THE FLORIDA STATE UNIVERSITY

COLLEGE OF BUSINESS

The Florida Catastrophic Storm Risk Management Center

Presenters

Bill Bracken, PE

John Minor, CGC

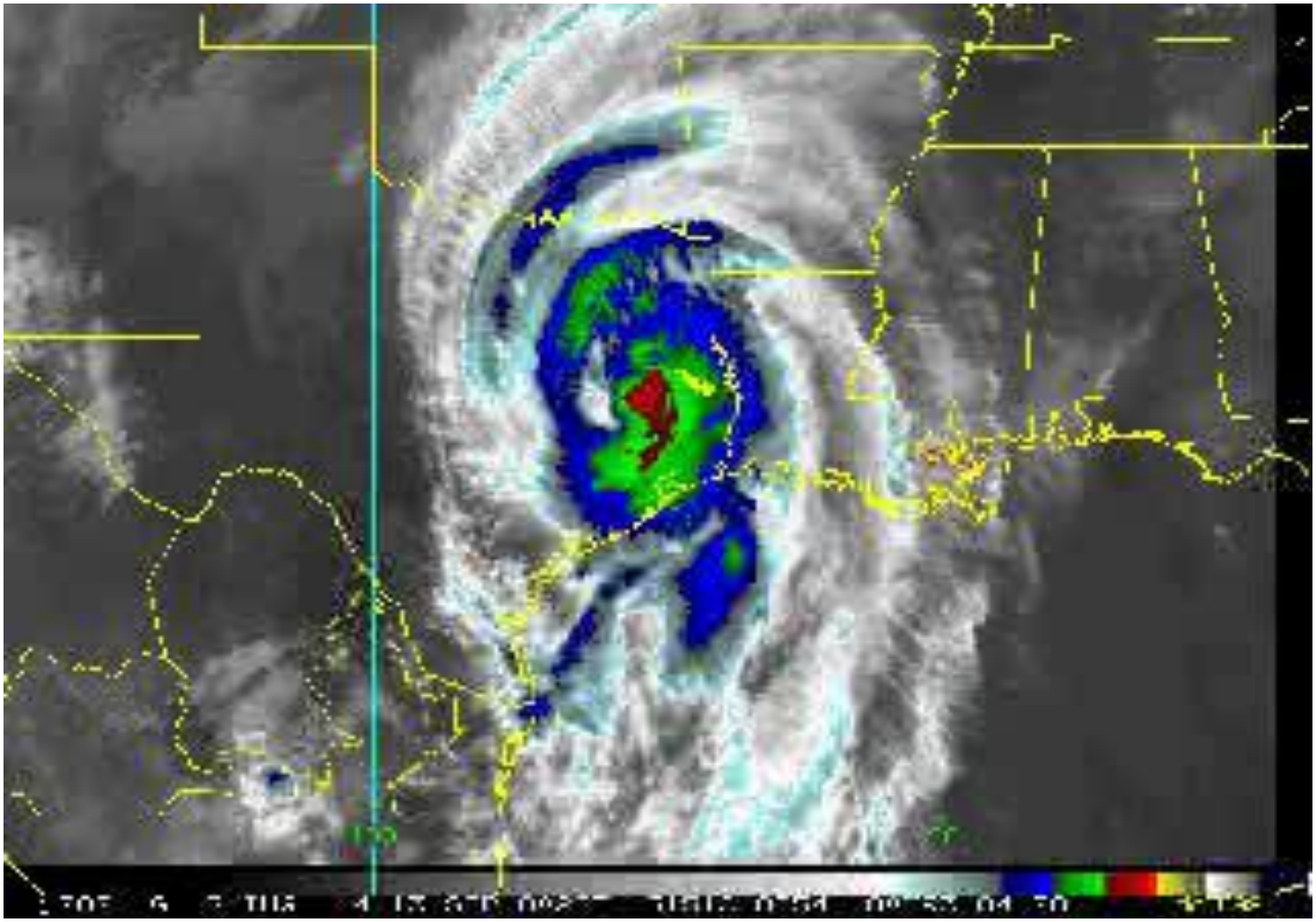
Bracken Engineering

Structures ▪ Disasters ▪ Forensics

COMPLETE

GENERAL CONTRACTORS, INC.

Hurricane Ike



Pre & Post FIRM Ike

Pre Firm

Post Firm

FEMA – Background

- The NFIP requires the mortgage loans that originate from federally-backed financial institutions to require flood insurance. [Circa 1968]
- More than 5.6 million policies in effect in +20,000 areas.
- Special Flood Hazard Area (SFHA) – 26% chance of being flooded during the term of a 30 yr mortgage as compared to 9 % chance of fire
- $250,000 policy limit for residences
- www.floodsmart.gov

FEMA – Background

The National Flood Insurance Program began in **1968** following a series of large hurricanes and storms, as noted in the initial law and those that followed. These laws became the regulations know as The *National Flood Insurance Act of 1968* and the *Flood Disaster Protection Act of 1973*

FEMA – Background

- The **National Flood Insurance Reform Act of 1994** resulted in major changes to the National Flood Insurance Program (NFIP). The law amended the Flood Disaster Protection Act of 1973. It provides tools to make the NFIP more effective in achieving its goals of reducing the risk of flood damage to properties and reducing Federal expenditures for uninsured properties that are damaged by floods.

FEMA – Background

- Local Enforcement
  - Floodplane Manager
  - Building Official v. Water Management District
  - Florida Building Code v. International Building Code
  - Community Assisted Visit (CAV)

FEMA – Background

- FEMA – NFIP
- Background
- Federal Regulation v. Local Ordinance
  - 44 CRF 59 through 80
  - Local Ordinance
- NFIP Regulations
  - Special Flood Hazard Areas
  - Pre-FIRM & Post-FIRM
  - Elevation Certificate
  - Non-Compliance (50% Rule)
  - New Construction Compliance

FEMA – Background

- 44 CRF 59 through 80
- The National Flood Insurance Program (NFIP) regulations, a part of the Federal Emergency Management Agency (FEMA) regulations, are set forth at 44 CFR 59 through 44 CFR 80. These regulations, updated yearly, include, but are not limited to issues related to flood insurance and mitigation, such as community floodplain activities, land management, policy rating and the actual standard flood insurance Policy.

FEMA – Background

- 44 CFR SUBCHAPTER B--INSURANCE AND HAZARD MITIGATION
- The main area for flood insurance and the Standard Flood Insurance Policies are parts 61 through 63.
- *61 - Insurance Coverage And Rates*
- *62 - Sale Of Insurance And Adjustment Of Claims*
- *63 - Implementation Of Section 1306(C) Of The National Flood Insurance Act Of 1968*

FEMA – Background

- Floodplane Manager
- The Floodplane Manager is the authority identified within the Floodplane Ordinance as the individual charged with enforcing the rules of the ordinance. While this individual can be anyone, this task normally falls to the local Building Official.

Hurricane Claims - Elevation

- LOMA – F
- Sometimes looks can be confusing and inspection without elevation cert and map is not enough
- Grade can be compliant at time of construction even with piling construction resulting in the first floor of a structure as pre-firm – see Hatteras 2003 Hurricane Isabel

FEMA – Background

- Community Assisted Visit (CAV)
- When disconnects occur, one can count on a FEMA CAV. A CAV will also occur immediately after a flood event occurs.
- Local Enforcement with Federal Assistance - *“I’m from the government and I’m here to help”*

FEMA – Background

- Florida Building Code v. International Building Code
- The International Building Code assigns the responsibility of Floodplane management to the Building Official. Some states however, such as Florida, afford the Building Official the ability but do not assign it.

FEMA – Background

- Building Official v. Water Management District
- When the individual in charge of insuring construction compliance is not charged with insuring Floodplane compliance, disconnects can occur.

NFIP – ICC

- Increased Costs of Compliance ICC is available after a property is 50% damaged for costs associated with the elevation of a new structure and demolition of the old.

- $30,000 is available to flood insurance policyholders in high-risk areas to help pay to bring their home or business into compliance.

www.fema.gov or www.floodsmart.gov

FEMA - 50% Rule

R105.3.1.1 Substantially improved or substantially damaged existing buildings in areas prone to flooding - *For applications for reconstruction, rehabilitation, addition, or other improvement of existing buildings or structures located in an area prone to flooding as established by* ***Table R301.2(1),*** *the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its pre-damage condition*

FEMA - 50% Rule

If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R323.

Hurricane Claims

The 50% rule has since been replaced by Section 4 in the 2007 Building Code Existing Structures

SECTION 402

REPAIRS

402.1 Scope. Repairs, as defined in Chapter 2, include the patching or restoration or replacement of damaged materials, elements, equipment or fixtures for the purpose of maintaining such components in good or sound condition with respect to existing loads or performance requirements.

402.2 Application. Repairs shall comply with the provisions of Chapter 5.

402.3 Related work. Work on non-damaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the provisions of Chapter 6, 7, 8, 9 or 10.

Hurricane Claims

SECTION 403

ALTERATION—LEVEL 1

403.1 Scope. Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment,

or fixtures that serve the same purpose. Level 1 alterations shall not include any removal, replacement or covering of existing materials, elements, equipment or fixtures undertaken for purpose of repair are defined in Chapter 2 and described in Section 402.

403.2 Application. Level 1 alterations shall comply with the provisions of Chapter 6.

SECTION 404

ALTERATION—LEVEL 2

404.1 Scope. Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation

of any additional equipment.

404.2 Application. Level 2 alterations shall comply with the provisions of Chapter 6 for Level 1 alterations as well as the provisions of Chapter 7.

Hurricane Claims

SECTION 405

ALTERATION—LEVEL 3

405.1 Scope. Level 3 alterations apply where the work area exceeds 50 percent of the aggregate area of the building and made within any 12-month period.

Exception: Work areas in which the alteration work is exclusively plumbing, mechanical or electrical shall not be included in the computation of total area of all work areas.

405.2 Application. Level 3 alterations shall comply with the provisions of Chapters 6 and 7 for Level 1 and 2 alterations, respectively, as well as the provisions of Chapter 8.

SECTION 406

CHANGE OF OCCUPANCY

406.1 Scope. Change of occupancy provisions apply where the

activity is classified as a change of occupancy as defined in Chapter 2.

406.2 Application. Changes of occupancy shall comply with

the provisions of Chapter 9.

Hurricane Claims

SECTION 407

ADDITIONS

407.1 Scope. Provisions for additions shall apply where work is classified as an addition as defined in Chapter 2.

407.2 Application. Additions to existing buildings shall comply with the provisions of Chapter 10.

SECTION 408

HISTORIC BUILDINGS

408.1 Scope. Historic buildings provisions shall apply to buildings classified as historic as defined in Chapter 11.

408.2 Application. Except as specifically provided for in Chapter 11, historic buildings shall comply with applicable provisions of this code for the type of work being performed

Costs of Coastal Construction

Large Cost Drivers for *New Construction*

- Laminated Windows
- Elevation of Utilities
- Continuous Load Path [Threaded Rods, Fasteners & Clips]
- Shear Walls
- Blocking and Tie Downs

Hurricane Claims - Inspection

- Ivan - Wind and Flood
- Once a flood line was established flood paid from there down
- Wind paid as damaged from flood line up

Hurricane Claims - Inspection

- Pre / Post firm – This will establish the coverage
- Flood Line – Obtain measurements from grade/ Finished Floor Elevation (FFE) hire surveyor or obtain elevation cert.
- Photo & Measure Site - with landmarks likely to remain and exterior of property.

Foundation Design

Principles For Sustainability

- Sufficient depth to resist both uplift and overturning caused by wind and/or water
- Sufficient depth to account for the possible loss of soil due to erosion or scour
- Adequate strength of the foundation material such that it will not break when the building is impacted by high winds and/or water and waves
- Strength to resist lateral movement without bracing if possible
- Sufficient structural redundancy to resist failure when one critical corner or section is damaged by water-borne debris

Ivan

Hurricane Claims

- **Wind vs Flood**
- It is important to understand how a structure is put together to understand where the flood stops and the wind begins
- The flood in the photo to the left has removed the load bearing components of this spread foundation in two tiers
- Wind has blown back the metal mansard

Ivan – Foundation Failure

Katrina – Wind and Flood

Hurricane Claims - Inspection

Hurricane Claims - Inspection

- Water damage to ceilings of first floor
- Flood has removed floor framing

Wind v Flood

Flood Line Finished Floor Elevation (FFE) - Measure with a tape up close and perspective.

Inside Debris Line : Still Water/Surge – The inside measurements may be different than those recorded outside due to the ramp-up effect of wave action

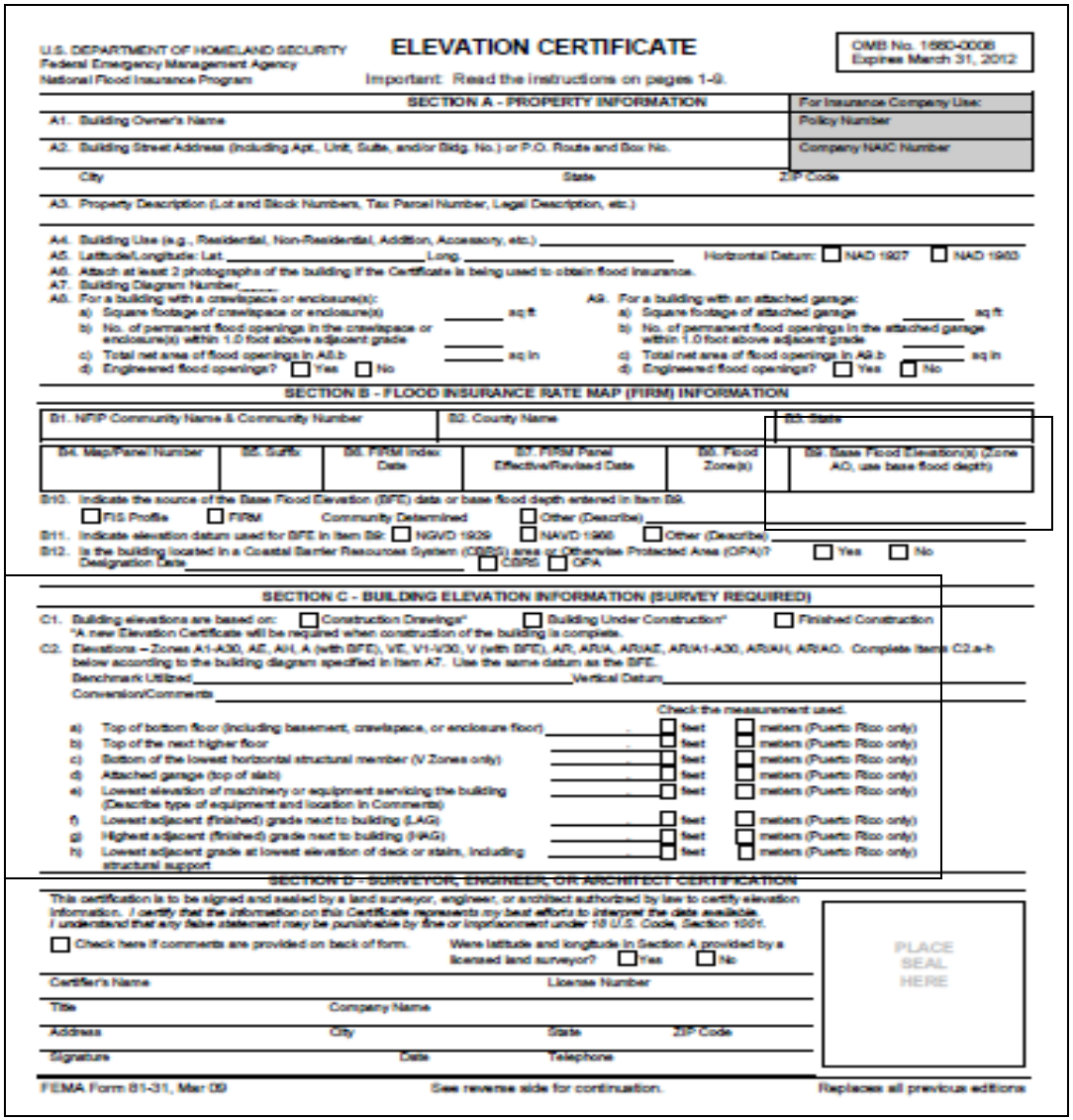
Elevation Requirements

The first things to understand on any wind/water loss

Elevation Certificate

An Elevation Certificate is required in order to properly rate Post-FIRM buildings, which are buildings constructed after publication of the Flood Insurance Rate Map [FIRM]. An Elevation Certificate is not required for Pre-FIRM buildings unless the building is being rated under the optional Post-FIRM flood insurance rules.

Elevation Certificate



U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expires March 31, 2012

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.

City State ZIP Code

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)

A5. Latitude/Longitude: Lat. Long. Horizontal Datum: ☐ NAD 1927 ☐ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number

A8. For a building with a crawlspace or enclosure(s):
a) Square footage of crawlspace or enclosure(s) sq ft
b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade
c) Total net area of flood openings in A8.b sq in
d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
a) Square footage of attached garage sq ft
b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade
c) Total net area of flood openings in A9.b sq in
d) Engineered flood openings? ☐ Yes ☐ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other (Describe)

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe)

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☐ No
Designation Date ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☐ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized Vertical Datum
Conversion/Comments

		Check the measurement used.	
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	☐ feet	☐ meters (Puerto Rico only)
b)	Top of the next higher floor	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	☐ feet	☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	☐ feet	☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	☐ feet	☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	☐ feet	☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	☐ feet	☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☐ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☐ No

PLACE SEAL HERE

Certifier's Name License Number

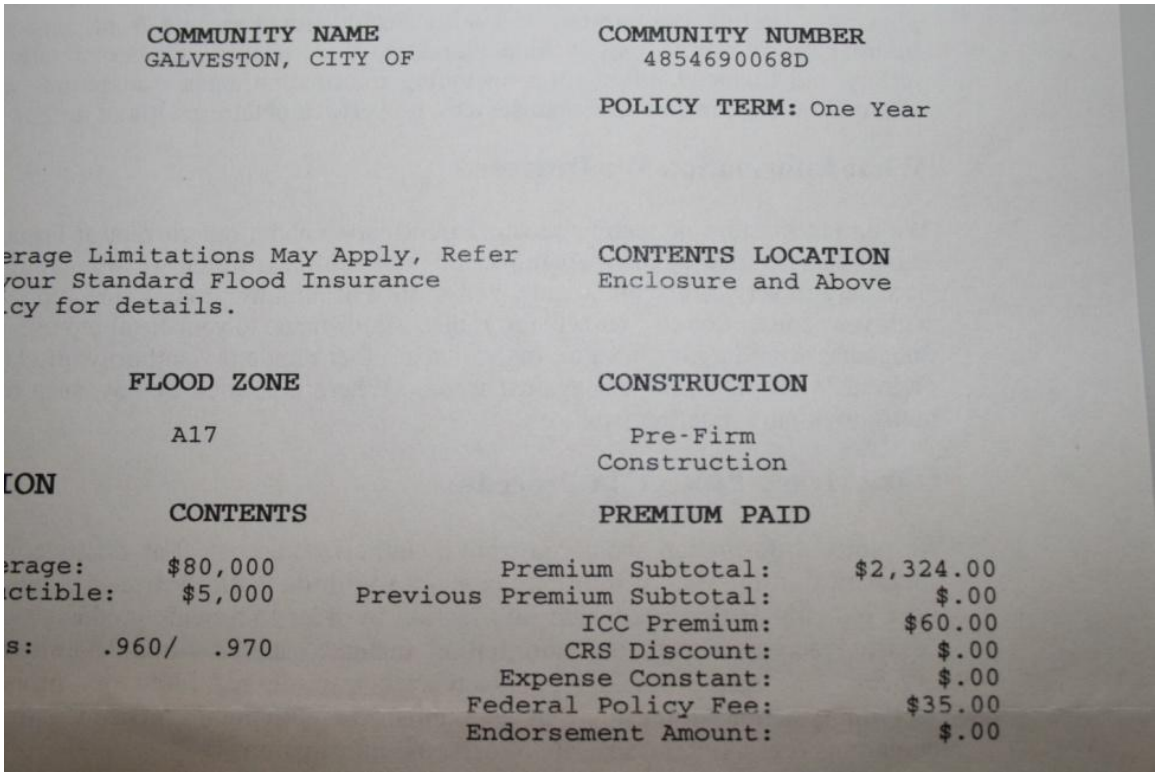
Title Company Name

Address City State ZIP Code

Signature Date Telephone

FEMA Form 81-31, Mar 09 See reverse side for continuation. Replaces all previous editions

Flood Policy



COMMUNITY NAME
GALVESTON, CITY OF

COMMUNITY NUMBER
4854690068D

POLICY TERM: One Year

erage Limitations May Apply, Refer
your Standard Flood Insurance
icy for details.

CONTENTS LOCATION
Enclosure and Above

FLOOD ZONE

A17

CONSTRUCTION

Pre-Firm
Construction

ION

CONTENTS

erage: $80,000
ctible: $5,000

s: .960/ .970

PREMIUM PAID

Premium Subtotal:	$2,324.00
Previous Premium Subtotal:	$.00
ICC Premium:	$60.00
CRS Discount:	$.00
Expense Constant:	$.00
Federal Policy Fee:	$35.00
Endorsement Amount:	$.00

Elevation Requirements

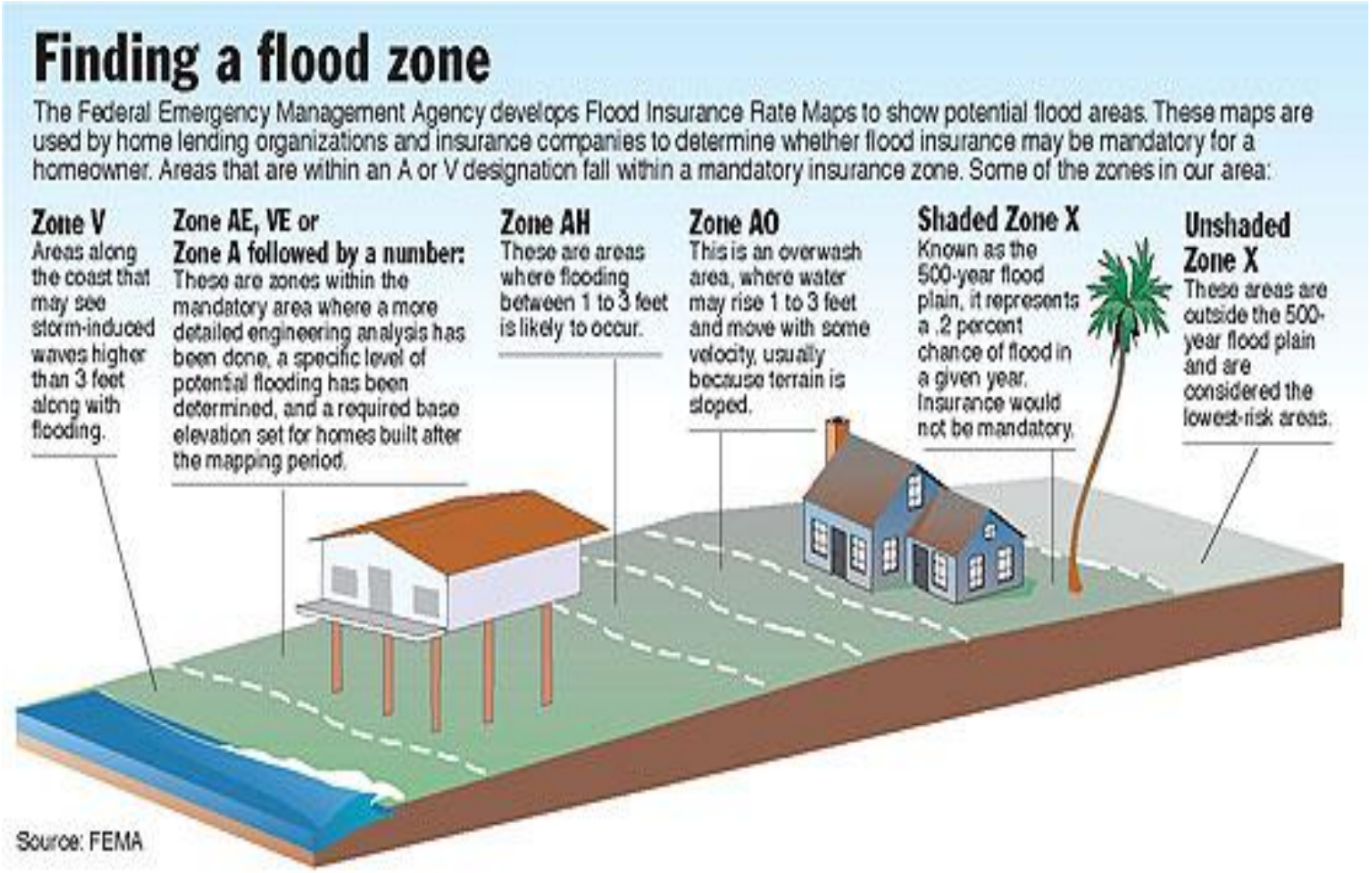
The first things to understand on any wind/water loss

NFIP Flood Inundation Maps

Excellent tool to use after a loss : Maps are based on the observation of survey teams set up by FEMA. These maps give ranges as to the height of flood waters : Anomalies in flood height ***can*** and do occur.

www.fema.gov/business/nfip

FEMA Flood Mapping



Elevation Requirements

The first things to understand on any wind/water loss

FIRM : Flood Insurance Rate Map

Provides the current elevation requirements for a particular property; these maps are continually updated and changed.

D-FIRM Elevation Maps

The Standard DFIRM Database is a digital version of the FEMA flood insurance rate map that is designed for use with digital mapping and analysis software.

University of Florida Hurricane Simulator Shown to the Left

FL State Univ – Modeling & Research

LA State Univ – Building the Digital Hurricane

Texas Tech – Mobile Weather Data Collection

UF – Ultimate Hurricane Simulator

Univ NF – Bridges & Roads Wired and Post storm data collection

Institute for Business & Home Safety ∞ IBHS

Institute for Business & Home Safety ∞ IBHS

Immediate Research Focus : Roof-Related Issues

- The initial research focus will be on Roofs and roofing-related issues and developing relationships between current test standards and performance of roofs in simulated windstorms;
- Identifying effective methods to provide back-up water intrusion protection when primary roof cover is damaged;
- Identifying fixes for water intrusion and wind-borne firebrand intrusion via roof venting systems;
- Simulating wind-driven hail events and evaluating associated damage to roof covers, as well as, identifying solutions;
- Initiating research into aging effects on roof performance in extreme events;
- Developing cost-effective methods for retrofitting various roofing systems to mitigate damage and losses.

Contact info@ibhs.org or call 866-657-4247

Oil and Water

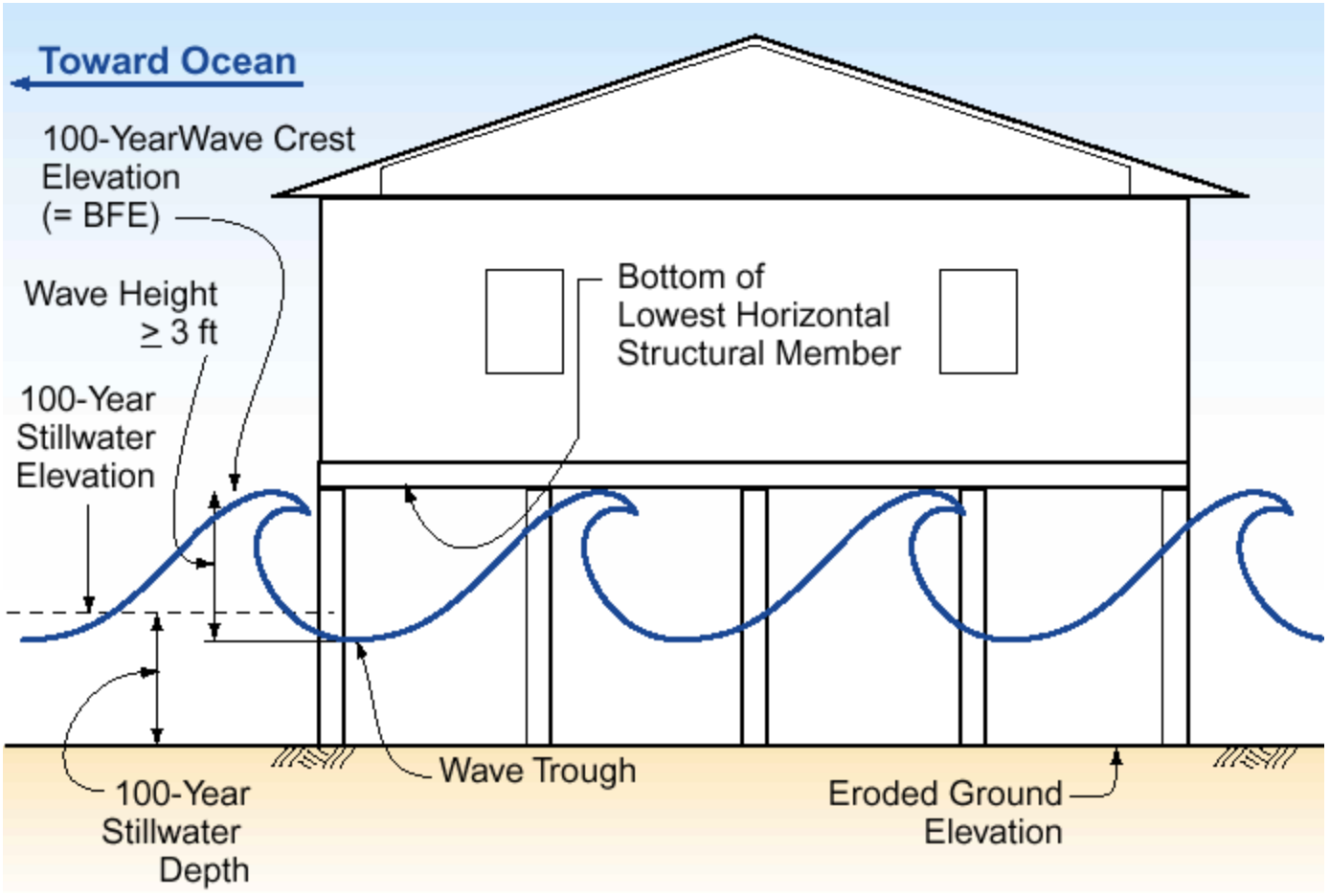
Federal Emergency Management Agency ∞ FEMA

Oil Spill Determination re: Insurance Coverages

- Coverage for commercial buildings and contents must be purchased separately and the limit for damage caused by pollutants is $10,000;
- Damage to the ground, soil or land caused by flood, oil or flood water mixed w/ oil is not covered;
- The cost of complying with any local or state ordinance including one that requires special removal methods for oil is specifically excluded;
- There is no coverage for testing for or the monitoring of pollutants unless there is a law or ordinance requiring it; [certain floodplain management mitigation requirements are exceptions]
- If the policyholder makes any claim against any person who caused the loss and recovers any money, the policyholder must pay FEMA or the WYO back first before the policyholder may keep any of that money.

FL Depart of Environmental Protection ∞ FL DEP

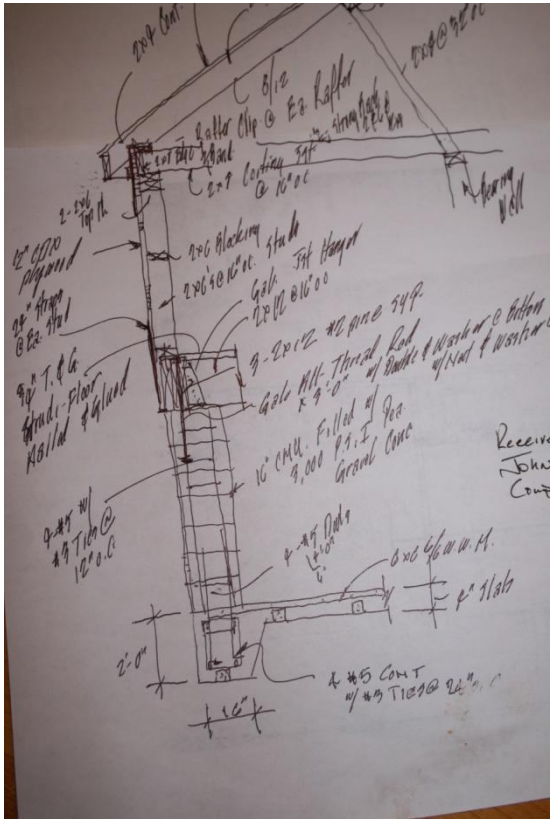
Coastal Barrier Construction Areas



Coastal Mississippi Post Katrina

Hurricane Claims

- Eye Witness / Fact Testimony – in more difficult files expect to interview the builder and or any other person that can provide testimony as to how a property was constructed including any special features



Potential Policy Solutions

All Risk Policies

- The ***Multiple Perils Act of 2007*** HR Bill 920, furthered by Congressman Gene Taylor of Mississippi, was an attempt at an all risk policy;

- This act has been opposed by insurance industry groups who say it could cause as much as $100-200 billion a year in losses with a similar track record as flood would end up a huge issue for tax payers;

Potential Policy Solutions

JUA

Insurance industry lobbyist argue that while insurance has doubled since Katrina, policies typically are available in many cases by the JUA. These are programs administered by each state, i.e., Citizens Ins Co in Florida; the NC JUA; and the Texas Wind Insurance Association.

Potential Policy Solutions

Citizen's Insurance

The Citizens' Board of Governors approved an emergency plan to validate the accuracy of the more than $700 million in wind mitigation credits provided to its policyholders.

As a government entity, Citizens has a fiscal responsibility to all Floridians to ensure that the premiums it charges are correct and reflect accurate rating characteristics for each covered property.

Potential Policy Solutions

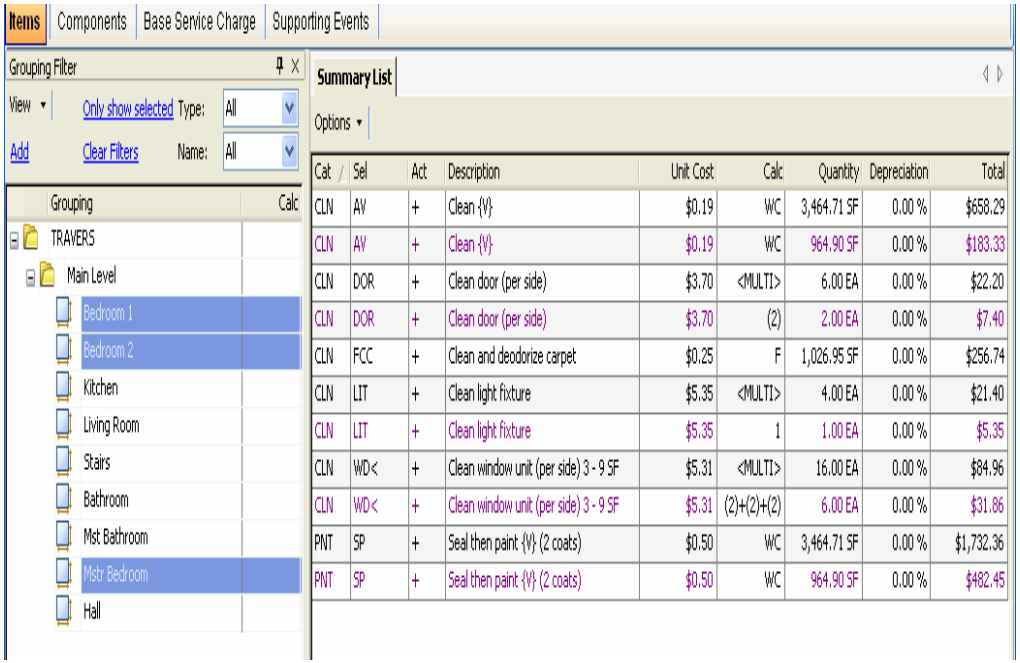
A large insurer is proposing a solution that would:

- Provide Flood & Wind Coverage in One Policy;
- Avoid Future Disputes over "Who Pays" or "No Coverage"
- Puts the Primary Claims Responsibility for Flood Damage on Private Insurance Companies.
- Likely provide excess flood and wrap around coverage while giving the wind to the JUA

Hurricane Claims- Excess Flood

- Excess Flood is so necessary in today's world where beach front homes can be $200 plus a square
- For example a 4000 SF home @ 200 a square is $800,000 with a maximum recovery of 250k from the flood an owner who loses his property is upside down $550,000

Hurricane Claims - Pricing



Establish a mechanism to understand and easily identify the costs, broken down in quantity residential policies

THE FLORIDA STATE UNIVERSITY

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