FLOOD MITIGATION

2016 SOCIAL AND ECONOMIC RESILIENCE
RETROFITTING DESIGN PHILOSOPHIES

SUZANNE DIGERONIMO, FAIA
PRESIDENT
DIGERONIMO PC

www.digeronimo-pc.com 1.201.634.1100
THE FACTS

Flooding is the most common environmental hazard.

This is due to the vast river floodplains and low-lying coastal areas.

Over 10% of US land is mapped as floodplain areas which are most prone to flooding.

• In the past 5 years, all 50 states have experienced a flood or flash flood
• From 2005 to 2014, total flood insurance claims averaged more than $3.5 billion
• Death and fatalities from these floods are in the thousands
• 90% of Presidential Disaster Declarations involve some sort of flooding
  • 2016 to date - Over 16 declarations for flooding recorded by FEMA
  • 2015 - 27 declarations for flooding recorded by FEMA
  • 2014 - 31 declarations for flooding recorded by FEMA
  • 2013 - 43 declarations for flooding recorded by FEMA
  • 2012 - 19 declarations for flooding recorded by FEMA
The 500-year flood level is statistically computed using past and existing information. As more data is collected, scientists continually re-evaluate the frequency of flooding. Climate change is also a factor newly included in those flood calculations.
State agencies who responded to Sandy Storm disaster such as the (NJ-DCA, NYC-DDC and NYC-SBS) receive funding provided by the Federal Housing and Urban Development (HUD).

The Community Development Block Grant (CDBG) is a flexible program under HUD that provides communities with resources to address a wide range of unique community development needs. This program provides for the elevation and reconstruction of homes along the areas damaged as a result of flood water from Super Storm Sandy.

These projects are under construction in many of those affected areas with HUD-CDBG funded programs such as the Residential NY Build it Back and the Residential NJ RREM (Rehabilitation, Reconstruction, Mitigation and Elevation and the NYC Small Business Services assistance to operating businesses.
WET FLOODPROOFING

Wet Floodproofing

[Diagram showing wet floodproofing with occupied area, BFE, ground, lower, relocate equipment]
WET WATER PROOFING

Waterproofing the building
Protect openings, doors, windows, vents, and penetrations design flood level
Seal with waterproofing membranes and sealants
Raise opening above the waterproofing level.
Provide contingent measures (panels and shields)
Protection where utilities enter building
Seepage of water through walls
Check valves, backflow valves
Perimeter building drainage, both external and internal
Sump pumps and foundation drain
Waterproofing the building
DRY FLOODPROOFING

Dry Floodproofing

- Floodwalls
- Gravity
- Buttress
- Counterfort
Dry floodproofing is a flood retrofit technique in which that portion of a structure below the design flood depth (walls and other exterior components) is sealed to be watertight and substantially impermeable to floodwaters. “Impermeable” means preventing the accumulation of any water or permitting (leakage) of not more than four inches of water depth in 24-hours.

FLOODWALLS can be used as barriers, designed to keep floodwaters from coming into contact with the structure.

SHORT WALLS can be built around the property site at the periphery.

FLOOD GATES can be stored remotely are installed as needed. System may include floodwalls, flood gates, and pump stations. May require human intervention to be set in place.

Seepage through flood wall at expansion and construction joints, use appropriate water stop sealants.

Flood water seepage up from rising groundwater wall may occur in the gap between the floodwall and the structure.
HYBRID FLOODPROOFING

A combination of wet and dry flood proofing

Flood wall surrounding emergency generator

Create a watertight enclosure for critical components, boilers and electrical systems - a ‘bathtub’ complete with a submarine door

Create redundancy - build a flood wall, waterproof the building, and create a watertight enclosures around critical utilities

WET AND DRY WATERPROOFING ARE FLOOD MITIGATION SOLUTIONS

Such systems will prevent flood water from infiltrating a building and / or critical space.

FEMA has approved such systems * Building Code allow such systems

Insurance companies will accept such systems and Lowers premiums

May be cheaper than elevating a building and / or critical equipment.

FEMA approves exterior waterproofing that prevents water from entering a building

FEMA approves sealing critical utility rooms by way of creating a bath tub using watertight doors

* Understand that a comprehensive design approach addresses all potential effects of damage to each building component.
EXAMPLE:
Additional layer of brick added with a seal in between.
Flood Barrier Shield for Doors or Windows
Helps Safeguard Building Contents

The impenetrable barrier prevents floodwaters from entering doors and building contents from water ingress in flood-prone areas. When water from heavy rains accumulates, the Flood Barrier Shield effectively blocks up to a foot or more of floodwater from permeating door or window openings.

Available in 10, 20, 24, 30, and 36 inches high barriers (other sizes available upon request). The lightweight, aluminum shield requires no tools or muscle strength for insertion into pre-existing vertical channels attached to send the door frame or adjacent walls. Additional shield sections can be stacked if greater height is needed.

The unit complies with guidelines of the Federal Emergency Management Agency (FEMA) and Federal Insurance Administration (FIA) for use on doors in flood-prone areas. The key to the shield’s impermeability is the use of triple-cell sponge (CCS) rubber, a brake configured by Zero to eliminate a water-tight seal. The shield is the aluminum channel brackets and the bottom of the shield. The neoprene also compensates for gaps in the threshold.

**Flood Barrier Shield for Doors**
- Part #: 2070A - 10" Tall
- 2075A - 20" Tall
- 2076A - 25" Tall
- 2077A - 30" Tall
- 2078A - 36" Tall

**Flood Barrier Shield for Windows**
- Part #: 2080A - 10" Tall
- 2085A - 20" Tall
- 2086A - 25" Tall
- 2087A - 30" Tall
- 2088A - 36" Tall

For more information, visit our website at www.zerointernational.com
WET AND DRY
FLOOD MITIGATION TECHNIQUES

If designed properly, critical facilities even experiencing “Impeded” access can

• Provide evacuation shelter

• Accept delivery and distribution of supplies

• Provide emergency responder dispatch

• Provide aid and critical care

• Authorizations - FEMA Critical Facilities, ASCE 7 Category IV Essential, ASCE 24 Limitations & Requirements, National Building Code – NYC and NJ, Insurance Companies
NY and NJ Sandy Elevation Projects

Minimum National Flood Insurance Program (NFIP) Elevation Requirements in Velocity (V) Zone

- Lowest point of structure support
- Breakaway walls
- Base-Line Flood Elevation (BFE)
- Wave Trough

Flood Source

ZONE

V

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ROW HOME
NOT YOUR TYPICAL ELEVATION
HYBRID ELEVATION
HELPFUL DEFINITIONS

National Flood Insurance Program (NFIP) – Established in 1968 to provide flood insurance protection to property owners in return for local government commitment to sound floodplain management and related flood disaster mitigation efforts. It is a voluntary partnership between the Federal Government and individual communities.

Flood Insurance Rate Map (FIRM) – the official map of the NFIP community that delineates the Special Flood Hazard Areas (SFHA) and the insurance risk premium zones.

Base Flood Elevation (BFE) - the water surface elevation resulting from the base or 100 year flood which is defined as the flood having a 1% chance of being equaled or exceeded in any given year.

Design Flood Depth - the depth of water used for regulatory and design purposes. BFE minus ground elevation.
APPENDIX

FEMA Flood Map Service Center
http://msc.fema.gov

FEMA REGION II Coastal Analysis and Mapping
http://www.region2coastal.com/sandy/table
QUESTIONS ????

Please feel free to contact our office for additional information.

Suzanne DiGeronimo, FAIA
DiGeronimo PC- Architects
650 From Road | MACK CALI II | Suite 650 | Paramus, New Jersey 07652
Office 201.634.1100

mail@digeronimo-pc.com
www.digeronimo-pc.com