Proposed Floodplain Regulation Updates

Workshop #4 - Commercial, Mixed-Use, and Multifamily Development
Workshops to Date

- **Workshop #1** - Tuesday, April 20 - Overview
- **Workshop #2** - Thursday, April 29 - Mapping
- **Workshop #3** - Thursday, May 20 - Vesting and Transition
- **Workshop #4** - Thursday, June 10 - Commercial, Mixed-Use, and Multifamily Development
  - **Focus:** Allowable Uses & Floodproofing Below Grade and Below DFE
Today's Agenda

• Background
  • Why We Regulate Below Grade Uses
  • Key Terms

• Proposed Regulatory Updates

• Case Studies on Allowable Uses
  • 100-Year vs. 500-Year

• Flood Protection Strategies

• Discussion
Why Do We Regulate Below Grade Uses?
Effects of Hydrostatic Pressure

Dry-floodproofed basements are engineered to withstand external forces and prevent collapse.
Life Safety

Flooded basements present risks of drowning, electrocution, chemical and sewage exposure, etc.

Courtesy ABC 7 Chicago

Courtesy Five Star Waterproofing
Key Terms
Dry floodproofing - Structure, including the attendant utilities and equipment, is **watertight** with all elements substantially impermeable to floodwater and with structural components having the capacity to resist flood loads.

Wet floodproofing - Flood-damage-resistant materials **minimize flood damage** to areas below the flood protection level of a structure, which is intentionally allowed to flood.
Residential, Nonresidential, & Mixed-Use

• Residential
  • Building and structures and portions thereof in which people live or that are used for sleeping purposes on a transient or nontransient basis. {ASCE 24-14}

• Nonresidential
  • Any building or structure or portion thereof that is not classified residential. {ASCE 24-14}

• Mixed Use
  • Any building or structure that has non-residential and residential portions. {FEMA P-2037}
Ancillary Residential Uses

A portion of building that is used by residents, but not as a dwelling unit. Ancillary residential uses include lobbies, mailrooms, loading docks, and gyms that are available only to residents, but do not include above-grade enclosed areas that are below the design flood elevation and used solely for parking of vehicles, building access, or storage.

Examples:
• Members-only gym = commercial use
• Tenants-only gym = ancillary residential use
• Stairwell landing = access use
• Lobby with chairs, sofa, and TV = ancillary residential use

*Defined by FEMA P-2037 Manual*
Proposed Regulatory Update
What would change? – Mixed Use

Current Flood Hazard Rule:
• Not addressed
• Has been grey area for FEMA
• DCRA Administrative Bulletin in 2016 requires code modification if entire building not elevated above 100-year elevation
• DOEE has required use of 500-year floodproofing standard as condition of support for code modification

Proposed Update:
• Better define mixed use, residential use, non-residential use
• Lowest floor of residential portion must be above DFE
  • Ancillary residential uses in 500-year zone can be dry floodproofed
• Requires 500-year standard (for all buildings)
• Allows dry floodproofing of non-residential portions to DFE, including underground parking by right
What would change? – Below-Grade Uses

Current Flood Hazard Rule:

• All below-grade uses for residential buildings are prohibited in the 100-year floodplain.
• Below-grade parking allowed for mixed-use buildings in the 100-year floodplain subject to a code modification.
• There are no below-grade use restrictions on any building categories in the 500-year floodplain.

Proposed Update:

• All below-grade uses for residential buildings are prohibited in the 100-year floodplain, and dwelling units are prohibited below grade for new construction in the 500-year floodplain.
• Underground parking allowed by-right for mixed-use buildings in the 100-year and 500-year floodplains.
Why 100- vs 500-year Differences?

- In the 100-year floodplain, we are regulated by FEMA in accordance with 44 Code of Federal Regulations 60.3
  - Need to comply with National Flood Insurance Program standards in order to maintain eligibility for subsidized flood insurance and federal disaster assistance.

- In the 500-year floodplain, we have more flexibility because we are regulating locally to adapt to climate change and protect life and property rather than to follow federal regulations.
# Regs Enforced on New Construction?

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>100-year</th>
<th>500-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family or Two-Family Home</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-Family Residential Building</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mixed-Use Building</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Commercial/Industrial Building</td>
<td>Yes</td>
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</table>
### Regs Enforced on Substantial Improvement?*

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*All mechanical, electrical, and plumbing equipment must be elevated or floodproofed, even if the project is in an existing structure and does not trigger substantial improvement.*
## Allowable Uses Below Grade

<table>
<thead>
<tr>
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<th>500-year</th>
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<tbody>
<tr>
<td>Single-Family or Two-Family Home</td>
<td>None</td>
<td>Dry Floodproofed Area Limited to Parking, Access, Storage</td>
</tr>
<tr>
<td>Multi-Family Residential Building</td>
<td>None</td>
<td>Dry Floodproofed Area Limited to Parking, Access, Storage</td>
</tr>
<tr>
<td>Mixed-Use Building</td>
<td>Dry-Floodproofed Area with No Dwelling Units</td>
<td>Dry-Floodproofed Area with No Dwelling Units</td>
</tr>
<tr>
<td>Commercial/Industrial Building</td>
<td>Dry-Floodproofed Area</td>
<td>Dry-Floodproofed Area</td>
</tr>
</tbody>
</table>
Case Studies
100-Year Floodplain
### New Construction Multifamily Building Uses 100-Year Floodplain

<table>
<thead>
<tr>
<th></th>
<th>Parking allowed below grade?</th>
<th>Uses below the Design Flood Elevation (DFE)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>No.</td>
<td>Wet-floodproofed parking, access storage, or ONLY.</td>
</tr>
<tr>
<td>Mixed-Use</td>
<td>Yes, if dry floodproofed in accordance with ASCE 24-14.</td>
<td>Areas must be non-residential and dry-floodproofed in accordance with ASCE 24-14.</td>
</tr>
</tbody>
</table>
Residential-Only Structure
100-Year Floodplain

Residential First Floor (RFF) Elevations is below DFE

Allowable RFF use:
- Parking
- Access
- Storage
- Lobby
- Resident Only Gym
- Mail Room
- Residential Units

Allowable basement use:
- None
Mixed-Use Structures
100-Year Floodplain

Residential First Floor (RFF) Elevation is below DFE

Allowable RFF use:
• Parking
• Access
• Storage
• Lobby
• Resident Only Gym
• Mail Room
• Residential Units

First Floor Retail
• Allowed if Dry Floodproofed
Mixed-Use Structures
100-Year Floodplain

Residential First Floor (RFF) Elevation is above DFE

Allowable RFF use:
• Parking
• Access
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• Mail Room
• Residential Units

First Floor Retail
• Allowed if Dry Floodproofed
Mixed-Use Structures
100-Year Floodplain

Allowable basement use:
- Parking
- Access
- Storage
- Commercial
- Lobby
- Resident Only Gym
- Mail Room
- Residential Units

Basement is watertight and reinforced to withstand flood loads specified in ASCE 24-14
Case Studies
500-Year Floodplain
### New Construction Multifamily Building Uses 500-Year Floodplain

<table>
<thead>
<tr>
<th>Parking allowed below grade?</th>
<th>Uses below the Design Flood Elevation (DFE)?</th>
</tr>
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<tbody>
<tr>
<td>Yes, if dry floodproofed in accordance with ASCE 24-14.</td>
<td>Wet-floodproofed parking, access, storage.</td>
</tr>
<tr>
<td></td>
<td>Ancillary residential uses dry-floodproofed in accordance with ASCE 24-14.</td>
</tr>
</tbody>
</table>

*Dry-floodproofed ancillary residential uses also allowed.*
Residential-Only Structures
500-Year Floodplain

Allowable basement and RFF use:
- Parking
- Access
- Storage
- Lobby
- Resident Only Gym
- Mail Room
- Residential Units

Basement is watertight and reinforced to withstand flood loads specified in ASCE 24-14
Mixed-Use Structures
500-Year Floodplain

Allowable basement and RFF use:
• Parking
• Access
• Storage
• Lobby
• Resident Only Gym
• Mail Room
• Commercial
• Residential Units

Basement is watertight and reinforced to withstand flood loads specified in ASCE 24-14
Flood Protection Strategies
Compliant Flood Protection Strategies

• **Dry Floodproofing**
  • Can be used for nonresidential uses or nonresidential use portions of mixed-use buildings.
  • Not to be used for residential uses
  • Can be used for ancillary residential uses in 500-year

• **Wet Floodproofing**
  • Can be used for above-grade parking, access areas, storage in all use categories.
  • Not be used for residential uses, ancillary residential uses, or commercial uses.
Compliant Flood Protection Strategies

• Elevation
  • The only acceptable method of flood protection for dwelling units in all zones
  • Can be used for ancillary residential uses (leasing office, furnished foyer, tenant amenities, etc.) in the 100-year floodplain.
Dry Flood Proofing of Non-Residential Buildings

Door with flood shield

Window with flood shield

Diagrams Courtesy of FEMA
Dry Flood Proofing of Non-Residential Buildings

Types of flood shields

Diagrams Courtesy of FEMA
Diagram Courtesy City of NYC

Wet floodproof area below the DFE by installing flood vents located at exterior and interior walls and replacing all windows, doors, structure and finishes with flood damage-resistant materials.

Fill basement and cellar to lowest adjacent grade.

Relocate the square footage from areas below the DFE to new addition at the roof.

Elevate critical systems above the DFE.

At 500-year flood elevation or 24” above 100-year flood elevation.
At 500-year flood elevation or 24” above 100-year flood elevation.
This level is elevated above the DFE and can be used for dwelling units, leasing offices, security desks, tenant lounges, mailrooms, gyms, etc.

This level is located below the DFE. It can be used for parking, access, storage, stairwells, unfurnished vestibules, and elevator waiting areas. It cannot be used for furnished lobbies, security desks, leasing offices, mailrooms, or gyms.
Compliant Residential Use
100-Year Floodplain

Elevated on piers with wet-floodproofed stairwell.

Elevated on slab.
Non-Compliant Residential Use
100-Year Floodplain

Leasing office

Gym accessible only to tenants
Compliant Mixed-Use

All Floodplains

- Leasing office
- Commercial office space
- Gym accessible to all paying customers
Other **Compliant** Uses

All Floodplains

Note deployed flood shield at entrance. Underground parking for mixed-use buildings currently (June 2021) requires an approved code modification, but will be allowed by-right under proposed Regulations.

Commercial uses (laundry service and restaurant) are located below DFE but dry-floodproofed. Note separate wet-floodproofed building access for the residential spaces.
## Summary – Required Elevations

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Regulations</th>
<th>Design Flood Elevation</th>
<th>Notes</th>
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<tbody>
<tr>
<td>General</td>
<td>Current Flood Hazard Rules</td>
<td>100-Year Flood Elevation + 1.5 feet</td>
<td>Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.</td>
</tr>
<tr>
<td>General</td>
<td>Current DC Construction Codes and Proposed Updated Flood Hazard Rules</td>
<td>Whichever is higher of:</td>
<td>Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.</td>
</tr>
<tr>
<td></td>
<td>• 100-Year Flood Elevation + 2 feet, or</td>
<td>• 500-Year Flood Elevation</td>
<td></td>
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<tr>
<td>Critical Facility</td>
<td>Proposed Updated Flood Hazard Rules</td>
<td>500-Year Flood Elevation + 2 feet</td>
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<td>Structure Located Within the Tidal Shoreline Buffer</td>
<td>Proposed Updated Flood Hazard Rules</td>
<td>500-Year Flood Elevation + 4.5 feet</td>
<td>Residential structures must be elevated, while nonresidential structures can be elevated or dry floodproofed.</td>
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Comments and Feedback
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Options for SI/SD* Structures in the 500-Year Floodplain

- Exempt these uses (Mixed use, multi-family, commercial) from the SI trigger
- Exempt buildings that are below a square footage, unit quantity, or floor quantity threshold from the SI trigger
- Require flood protection but allow choice of either elevation or dry floodproofing
- Require flood protection but allow basements to be wet-floodproofed (vents for water to drain in and equalize pressure, pump to remove water after flood)

*SI = Substantially Improved, SD = Substantially Damaged
Considerations for Discussion

• Elevation of a multifamily building can be expensive
  • Estimated at $410,000 - $700,000 for a 3-story/6-unit structure depending upon whether existing lowest level is partially above grade or entirely below grade, respectively
• Existing basements may not be rated to withstand hydrostatic pressure
• Homeowners may choose to live with the risk, but renters have no choice
• Balance between flood risk reduction and availability of affordable housing
Interactive Polling!
Thank You!!!
Discussion

Nicholas Bonard
Nicholas.Bonard@dc.gov

Martin Koch
Martin.Koch@dc.gov