances for some specific flood protection measures, and parking design modifications in low-density Residence Districts.

Locating Mechanical Equipment Above Flood Elevations

ZCFR would help protect mechanical equipment from flood damage by facilitating its elevation above flood levels, which is often the first and most cost-effective resiliency strategy for existing buildings since it requires few changes to the building’s structure or floor elevations.

The 2013 Flood Text allowed mechanical equipment, typically found in basements and cellars, to be relocated to other areas within buildings or in required open areas. In some instances, these have been found to be insufficient and have therefore hampered resiliency improvements. For example, owners of residential campuses who are looking to construct a new separate structure to house mechanical equipment above expected flood levels have been hindered by zoning regulations that require minimum distances between buildings. ZCFR would improve upon these existing 2013 Flood Text provisions for mechanical equipment by promoting an expanded set of resiliency improvements.

*Within and on top of buildings*

ZCFR would facilitate the relocation of mechanical equipment from basements and cellars to locations higher in or on top of buildings.

The 2013 Flood Text included allowances for larger bulkheads on the top of multi-family buildings and for existing commercial or manufacturing buildings. It also included modifications in lower-density Residence Districts to facilitate the relocation of equipment from below-grade spaces to elsewhere within the building. Bulkheads were already considered permitted obstructions and permitted to extend above any required maximum heights or sky exposure planes if they remained within certain size limitations. The 2013 Flood Text increased these dimensions in the floodplain to encourage mechanical equipment to be moved onto roofs where they are more protected from flooding. For example, for buildings in R5 through R10 districts, and in Commercial and Manufacturing Districts, these changes permitted a 10 percent increase in bulkhead coverage. Alternatively, for existing buildings, it allowed an approximately 30 percent increase of their permitted height. Bulkheads in R3 and R4 Residence Districts were permitted smaller increases given their smaller scale. Screening was required for all bulkheads. ZCFR would maintain these provisions, while increasing their applicability for all new and existing buildings in Residence, Commercial and Manufacturing Districts. While there are no prohibitions on locating mechanical equipment in the cellars of non-residential structures, in the long-term it is safer to locate such equipment above the flood level.

In addition, the 2013 Flood Text also exempted buildings in the floodplain from limitations on interior mechanical space found in many lower-density Residence Districts, as this tended to force mechanical equipment into basements and cellars. This exemption would continue in ZCFR to ensure that mechanical equipment can be placed above the FRCE.

#### *In open areas*

ZCFR would also facilitate the placement of mechanical equipment above the FRCE outside of buildings to address situations where the structures cannot physically sustain additional loads or where centralizing this equipment in a single structure would be more efficient.

The 2013 Flood Text included allowances for mechanical equipment in various open areas regulated by zoning. The equipment can be considered permitted obstructions within yards, courts and other open areas if it stays within certain coverage and height limitations. These measures offered alternative locations for necessary mechanical equipment in lieu of basements and cellars. The provisions are available for existing single- and two-family residences as well as all other new and existing buildings.

ZCFR would consistently apply these allowances to all buildings regardless of whether they are new or existing. It would also modify some of the dimensional limitations to provide more rational standards to address various design challenges that have been identified since 2013. Mechanical equipment would have to be placed a minimum of five feet from property lines (though this could be reduced to three feet for substandard lots). Coverage would be limited to 25 percent of the minimum required open space, but the coverage would be restricted to 25 square feet if the equipment is located between the building and the front lot line, to minimize its effect on the street. The height would be limited to certain heights above the “reference plane” depending on the zoning district (10 feet in low-density Residence Districts, 15 feet in other Residence Districts, and 23 feet in Commercial and Manufacturing Districts). All equipment would be required to be screened by vegetation when located in front yards or between the street line and the street wall and when placed in other locations, if more than one piece of equipment is provided, it would have to be screened by materials that are at least 50 percent opaque.

Finally, to allow for the construction of new utility structures on larger campus-style housing sites, ZCFR would permit buildings used predominantly for mechanical equipment to be considered permitted obstructions on properties larger than 1.5 acres. The structure’s coverage would similarly be limited to 25 percent of the minimum required open space, and it would be required to be located at least 30 feet from any legally required windows with the exhaust stacks located above adjacent residential buildings. The structures would be subject to underlying height and setback controls.

### Locating Important Spaces Out of Harm's Way

Beyond mechanical equipment, there are some situations where elevating key support spaces would improve the long-term resiliency of buildings and their uses. ZCFR therefore includes modifications to address three of these situations.

Many retail stores rely on basement and cellar space to support their at-grade retail, but zoning regulations often restrict these spaces from being located on the second floor, which limits the stores' ability to become more resilient. ZCFR would therefore include two modifications to address this issue.<sup>15</sup> In low- and medium-density C1 and C2 local Commercial Districts, where underlying zoning regulations limit commercial uses to the first story in mixed-use buildings, ZCFR would allow commercial uses on the second story in buildings in the floodplain. This would give businesses an opportunity to move key spaces out of basements or cellars. The space within the second floor would still be counted towards floor area regulations.

In Commercial and Manufacturing Districts with a low maximum floor area ratio (FAR), buildings may have little available floor area to raise key spaces above the flood elevation.<sup>16</sup> To remedy this, ZCFR would add a floor area exemption of up to 500 square feet to provide businesses the option of elevating important spaces, such as offices or storage rooms, above the FRCE in Commercial and Manufacturing Districts where the permitted commercial or manufacturing FAR is less than or equal to 1.0.

Lastly, existing residential buildings in low-density Residence Districts are often hindered by underlying zoning regulations when attempting to fill in their basements or cellars and relocate the required parking found there to other portions of their lot. The 2013 Flood Text included provisions to address this. ZCFR would similarly allow below-grade parking in existing residential buildings in R1 through R5 districts (except R4B and R5B districts) to be relocated to front, side or rear yards. To be granted this allowance, below-grade spaces would have to be removed and filled, in compliance with "flood-resistant construction standards." In addition, ZCFR would continue to allow parking spaces and driveways to be covered with dustless gravel for all single- and two-family residences in R1 through R5 districts.

### Incorporating Flood Protection Measures

ZCFR would allow more flood protection measures as permitted obstructions to accommodate their installation when required for compliance with "flood-resistant construction standards" and in situations where alternate flood protection strategies may be warranted.

The 2013 Flood Text allowed several flood protection measures, such as flood barriers and associated emergency egress, as permitted obstructions in various required open areas in recognition that they are required in front of building entrances. However, practitioners and other City agencies have subsequently identified additional viable measures that are not included and have noted the difficulty in finding on-site storage within buildings for temporary measures such as flood panels, both of which have limited the use of these measures.

ZCFR would therefore maintain the existing flood protection measures listed as permitted obstructions but add items which were not previously listed: landscaped berms and their associated floodgates. ZCFR would also allow space used for the storage of temporary flood panels to be exempted from floor area calculations, up to a maximum exemption of 15 square feet for each linear foot of protection and no more than 1,000 square feet of exemption per zoning lot. These standards account for the space that panels, trolleys and deployable access take up in a typical building configuration).

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<sup>15</sup> This recommendation came from the 2016 *Resilient Retail* report.

<sup>16</sup> This recommendation came from the 2018 *Resilient Industry* report.

### Accommodating Current and Future Flood Elevations on Waterfront Sites

ZCFR would modify provisions applicable in waterfront areas to better allow for coastal flood resilient design.

In 1993 DCP enacted comprehensive waterfront rules that, at their core, required developments on the waterfront to provide public access in the form of esplanades and ancillary spaces. The zoning text set forth minimum amounts and dimensions for these spaces and stipulates necessary amenities that must be provided, including circulation paths, planting, seating, lighting, and several other elements to help ensure that these are successful public spaces.

However, practitioners have noted how some of these requirements make it difficult, if not impossible, to integrate contemporary resiliency measures into the waterfront spaces and address sea level rise. The 2013 Flood Text provided some limited allowances for the grading of waterfront yards and visual corridors to increase flood resilience, but practitioners have identified other rules that could also be improved. These include limits on site grading and height for waterfront yards, open spaces and paths.

ZCFR would permit the construction of bi-level esplanades that facilitate waterfront public access both close to the shoreline at the water level and at a higher elevation to meet flood design elevations at the building level. To facilitate these bi-level designs, ZCFR would also allow for increased retaining wall heights (generally up to three feet), provide new planting design options (including terraced planting), and provide slight reductions to the minimum required planting areas, and screening buffers so that access requirements can be satisfied.

ZCFR would facilitate the elevation of waterfront public access areas while maintaining visual connectivity to the water by raising the required level of visual corridors on upland streets from three feet above curb level to five feet. In addition, flood protection measures such as temporary flood control devices and associated permanent fixtures, structural landscaped berms, flood gates, and associated emergency egress systems would be permitted as obstructions in both waterfront yards and visual corridors subject to dimensional limitations (up to the FRCE or five feet above the lowest adjacent grade, whichever is higher).

Finally, to encourage waterfront sites to include soft shorelines (such as natural aquatic grasses) as a resiliency measure, ZCFR would allow the width of the required waterfront yard and shore public walkway to be reduced for soft shorelines by up to seven feet along up to 30 percent of the shoreline length of such yard.

### **Goal 4. Facilitate future recovery by reducing regulatory obstacles.**

ZCFR would include modifications to expedite future recovery processes. Hurricane Sandy showed that areas affected by the storm went beyond the floodplain and that the regulations which would facilitate recovery would be useful for other types of disasters. Thus, these select rules would be applicable citywide. Topics addressed in this section include mechanical equipment, vulnerable populations, as well as zoning rules available after a disaster occurs.

### Power Systems and Other Mechanical Equipment

ZCFR would allow appropriately scaled power systems on lots throughout the city to make it easier to provide back-up energy, especially in the event of a disaster. Recovery efforts from Hurricane Sandy also identified issues with existing zoning regulations for mechanical equipment both within and outside of the floodplain. As described below, both of these issues extend beyond the floodplain and therefore modifications to address them are required on a citywide basis.

The 2012 hurricane caused a wide array of power system disruptions well beyond the floodplain, and the city's power grid has seen other recent disruptions through events like blackouts. Allowing power systems to be more easily located around the city would help support back-up energy needs and the overall energy grid. The 2013 Flood Text took the first step by allowing back-up systems, such as emergency generators, to be considered permitted obstructions in the required yards and open spaces for single- and two-family residences in the floodplain.

ZCFR would expand this approach citywide in a more consistent fashion. Power systems (including, but not limited to, generators, solar energy systems, fuel cells, batteries, and other energy storage systems) would be added as a permitted obstruction, subject to dimensional limitations, that could encroach in any required open area in all zoning districts citywide. Similar to the limitations for the broader mechanical equipment category in the floodplain, power systems would have to be placed a minimum of five feet from property lines. Coverage would be limited to 25 percent of the minimum required open space, although the coverage would be restricted to 25 square feet if the equipment is located between the building and the front lot line to minimize its effect on the street. The height would be limited to certain heights above adjoining grade, or the "reference plane" for lots in the floodplain, depending on the zoning district (10 feet in low-density Residence Districts, 15 feet in other Residence Districts, and 23 feet in Commercial and Manufacturing Districts). Exempted equipment would be subject to requirements for enclosure or screening, depending on the equipment type and applicable zoning district.

In addition, recovery efforts after Hurricane Sandy have highlighted shortcomings with the floor area exemptions provided for mechanical equipment in the ZR that have hampered resiliency projects. Space used for mechanical equipment is exempted from floor area calculations in all zoning districts citywide. However, it has not been clear whether the space necessary for routinely accessing and servicing the equipment is also exempted, which has led to inconsistent outcomes. This has also, in some situations, made it difficult to retrofit buildings in the floodplain by moving mechanical equipment from below-grade locations, where they are fully exempted from floor area calculations, to upper areas where they may not be. To address this situation in a comprehensive manner across the city, ZCFR would clarify that the floor area exemption for mechanical equipment applies to mechanical, electrical, plumbing equipment, as well as to fire protection and power systems, and necessary maintenance and access areas. This is consistent with the general practice at the Department of Buildings but would ensure that buildings across the city would be treated consistently.

### Ramps and Lifts

ZCFR would provide rules for accessible design that are consistent throughout the city.

The 2013 Flood Text classified ramps and lifts as permitted obstructions in various forms of required open areas to help facilitate the elevation of living spaces. But in areas beyond the floodplain, these elements are permitted in required open areas in a piecemeal fashion. For example, lifts are classified as permitted obstructions in residential courts, yet they are not considered permitted obstructions in required yards. While DCP has been gradually adding them to the ZR as permitted obstructions through different text amendments, ZCFR would provide full consistency across the city by classifying both ramps and lifts as permitted obstructions in all required open areas.

### Vulnerable Populations

ZCFR would limit the growth of vulnerable populations in nursing homes in high-risk areas of the floodplain.

Hurricane Sandy and other storms across the nation have exposed the difficulties facing nursing home residents in high-risk areas. Nursing homes are licensed to house populations that require continual medical

care, but research shows that this dependency can be strained whether nursing homes shelter in place or evacuate prior to a coastal storm event. While all nursing homes in hurricane evacuations zones in the city are subject to mandatory evacuations during a declared emergency, the City believes it would be appropriate to limit the growth of nursing homes in high-risk areas to lessen the health consequences and logistical challenges of evacuating the residents of these facilities.

ZCFR would therefore prohibit the development of new nursing homes and restrict the enlargement of existing facilities within the 1% annual chance floodplain and other selected geographies likely to have limited vehicular access because of the storm event. The modification would restrict the enlargement of existing nursing homes in this geography to a maximum of 15,000 square feet to allow for improvements, including those related to resiliency. These restrictions would also apply to the nursing home portions of Continuing Care Retirement Communities (CCRCs). The CPC special permit (ZR Section 74-901) that permits nursing homes in areas where they are not allowed as-of-right (i.e., R1 and R2 districts and certain community districts) would not be available in this geography.

### Disaster Recovery Rules

ZCFR would include rules that could be made available to facilitate the recovery process from future disasters, some of which would be implemented now to help address the COVID-19 pandemic and its associated economic effects.

The need to adopt the 2013 Flood Text and 2015 Recovery Text as temporary zoning rules on an emergency basis after Hurricane Sandy demonstrated that a lengthy process to update zoning regulations can present obstacles to the necessarily fast-paced disaster response. In addition, while the Mayor can issue Emergency Orders to temporarily remove legislative obstacles to facilitate recovery efforts, including rules from the ZR, that process is limited in time (the duration of the disaster), which may not be enough for a longer-term recovery. That became clear post-Sandy and now during the COVID-19 pandemic disaster response.

Given this, ZCFR would include a series of disaster recovery provisions that could be made available through a text amendment when a disaster occurs. Adding these provisions to the ZR would offer a useful roadmap for the public, planners, and decision-makers when working to recover from a disaster. Applicable recovery provisions would be selected based on the issues caused by the disaster and would be available for a limited time period (set at the time of the text amendment). The provisions could be limited to designated recovery areas whose extent would be determined based on the disaster's impacts and the City's recovery plans.

The recovery provisions would include a range of rules that could facilitate the recovery process from disasters which cause physical impacts. The 2013 Flood Text and the 2015 Recovery Text included a set of rules that facilitated the reconstruction and retrofit of Hurricane Sandy-damaged buildings, and therefore could also be useful after any other disasters that lead to a concentration of physical damage in the city. ZCFR would build upon this set of provisions and include modifications to the damage and destruction thresholds set forth in the underlying zoning rules to allow the reconstruction of non-complying buildings and non-conforming uses. It would also include modifications to building envelope rules to allow non-compliances to be increased, or even created, in the event new regulations would require damaged buildings be replaced in a slightly different shape and form. (For example, after Hurricane Sandy, new Building Code regulations were adopted and required buildings to elevate beyond the minimum level required prior to the storm.) These provisions would also include an allowance for property owners to use their tax lot as their zoning lot when applying zoning rules, which was found necessary in many waterfront communities. Lastly, it would allow the documentation process for obtaining DOB permits to be simplified for disaster-damaged buildings.

The recovery provisions would also facilitate the recovery process from a wider range of disasters including those that do not involve physical impacts, such as pandemics. This set of provisions is mostly drawn from the lessons learned during the COVID-19 pandemic response. The provisions would provide a framework to allow uses in zoning districts where they are not typically permitted to better respond to the situation then at hand. This framework would also allow possible relief from zoning rules that require permits to be sought with a specific timeframe, and those that require a certain level of construction and operation be completed to vest a project. It would also include possible relief from provisions that only allow non-conforming uses to remain inactive for a limited period (generally two years) before they can no longer legally reopen.

The Mayor's Executive Order No. 98 (March 12, 2020), which provided short-term relief from regulations hindering the pandemic recovery effort, included relief from construction timeframes and non-conforming use provisions. However, these allowances will cease when the Executive Order expires. Consistent with the general intent of the disaster recovery rules and the Mayor's Executive Order, ZCFR would extend the available timeframe for non-conforming uses to reactivate by an additional two years. In addition, ZCFR would allow for the extension of the timeframe required for substantial construction to take place under City Planning Commission special permits and authorizations for an additional term. These changes would provide greater certainty to residents, business and building owners, and therefore support the city's recovery from the ongoing pandemic.

#### Uses in Waterfront Recreation Districts

Lastly, ZCFR would modify the zoning requirements that have made it difficult for eating or drinking establishments in some lower-density waterfront areas from making long-term resiliency improvements.

In C3 and C3A Waterfront Recreation zoning districts, which are mapped along the city's waterfront in limited locations, these businesses are required to obtain a BSA special permit to operate, renewable every five years. Local elected officials and business owners have noted how this short timeframe adds uncertainty that makes it difficult for these establishments to invest in resiliency. Therefore, ZCFR would extend the initial special permit term from five to 10 years for new applicants. Additionally, for existing establishments with a previously approved special permit, the permit would allow the BSA to determine the required term moving forward.

#### **Overlap with Special Districts**

While special purpose districts cater to a range of locally specific conditions, the 2013 Flood Text allowed the optional provisions in the 1% annual chance floodplain to supersede their special regulations and further modified select special purpose district rules that overlap with the floodplain. ZCFR would allow the optional provisions to supersede regulations applicable in all areas within any special purpose district that geographically overlaps with the 1% and 0.2% annual chance floodplains. Additionally, select provisions in these special purpose districts would be modified to align with ZCFR's ground floor use, street wall, and building envelope regulations, as well as the proposed streetscape rules. This would allow all buildings in the floodplain to have a consistent zoning framework for resiliency.

#### **Related Actions**

In addition to the proposed citywide zoning recommendations, DCP would be proposing neighborhood-specific zoning text and map changes in three neighborhoods that were recommended as part of DCP's Resilient Neighborhoods Initiative. These related actions would be in public review concurrent with ZCFR and their effects are analyzed as part of separate environmental reviews. These specific actions are intended to address resiliency challenges that are specific to the conditions in these areas. These three neighborhoods are Gerritsen Beach and Sheepshead Bay in Brooklyn, and Old Howard Beach in Queens.