

# **FLOOD MITIGATION 101**

**JACKSONVILLE SPECIAL COMMITTEE ON RESILIENCY  
OCTOBER 23, 2020**

**RODERICK SCOTT, CFM**

**FLOOD MITIGATION INDUSTRY ASSOCIATION**

**[WWW.FLOODMITIGATIONINDUSTRY.ORG](http://WWW.FLOODMITIGATIONINDUSTRY.ORG)**



**JACKSONVILLE IS NOT ONLY AN IMPORTANT ECONOMIC AND  
TOURISM REGION**



# US STRATEGIC IMPORTANCE



**JACKSONVILLE ALSO HAS STRATEGIC IMPORTANCE WITH ITS  
MILITARY INSTALLATIONS**

# JACKSONVILLE FLOODING



**JACKSONVILLE REGION IS NO STRANGER TO FLOODING**



# FLOOD RISK IS INCREASING



**ERA OF INCREASING FLOOD RISK**

# FLOOD INSURANCE RATES INCREASING

## FEMA NFIP RESIDENTIAL ACTUARIAL RISK RATES COMPARISON

PREMIUM AT 4 FEET BELOW  
BASE FLOOD ELEVATION

\$9,500/year  
\$95,000/10 years

PREMIUM AT  
BASE FLOOD ELEVATION

\$1,410/year  
\$14,100/10 years

PREMIUM AT 3 FEET ABOVE  
BASE FLOOD ELEVATION

\$427/year  
\$4,270/10 years



Floor Level (in relation to BFE)	Premium with NO floodproofing*
2+	\$1,076.00
1+	\$1,567.00
0	\$2,840.00
-1	\$6,006.00
-2	\$8,827.00
-3	\$11,684.00
-4	\$15,004.00
-5	\$18,269.00
-6	\$20,853.00
-7	\$23,214.00
-8	\$25,488.00
-9	\$27,243.00

- ERA OF RAPIDLY INCREASING, UN-AFFORDABLE FLOOD INSURANCE RATES ON ALL OLDER HIGH FLOOD RISK PRE-FLOOD MAP BUILDINGS
- FIRST JACKSONVILLE FLOOD MAPS 1989!





**REPETITIVE FLOODING IS VERY HARD, IF NOT IMPOSSIBLE TO STOP**



**STRUCTURAL FLOOD PROTECTION IS VERY EXPENSIVE AND TAKES YEARS TO FINANCE, DESIGN AND BUILD**





**FLOOD HAZARD MITIGATION ELEVATION AND DRY FLOOD PROOFING ARE PROVEN METHODS OF REDUCING FLOOD RISK AND RAPIDLY RISING FLOOD INSURANCE COSTS**





**FLOOD MITIGATION PROJECTS HELP PRESERVE PROPERTY VALUES  
WHICH ALSO WORKS TO PRESERVE PROPERTY TAX REVENUES THAT  
FUND OUR SCHOOLS, GOVERNMENT OPERATIONS AND THE  
RE-PAYMENT OF REVENUE BONDS FOR BIGGER RESILIENCE PROJECTS**



# HOW MANY ARE THERE OUT THERE?

- How many do you have?
- What are the property values?
- What are the property revenues?
- How much will it cost?



# ELEVATION READY COMMUNITY

- **ELEVATION IS NOT FOUND ON PERMITS. YOU NEED TO MAKE A PLACE FOR DOCUMENTING AND TRACKING THE NUMBERS OF THESE PROJECTS.**
- **NEED TO STREAMLINE VARIANCE REQUESTS FOR SET BACKS FOR ELEVATION PROJECTS.**
- **NEED TO GET EXPERIENCED GRANT WRITER AND PROJECT ADMIN ON BOARD. OUR INDUSTRY HAS SEEN MANY GOVERNMENTS STRUGGLE.**
- **DESIGN GUIDELINES AND REVIEW OF PROJECT PLANS.**
- **EDUCATION PROGRAMS FOR DESIGN PROFESSIONALS AND GC'S.**
- **HAVE ENOUGH STRUCTURAL COMPANY CAPACITY TO GET A LOT OF THESE PROJECTS DONE IN THE NEXT 20 YEARS.**
- **COMPLETE NEW HISTORIC BUILDING SURVEY.**



# THE ELEVATION PROJECT

## IASM STEPS TO ELEVATION A CRS 330 PUBLICATION FOR PUBLIC OUTREACH

### ELEVATE

*before it's too late!*




**International Association of Structural Movers**

The International Association of Structural Movers (IASM) is the 501(c)(4) professional organization comprised of member companies involved in projects to elevate and/or relocate buildings for flood hazard mitigation.

(803) 951-9304 | [info@iasm.org](mailto:info@iasm.org) | [iasm.org](http://iasm.org)

#### COMBATING RISING FLOOD INSURANCE COSTS

Flooding is increasing across the US, requiring communities to examine alternatives to the cycle of repetitive flooding. The cost of the flood recovery cycle is VERY EXPENSIVE, not only monetarily, but everyone involved has lifetime challenges as they navigate flood recovery. This is now compounded by rapidly rising flood insurance policy rates on all older buildings built before the first flood insurance rate map for the community. Elevation can help offset those rates dramatically.

FLOOD INSURANCE PREMIUMS:	4 ft below BASE FLOOD ELEVATION	level with BASE FLOOD ELEVATION	3 ft above BASE FLOOD ELEVATION
	\$9,500/yr	\$1,410/yr	\$427/yr
	\$95,000/10 yrs	\$14,100/10 yrs	\$4,270/10 yrs

#### WHY ELEVATE?

- INCREASES MULTIPLE CONSTRUCTION TRADES & LABOR**
- ENVIRONMENTALLY RESPONSIBLE** - the recycling and reuse of existing buildings results in a reduction of 50% of solid waste to landfill
- SAVES NATURAL RESOURCES** - every 1,000 sq ft of wood-frame building uses approximately 250 TREES
- PRESERVES HISTORIC BUILDINGS**
- STABILIZES THE REAL ESTATE MARKET & PROPERTY VALUES**
- REDUCES RECOVERY EXPENDITURES** - every \$7 invested in elevation saves \$7 in recovery expenditures
- SIGNIFICANTLY REDUCES THE RISK OF FLOODING** - FLOOD INSURANCE POLICY RATES
- PRESERVES PROPERTY TAX REVENUES** - which support schools & government operations, infrastructure & public safety, & bonding for public projects
- KEEPS THE COMMUNITY TOGETHER** - Elevating down homes to create green space not only results in the loss of property taxes critically needed to fund public services and schools, you lose the families that built the community. This option should often be the last alternative.

#### STEPS TO ELEVATION

There are three main phases in these flood hazard mitigation elevation/relocation projects: FINANCING, PLANNING/DESIGN AND IMPLEMENTATION.

##### FINANCING

- ###### EVALUATE FINANCING OPTIONS

  - For those elevation grants available, local government will have information.
  - If the property has flood insurance, the total cost of compliance (TCO) is currently a \$20,000 one-time payment to the policy holder if the home is over 20% damaged and there is a claim on the policy.
  - Small Business Administration (SBA)** - If the building is 50% or more damaged by flooding, the SBA allows up to \$20,000 in additional loan funding to elevate.
  - FEMA's 15% loan waiver** - This is a financing package available from any bank. There is a construction loan followed by a conversion into a 30-year mortgage. The total funding available is \$240,000.
  - As always, each property has unique needs for the contractor and the customer.



**BEFORE**

##### PLANNING / DESIGN

- ###### ELEVATION CERTIFICATE AND OR A LAND SURVEY (if required)

The FEMA elevation certificate is the document that establishes the current elevation and final required elevation of the building and adjacent land. It is also the form that sets the National Flood Insurance Program flood policy rates. A current land survey is required by certain communities so they can evaluate the project design in relation to the zoning requirements like setbacks and height.
- ###### ENGINEERED FOUNDATION AND ARCHITECTURAL DESIGNS

The new or additional foundation must be designed in compliance with the American Society of Civil Engineers (ASCE) flood zone construction requirements, ASCE 24-14 is the publication number. The foundation work on these projects is design driven half of the project cost. In addition to the foundation structural design requirements, we need to consider what the result of the project will look like. Remember, these buildings are one built much more solid than originally and will be around for a long time. The owner and the community can debate this and if the building is designated historic, there may be a pre-permit design review if required by community or federal funding. The site visit determines the design of the foundation, so a soil sample is the best way to go at this point. The soil stress and load bearing capacity will determine if piles or helixes will need to be driven below the new foundation. Some communities and design professionals require this testing.

##### IMPLEMENTATION

- ###### UTILITY DISCONNECTS / PREPARE STRUCTURE FOR ELEVATION

Once the permits are in place, portable toilets are on site and any fencing required by local government is installed, any preparation work needs to be completed. Once the structure of the building and its perimeter is addressed to start removal, needs to be done. If the building is brick (old), many communities remove the brick and later install siding. If there is a brick edge incorporated in the side, then the brick layer can be elevated with the building. Utilities preparation is different in every community. Make sure to check with the building department for their requirements. Some communities allow gas shut off and sewer/water disconnect, which is the safest and most expensive. Other communities require complete capping of some or all of utilities with a demolition permit and all new utilities installed. This is a very expensive alternative.
- ###### STRUCTURE ELEVATION / RELOCATION

  - SLAB ON GRADE**

The slab on grade has two types of construction and therefore has two types of projects to elevate:

    - STRUCTURAL SLAB ON PILES** (slab and grade beam footings present and are intact)
    - NON-STRUCTURAL SLAB** (sloped footing and slab)

These foundations typically have piles, usually wood, to support the foundation. Elevation requires the piles under the foundation and/or helixes or auger-cast piles are driven next to the original piles. The grade beams are excavated at the site of lifting piles. Crib jacks and slab support jacks are installed.



**DURING**



**AFTER**

# PLANNING

- **MUST INCLUDE DESIGN GUIDELINES SO YOU DON'T GET UGLY RESULTS**
- **ELEVATION CERTIFICATE**
- **SOIL PROFILE**
- **PRELIMINARY DESIGNS**
- **PRELIMINARY BUDGET**





# PLANNING

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- **ELEVATION CERTIFICATE**
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- **PRELIMINARY BUDGET**



# FINANCING



**We will review the myriad financing sources at the next meeting**



- **CONSTRUCTION PLANS**
- **FINALIZE BUDGET FOR CONTRACTING**
- **PERMITTING**



# ELEVATE THE BUILDING

- **DISCONNECT UTILITIES**
- **INSERT LIFTING STEEL**
- **ELEVATE BUILDING OFF ORIGINAL FOUNDATION**





# ELEVATE THE BUILDING

- **DISCONNECT UTILITIES**
- **INSERT LIFTING STEEL**
- **ELEVATE BUILDING OFF ORIGINAL FOUNDATION**



# FOUNDATION

**ADD TO ORIGINAL  
FOUNDATION, IF  
STRUCTURAL ENGINEER  
CERTIFIES THE RE-USE**





# FOUNDATION

**OR  
REMOVE OLD  
FOUNDATION  
AND REPLACE  
WITH NEW ONE**





# COMPLETION

**CONNECT BUILDING  
TO HIGHER  
FOUNDATION**



# FINISHING TOUCHES

**ADD A/C UNITS ON  
STANDS, RE-CONNECT  
UTILITIES AND BUILD  
STAIRS/LANDINGS**





# FINISHING TOUCHES

**ADD A/C UNITS ON  
STANDS, RE-CONNECT  
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# WOOD FRAME



**BEFORE**



**AFTER**



# CMU block



# BRICK





# SLAB ELEVATION



# SLAB SEPARATION



**BEFORE**



**AFTER**



# DRY FLOOD PROOFING

- **NON RESIDENTIAL BUILDINGS**
- **UN-REINFORCED WALLS ONLY TO 3FT PLUS 1FT FREEBOARD**
- **INTERIOR SUMP PUMP INDEPENDANTLY POWERED**
- **SEWER BACK FLOW PREVENTOR**
- **EMERGENCY PLAN**
- **ANNUAL SET UP AND INSPECTION**
- **CERTIFICATION BY STRUCTURAL ENGINEER**

# DRY FLOOD PROOFING PRODUCTS

## CLOSURES





# DRY FLOOD PROOFING PRODUCTS

## GLASS WALLS



## WINDOWS

# DRY FLOOD PROOFING PRODUCTS

## DOORS





# FEMA FLOODPROOFING



## 3 Dry Floodproofing Measures

The purpose of dry floodproofing a building is to make it watertight to floods of limited duration (a few hours) and depth (typically less than 3 feet). Dry floodproofing reduces the potential for flood damage by reducing the probability that the building interior will be inundated. It can be an appropriate alternative for flood mitigation when relocating or elevating buildings is not cost-effective or technically feasible.



### Special Note

FEMA strongly encourages that flood retrofits provide protection to the DFE (the community's regulatory DFE). However, in some situations, lower flood-protection levels may be appropriate. Owners and design professionals should meet with a local building official to discuss the selected retrofit measure and the elevation to which it will protect the building.

The minimum performance requirement for dry floodproofing measures is a space that is protected by walls that are substantially impermeable and resistant to flood loads. As noted in Section 1, a substantially impermeable wall should limit water accumulation to a maximum accumulation of 4 inches in a 24-hour period with a sump pump to control seepage (USACE 1995). However, the minimum performance requirement can be exceeded with proper planning, design, and materials.

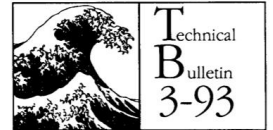
Incorporating flood damage-resistant materials into the dry floodproofing design up to the height of the dry floodproofing measure is recommended. Additionally, building systems such as walls and foundations may need to be strengthened to withstand direct flood forces and the loads imposed by floodproofing measures (e.g., shields, watertight doors), which are used to temporarily seal openings.

An effective dry floodproofing retrofit requires the following:

- Detailed site evaluation (see Section 3.1.2)
- Detailed building evaluation (see Sections 2.6.2 and 2.6.3)
- Careful evaluation of all of the dry floodproofing measures (see Sections 3.2 through 3.7), including a consideration of residual risk (see Section 1.3)
- Design by a qualified registered design professional
- Verification/testing that the constructed systems provide the desired floodproofing effectiveness
- Floodproofing Certificate for Non-Residential Structures for the dry floodproofing design (see Section 2.1.2)
- A plan for deploying any active dry floodproofing measures that require human intervention (see Section 2.5.4)
- Sufficient warning time to deploy active dry floodproofing measures and vacate the building
- Operations and maintenance plan (see Section 3.8)

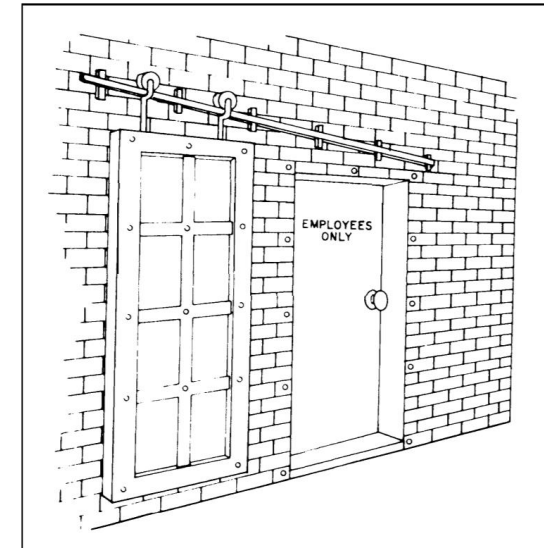
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### Non-Residential Floodproofing — Requirements and Certification

for Buildings Located in Special Flood Hazard Areas  
in accordance with the  
National Flood Insurance Program



FEDERAL EMERGENCY MANAGEMENT AGENCY  
FEDERAL INSURANCE ADMINISTRATION

FIA-TB-3  
4/93

# SUMMARY

- We have less time than we think to adapt.
- Adaptation is essential for all of us
- We know how to do this
- We need to do this
- We must get financing for this – next session from us
- Let's go out there and discuss this with the property owners
- Together we will be flood resilient





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**QUESTIONS?**