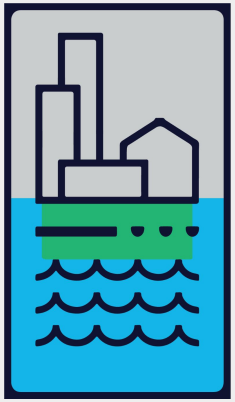

Metro Flood Defense

Introduction to MFD, Coastal Resiliency and Flood Protection Locally and Beyond CB14

February 5, 2024

Our Mission:

To promote the preservation, protection, and safety of the Greater New York City Metropolitan regional area, and all its residents, from the dual threat of inland and coastal flooding caused by storm surge, sea level rise, and extreme precipitation in the era of climate change.

We champion science based solutions and provide support and resources to residents and the community.

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MFD in NYC

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We are active members of…

The Metro NY-NJ Storm Surge Working Group
A coalition of oceanographers, ecologists, engineers, urban planners, advocates, architects, and social scientists dedicated to the premise that: protection of the NY-NJ metropolitan region against catastrophic flooding from ocean storm surges and rising sea levels can best be secured by a regional approach.

The City Club of NY Waterfront Committee
A group of experts, community-minded folk, and thought leaders interested in guiding the City Club's efforts to protect and enhance our waterfronts, waterways, and natural areas—especially mindful of climate change.

The Waterfront Alliance Rise to Resilience Coalition
Coalition of organizations representing residents, business leaders, labor and justice, scientists, environmental advocates, and designers collectively calling on our federal, state, and local governments to make climate resilience an urgent priority.

Rainproof NY and Rainproof Flatbush
Rainproof Flatbush is a community-scaled Rainproof neighborhood planning initiative aiming to address stormwater flooding in Flatbush, concentrating on the neighborhoods of East Flatbush, Prospect Lefferts Garden, Wingate, Erasmus, Ditmas Park, and Prospect Avenue South.

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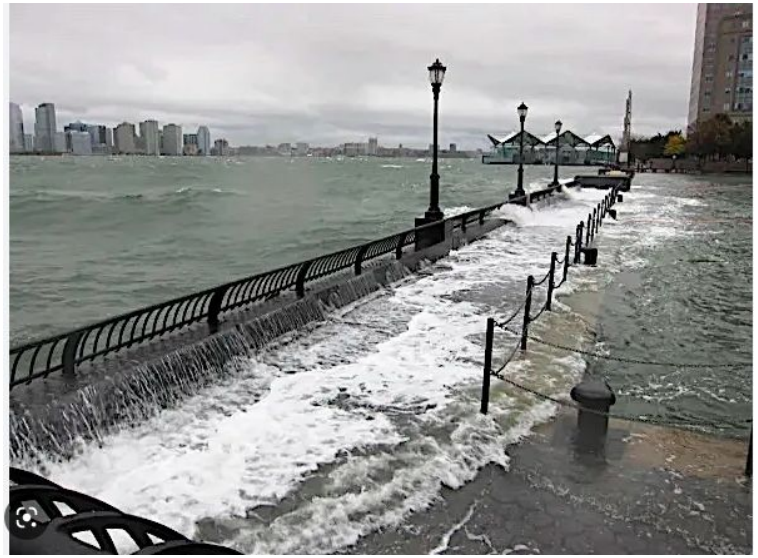
Two Types of Flooding in NYC

Inland

Cortelyou Road, Brooklyn. Hurricane Ida 2021
OVER 3.5 miles from the closest coastline.

Coastal



Hudson River, Hurricane Sandy, 2012

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Three Causes of Flooding in NYC

- Intense Rainfall
- Sea Level Rise
- Storm Surge

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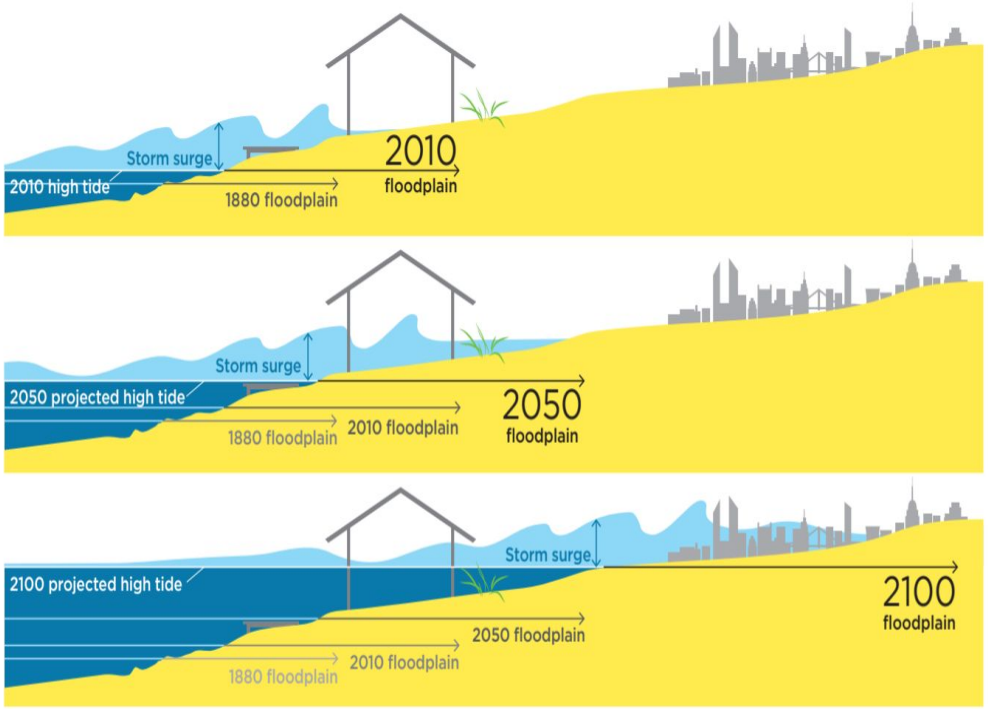
Storm Damage Increases With Sea Level Rise



Union of Concerned Scientists

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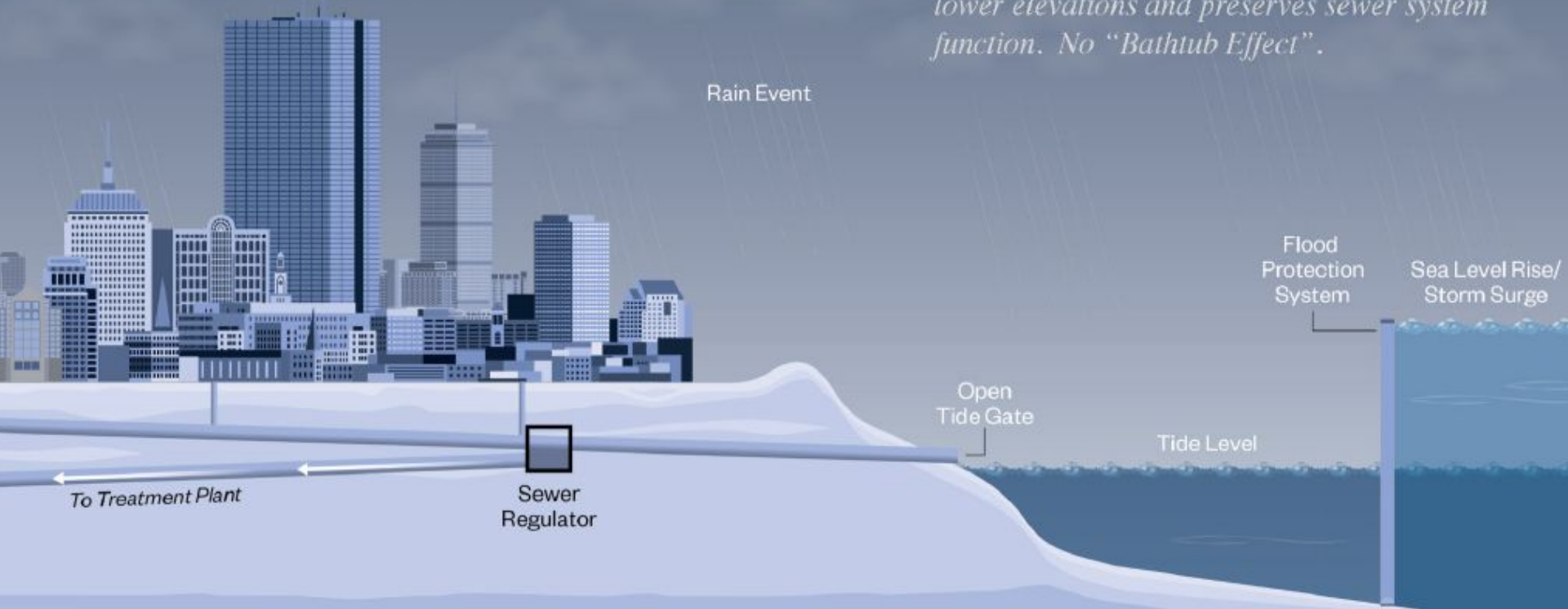
Sea Level Rise Projections

	10th Percentile	25th Percentile	75th Percentile	90th Percentile
2030s	6 in.	7 in.	11 in.	13 in.
2050s	12 in.	14 in.	19 in.	23 in.
2080s	21 in.	25 in.	39 in.	45 in.
2100	25 in.	30 in.	50 in.	65 in.
2150	38 in.	47 in.	89 in.	177 in.

Wet Weather operation with a Regional Flood Protection – Regional Sea Gates

Closure of regional sea gates to protect from storm surge maintains tide levels behind the sea gates at lower elevations and preserves sewer system function. No "Bathtub Effect".



NYS Climate Impacts Assessment

Most Comprehensive Assessment of Climate Change Impacts in the history of NYS which provides analysis along "sectors" and geographic regions.

New York City:

https://nysclimateimpacts.org/explore-by-region/new-york-city/

What is likely to happen: Precipitation

- **Total Annual:** projected to increase between 4% and 11% by the 2050s and between 7% and 17% by the 2080s relative to the 1981–2010 average. *This precipitation could increasingly come from heavy storms, which can lead to flooding. Extreme precipitation may also contribute to high streamflow.*

- **Seasonal:** Winter precipitation in New York City is projected to increase between 5% and 18% by the 2050s and between 11% and 30% by the 2080s …

- **Heavy:** Extreme precipitation events are projected to happen more and more often.

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What does this mean for NYC?

Climate Change Summary:

– Flooding is a top concern for coastal adjacent communities (basically all of NYC)
– More precipitation, especially in winter Higher humidity levels throughout the year. Less snowfall, shorter winters, potentially winters without snow; icing more likely
– Increased extreme precipitation events; overall more hot days; extreme heat will be an issue for the NYC area
– Expect the unexpected; more frequent hurricanes, wildfires, pests, micro-bursts, convective storms

Impacts/Adaptation needs:

– Aging storm water systems will be taxed and overwhelmed; increased disruption to mass transit and tunnels
– Costly flood damage, needs for improved stormwater systems and littoral infrastructure adaptation strategies
– Building structural and materials changes, infrastructure at increased risk

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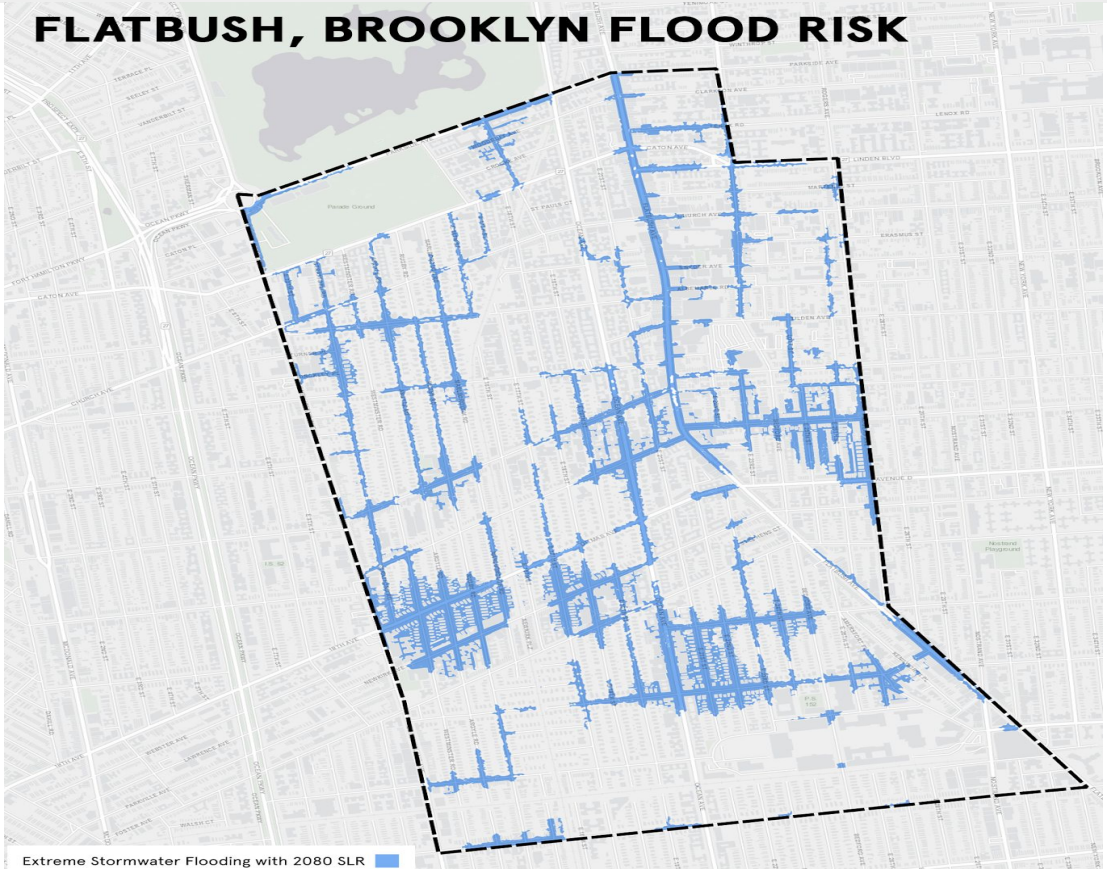
What does this mean for Flatbush: Ida and beyond



Flatbush is one of the 20 most flood prone areas in NYC despite being outside of FEMA's 100-year flood zone.

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Rainproof Flatbush

A neighborhood planning initiative addressing stormwater flooding in Flatbush, concentrating on the neighborhoods of East Flatbush, Prospect Lefferts Garden, Wingate, Erasmus, Ditmas Park, and Prospect Avenue South.

We are developing an Interactive flood map which will capture oral and written stories related to flood impacts, available data sets, and other relevant information. The stories, resources and data collection will be flexible and dynamic informing education, advocacy, policy development, and change within the neighborhood and beyond.

FLOOD RISK AND CLIMATE CHALLENGES: Flatbush is identified as one of NYC's most flood-prone areas despite being outside FEMA's 100-year flood zone.

- Updated NYC stormwater maps project increasing risk by 2080 due to sea level rise and extreme rainfall events.
- Flatbush is one of the top 20 most flood-prone areas in NYC.
- During the September 29, 2023 flash flood, Kensington/Flatbush was identified as one of the neighborhoods with the most concentrated 311 flooding complaints.
- East Flatbush is ranked #1 for the most heat-vulnerable and underserved neighborhood with the fewest number of cooling center locations

WHY THESE STATISTICS MATTER:

Flatbush's demographics, housing dynamics, and economic landscape compounded with its under-documented multiple climate risks highlight the urgency to pilot a neighborhood, bottom-up, community-driven approach.

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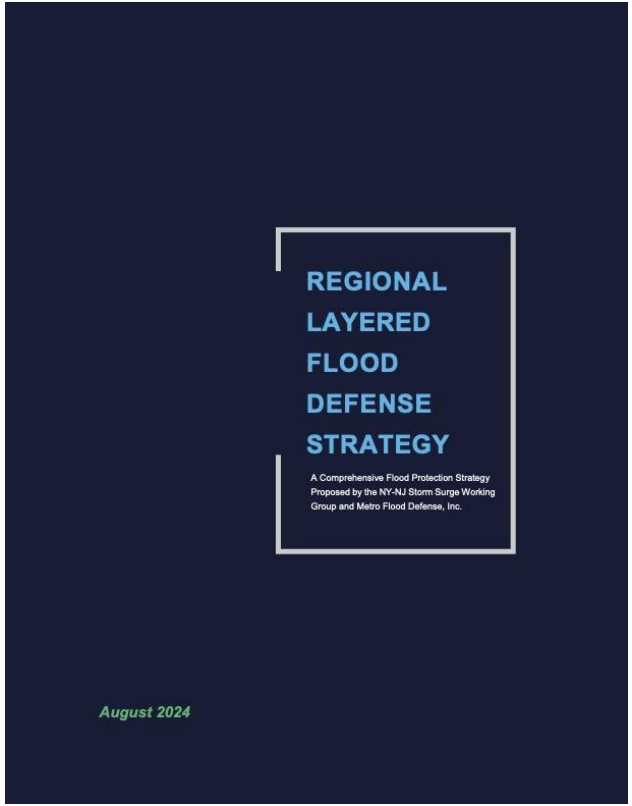
A Comprehensive Approach



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https://www.metroflooddefense.org/post/regional-layered-flood-defense-strategy

Addressing All Types of Flooding

MFD's Layered Defense Strategy:

- Extreme Rainfall — Is State and Local Responsibility
- Storm Surge — Is USACE Responsibility
- Sea Level Rise — Is Joint USACE/State and Local Responsibility

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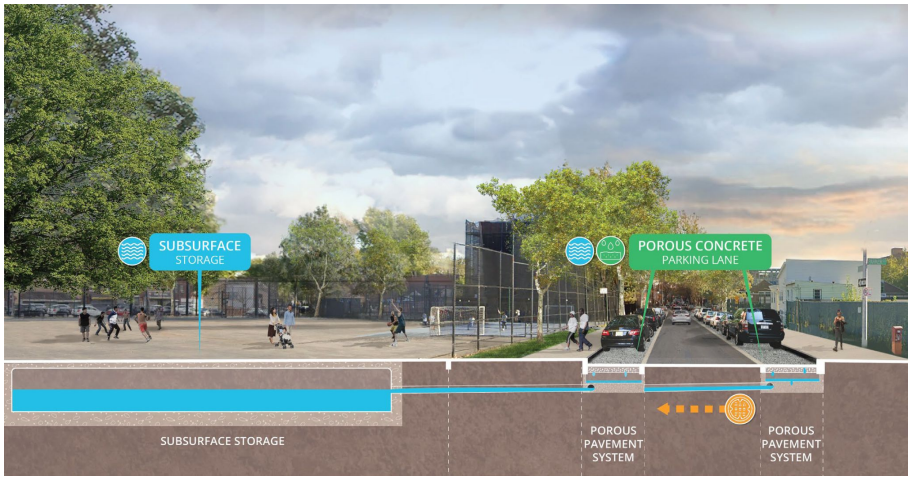
State and Local Efforts on Rainfall

- Cloudburst Management
- PlaNYC
- Sewer System Upgrades
- NY Atlas of Disaster
- NY Atlas of Accountability
- Rainfall Ready NYC
- Rainproof NYC
- FloodNet NYC
- Rain Ready NY Act
- Climate Resilience NY Act
- NYC CSO Impact Reduction Efforts



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NY & NJ Harbor & Tributaries Focus Area Feasibility Study (HATS)

*The **HATS study** was commissioned to devise and implement infrastructure projects designed to protect us from the next Superstorm Sandy.*

More than 12 years later, the Army Corps study has stalled, leaving us with an undeveloped and largely rejected "tentatively selected plan"

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MFD/SSWG's Solution: A Layered Defense Strategy

Layer 1 – Extreme Rainfall Strategies

Networks of detention basins, swales, green roofs, etc.

Upsize storm water drainage systems, where applicable

Layer 2 – Sea Level Rise Measures

Low Berms and Bulkheads, Raised Streets and Buildings, Retreat

- Relieves pressure to use storm-surge barriers too often

Layer 3 – Coastal Ecosystems Restoration

Accelerate Hudson Raritan Estuary and Hudson River Habitat restoration projects

- Flood benefit: dampens wave action and limits erosion

Layer 4 – Storm Surge Protection

Regional Seagates and Nature-Based Dunes

- Includes all communities (e.g. South Bronx, Astoria, South Williamsburg, Yonkers), and LGA, Hunts Point Market, Statue of Liberty, Governor's Island
- Secondary benefit: Allows normal storm water drainage into harbor

Layer 1: Extreme Rainfall Strategies:
Network of swales, detention basins, green roofs

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Green and Gray Infrastructure

Green =

Examples of Green Infrastructure

Rain Garden, NYC

Note: Green systems alone cannot protect the region from flooding

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Green and Gray Infrastructure

Gray =

Expanding NYC's Sewer Drainage System

Other cities have or are currently building offshore moveable sea gate systems. River Thames, London, UK.

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Engaging Frontline Communities

MFD's layered defense strategy:

- Cities' efforts to mitigate extreme rainfall flooding will be discussed with communities
- Local governments will plan waterfronts to address long-term SLR (or plan retreat) with communities

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Prioritizing People over Property Values

MFD's layered defense strategy:

- Protects all communities equally
- Fosters equity in cost-benefit analysis because differences in community property values won't determine degree of protection

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Thanks for Listening!

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