This semi-detached case study begins to demonstrate the complexity of the federal regulations when applied to urban typologies. This building is an unreinforced masonry structure with a shallow foundation, one party-wall, and critical systems located on the first floor. The structure is attached on one side and therefore not suitable for elevation.

Retrofit strategies resulting in full NFIP reduction in flood insurance premiums require extensive modifications to the building structure and program, which would result in the loss of useable space and have structural integrity implications for the neighboring property. NFIP premium reduction options include wet floodproofing the ground floor, converting it into a garage, access and storage area, and building a new addition on the second and third levels to minimize loss of square footage. These changes require substantial structural reinforcement.

Alternative adaptation strategies, currently not recognized by NFIP, include leaving existing uses in place and either wet or dry floodproofing below the DFE. Partial adaptation could be limited to elevating or floodproofing the critical systems. Dry and wet floodproofing solutions also require assessment of the building’s structural integrity and implications of changes on the neighboring buildings.

**KEY CHARACTERISTICS**

**FLOOD RISK**
- Flood Zone/BFE: AE +13’
- Grade Elevation: +11’ at sidewalk and property
- Design Flood Elevation (DFE): +15’ (4’ above sidewalk grade)
- Cellar Elevation: N/A
- Critical Systems Location: Ground Level

**TYPOLOGY**
- Lot Size: 25’ x 80’
- Building Size: 20’ x 35’
- Yards: 20’ front, 25’ rear, including alley
- Construction Type: Masonry with wood joists
- Foundation Type: Shallow Masonry
- Year Built: 1925
- Stories: 3
- Residential Floor Area: 2,000 s.f.
- Residential Units: 1
- Elevator: N/A

**SITE CONDITIONS**
- Sidewalk Width: 15’
- Roadbed Width: 34’
- Zoning District: R4-1, Residential
Due to the construction of a new streetwall, where the lowest occupiable floor is over 9' above the sidewalk grade, the Zoning Resolution requires two streetscape mitigations to be implemented. These enhancements can be selected from a list of options specified in the Zoning Resolution.

- Elevated critical systems to a platform above the DFE.
- The allowable building height is measured from the DFE.
**ADAPTATION CONSIDERATIONS**

**ACCESS**
Inviting access and a strong relationship with the streetscape are important design elements when relocating access points. Zoning requires homes to provide specific streetscape mitigations such as plantings along the streetwall, open or covered porches, stair turns, or raised yards.

**STREETSCAPE**
Covered porches, stair turns, or along the streetwall, open or mitigations such as plantings provide specific streetscape Zoning requires homes to when relocating access points. are important design elements Inviting access and a strong when relocating access points. Zoning requires homes to provide specific streetscape mitigations such as plantings along the streetwall, open or covered porches, stair turns, or raised yards.

**CRITICAL SYSTEMS**
Heating system components are vulnerable to flood damage. Relocating boilers, furnaces, or other forced air systems to an upper story is ideal but may not be practical. If relocation is impossible, try to elevate as high as possible at the current location. Property owners should consider required equipment clearances and venting before determining if and where to relocate.

**NON-SUBSTANTIAL DAMAGE/IMPROVEMENT STRATEGIES**
Non-substantially improved buildings within the floodplain are not required to comply with Appendix G of the NYC Building Code. This allows for greater flexibility in adapting buildings for flood resiliency. The alternatives illustrated below lower the risk for buildings and provide practical pathways for adaptation. Under current NFIP regulations, these measures may not lower insurance premiums.

The blue icons below illustrate adaptive measures that receive full reduction of NFIP premiums. Icons in gray indicate strategies that improve building resilience, but receive no or partial reduction of NFIP premiums.

<table>
<thead>
<tr>
<th>Level</th>
<th>Critical Systems</th>
<th>Occupied Space</th>
<th>Dry Floodproof</th>
<th>Wet Floodproof</th>
<th>Open Structure</th>
<th>NFIP Premium Reduction</th>
</tr>
</thead>
</table>
| Ground Level | New parking, access, storage, and mechanical room. | Two required streetscape mitigations - covered porch. Additional streetscape mitigation - plantings. | Elevated critical systems in existing mechanical room. | Levels Two and Three | Level two becomes the lowest occupiable floor. Existing use remains with addition of relocated floor area from the ground level to the new addition at the second and third stories. |}

Residents should always follow evacuation procedures. If the lowest occupiable floor is left below the DFE, life safety must be considered. No or partial reduction in NFIP premiums. Residential use and critical systems remain located below the DFE. Dry floodproofing is not permitted at residential use. Lowest occupiable floor is below the DFE.

Elevate critical systems and lowest occupiable floor above the DFE. Wet floodproof enclosed area below the DFE by installing flood vents and replace all windows, doors and finishes with flood damage-resistant materials. Relocate partial ground floor area to a new fourth floor addition within a transitional sub-enclosure. Add structural reinforcement for additional structural loads on the roof. Ensure changes to party-wall do not impact neighboring property’s structural integrity. Relocate partial critical systems to the roof within a fire-rated and vented enclosure. Add structural support to new location of critical systems. Add structural support to new location of critical systems. Add structural support to new location of critical systems.

Elevate the systems above the DFE within a fire-rated and vented enclosure in the rear yard. Retain existing first floor residential use. Loss of occupiable space may occur if systems location requires a window to be infilled. Add structural support to new location of critical systems. No or partial reduction in NFIP premiums. Residential Use and critical systems remain located below the DFE. Lowest occupiable floor is below the DFE.