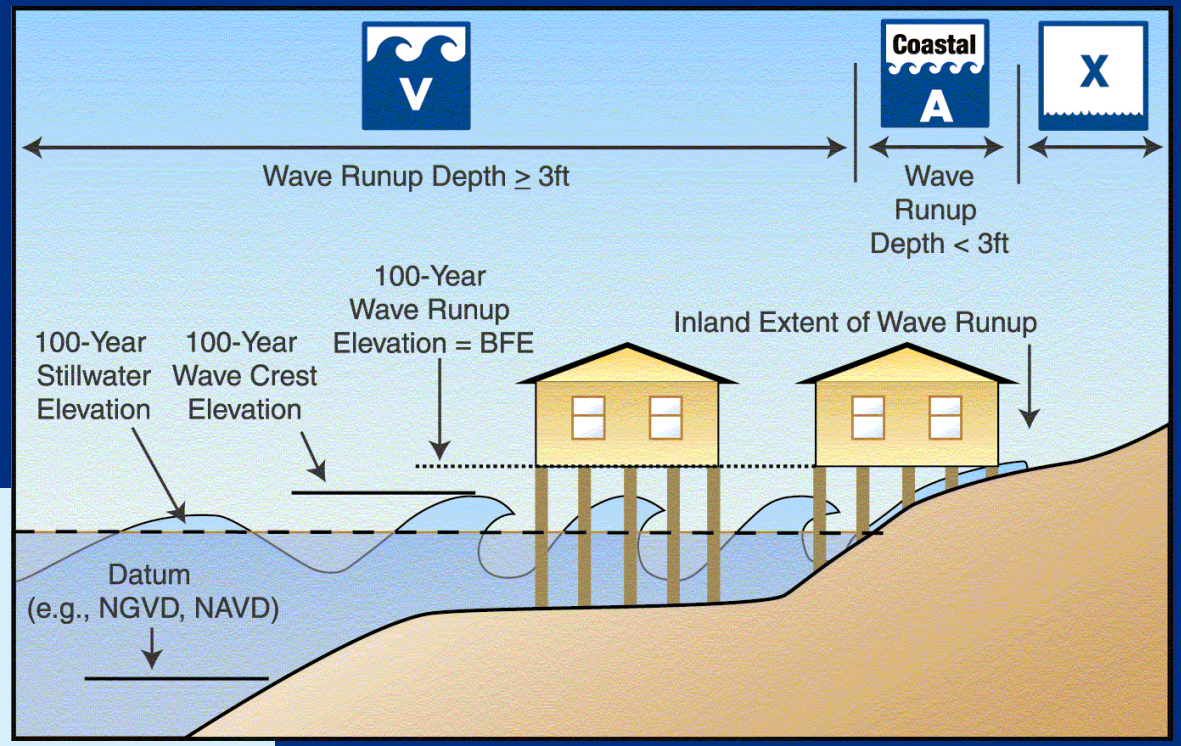
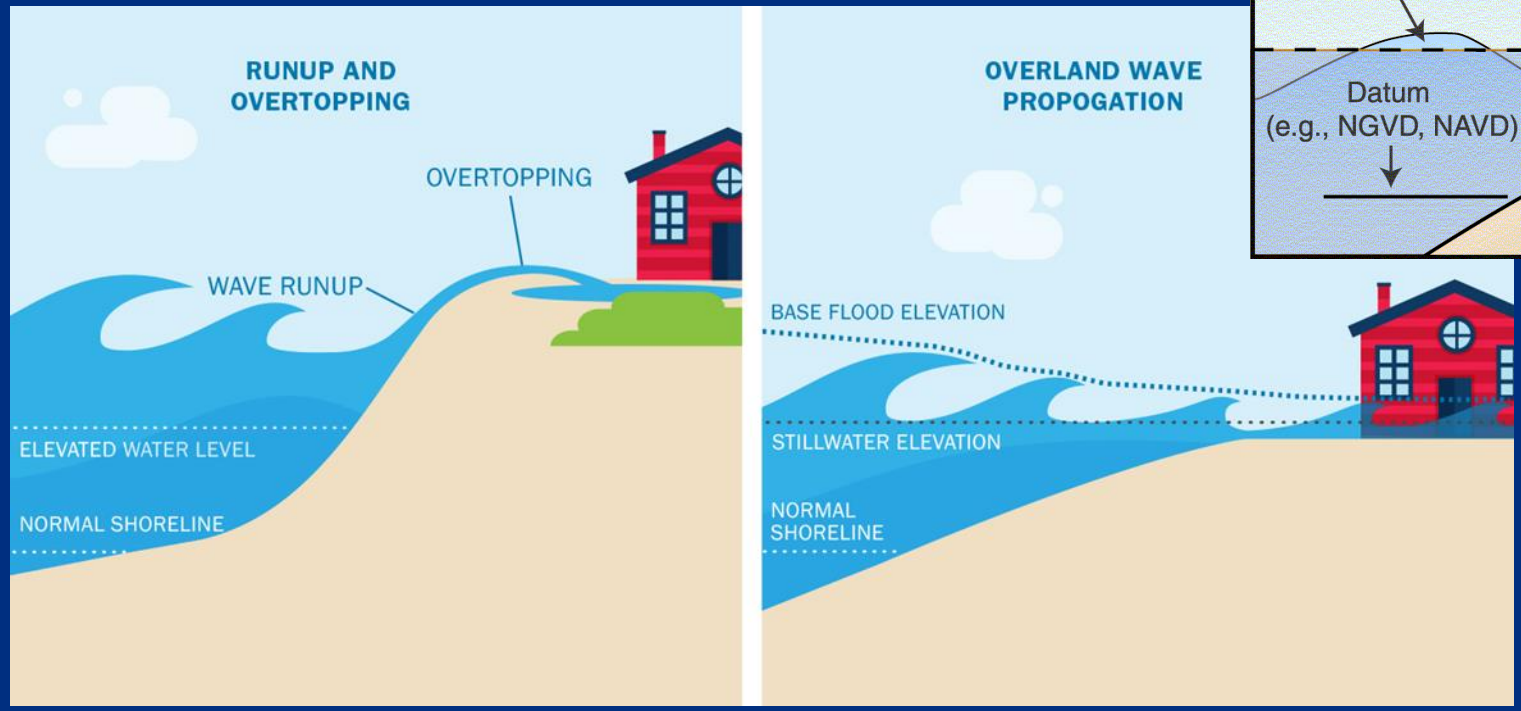
Ashley
Coastal Regs

Coastal SFHAs





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Coastal High Hazard Areas (zones V, V1-30 and VE)

- Coastal High Hazard Area: an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on the FIRM as Zone V1 – V30, or VE or V.
  - Typically marked by wave heights (or runup height) exceeding 3 feet during 1% annual chance flood
- Limit of Moderate Wave Action (“LiMWA”): indicates portion of zone AE adjacent to zone VE or an open coast in which wave heights between 1.5 and 3 feet would occur during the base flood
  - LiMWA not applicable to runup-dominated coastal areas

Additional forces acting on buildings in coastal areas

- *Hydrodynamic* forces
  - Velocity flow
  - Breaking waves
  - Wave uplift
- High winds
  - Lateral
  - Uplift
- Debris
  - Windborne
  - Waterborne
- Erosion and scour

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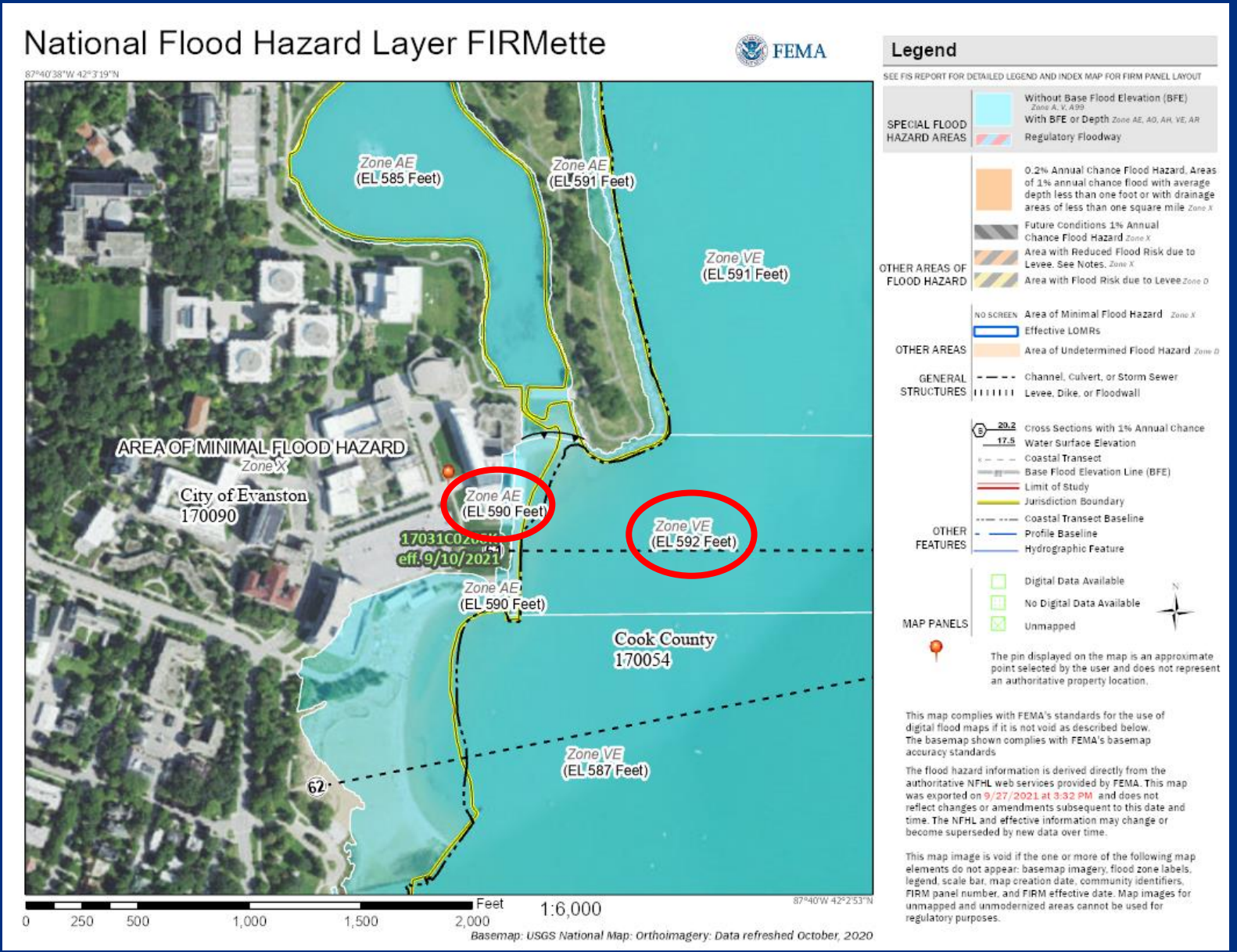
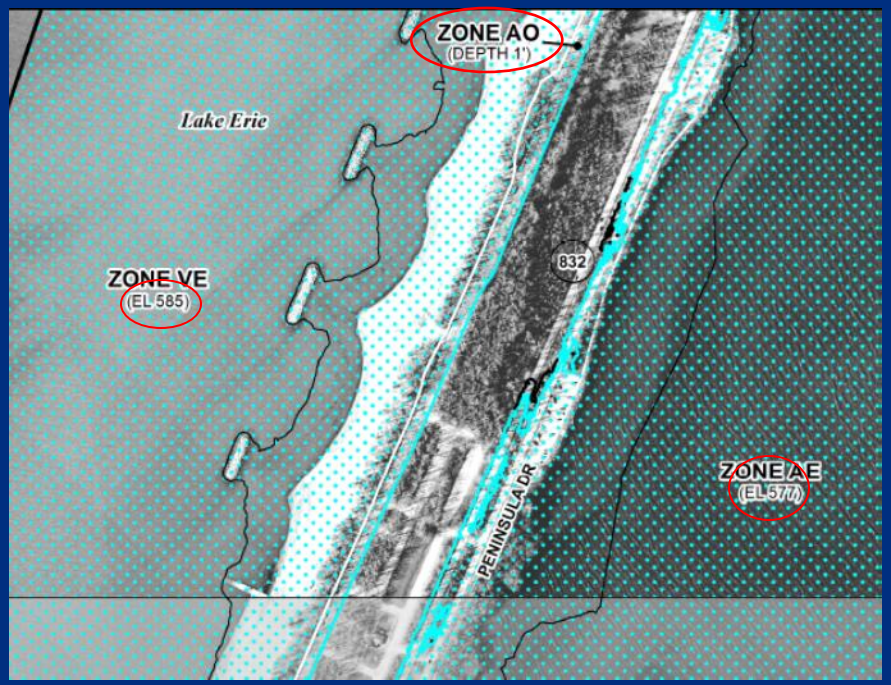
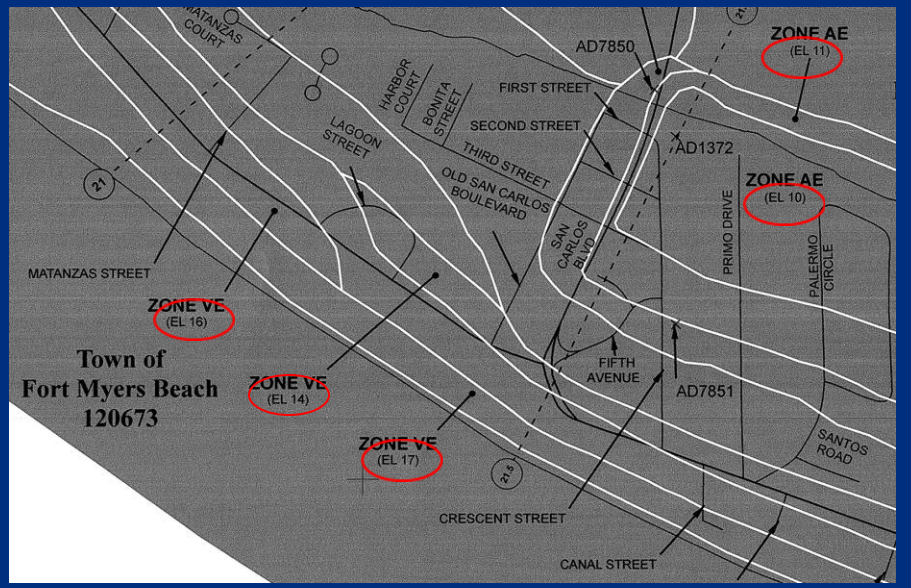
Coastal floodplain map



The BFE is the number ON THE MAP for the area bounded by the gutter lines





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What if the site crosses over the gutter lines?

And therefore has multiple BFEs?

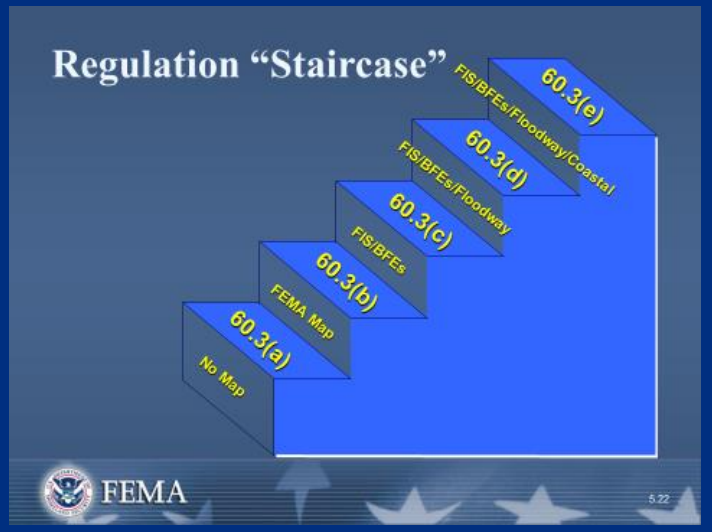
Or multiple flood zones (VE, AE, AO…)?

- Always use the more hazardous zone for the area encompassed by the development.
- Always use the highest BFE for the area encompassed by the development.
- If the development is a building, the whole building needs to meet the requirements for the most hazardous zone and highest BFE that applies to any part of the building.

NFIP Floodplain Management Standards for Coastal High Hazard Areas (highlights)

- 44 CFR §60.3(e):

"When the Federal Insurance Administrator […] has identified on the community's FIRM coastal high hazard areas by designating Zones V1-30, VE, and/or V, the community shall: […]"

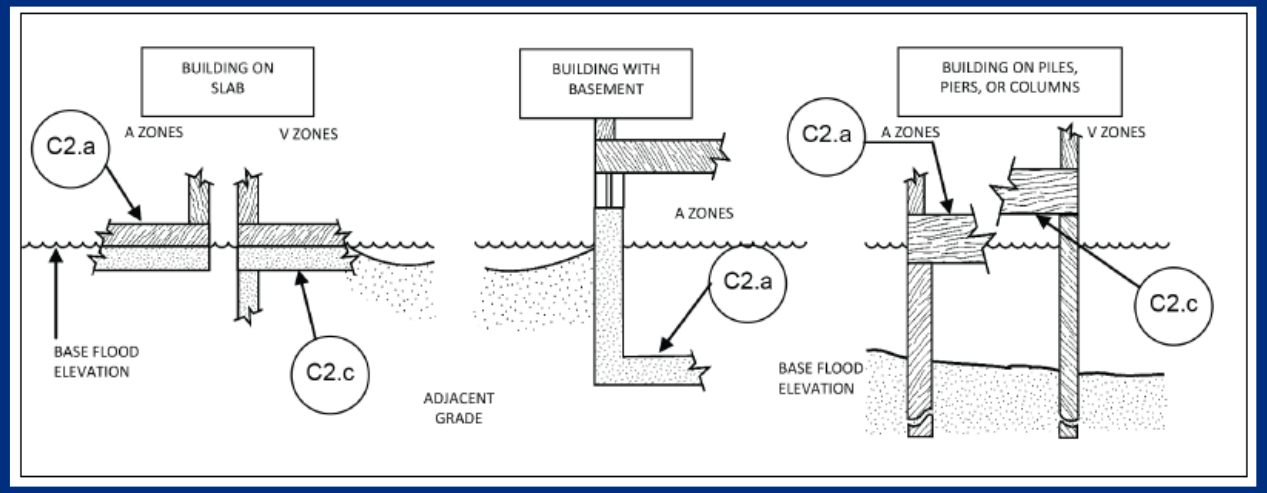


Remember the staircase from E273?

60.3(e)(2)

Within Zones V1-30, VE, and V on the FIRM:

"Obtain the elevation [in relation to the FIRM datum] of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures, and whether or not such structures contain a basement, and maintain a record of all such information[…]"



Line C2.c on the Elevation Certificate

IBC 110.3.3; 110.3.10.1; 104.7; 1612.5(2.1); R104.7; R109.1.3; R109.1.6.1; R322.1.10

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Where's the bottom of the lowest horizontal structural member?

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60.3(e)(3)

- “Provide that all new construction within Zone[…] VE […] on the community’s FIRM is located landward of the reach of mean high tide”
- In the Great Lakes, the line of mean high tide is analogous in many ways to the Ordinary High Water Mark.
- The purpose is to prevent new buildings from being built in extraordinarily exposed positions directly over water in locations where damaging wave impacts are anticipated.

1612.4 (through reference to ASCE 24-14, 4.3(1)); G401.2; R322.3.1(1)

Built circa 1942

J.N. “Ding” Darling Fish House, later owned by abstract expressionist artist Robert Rauschenberg

(not landward of mean high tide, also not “new construction”)

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60.3(e)(4)(i)

- “Provide that all new construction and substantial improvements in Zone[…] VE […] on the community’s FIRM are elevated on pilings and columns so that (i) the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level[…]”

60.3(e)(4)(ii)

- “[…] and (ii) the pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values shall be those associated with the base flood. Wind loading values shall be those required by applicable State or local building standards.” (emphasis added)

104.2.1; 1612.1; 1612.4 (through reference to ASCE 24); R322.3; R322.3.2; R322.3.3

60.3(e)(4)

“A registered professional engineer shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of paragraphs (e)(4)(i) and (ii) of this section.”

“accepted standards of practice”:

ASCE/SEI 7-16 Minimum Design Loads for Buildings and Other Structures

ASCE/SEI 24-14 Flood Resistant Design and Construction

1612.5(2.2); R322.3.3; R322.3.6

“Continuous load path” (Sec. 60.3(e)(4)(ii))

Load Paths

- Load path must be continuous
- Each link must be strong
- Load path always ends in supporting soil
- A building has hundreds of load paths

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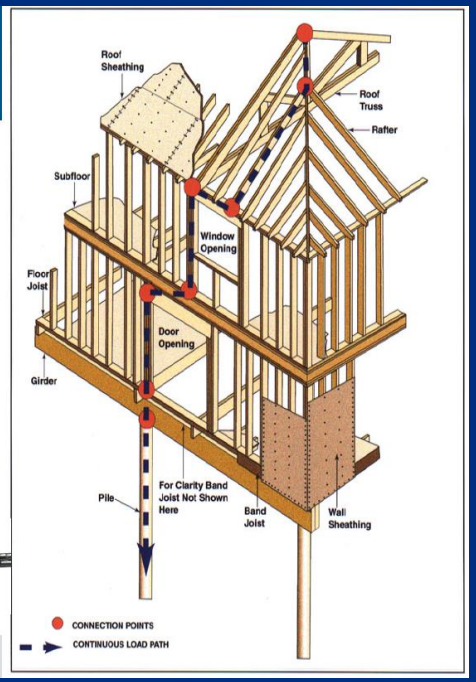
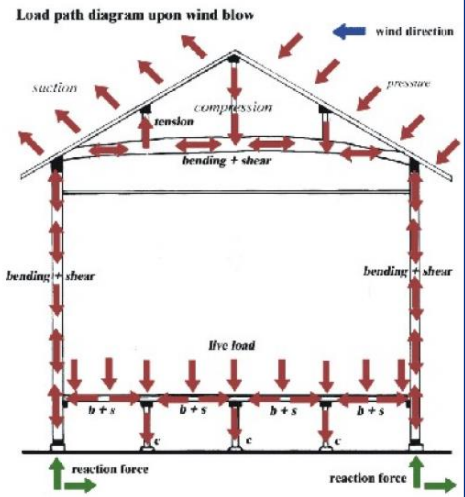


Anticipated loads can and must be transferred through the building in a continuous path to the supporting soils.

Any weakness in that continuous path is a potential point of failure.

A structure is as strong as its weakest connection.



Continuous load path:

“Superstorm” Sandy November 2012

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60.3(e)(5)

"Provide that all new construction and substantial improvements within Zone[…] VE […] on the community's FIRM have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system."

Wood lattice-work:

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“Breakaway” walls (60.3(e)(5))

- “[…]a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot.”

“Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

(i) Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and

(ii) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural).”

1403.6; 1612.4 (through reference to ASCE 24; 1612.5(2.3); 1804.4(3); G501.5; R322.3.2; R322.3.4; R322.3.5

Breakaway wall enclosures

"Such enclosed space shall be useable solely for parking of vehicles, building access, or storage."

Separate rooms?

"Roughed in" plumbing and electrical?

Windows and French double-doors in "breakaway" walls?

What's that blue glow coming from the windows after dark?

Community must be diligent in ongoing enforcement.

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60.3(e)(6)

"Prohibit the use of fill for structural support of buildings within Zones V1-30, VE, and V on the community's FIRM." (emphasis added)

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1612.4(through reference to ASCE 24; G401.2; R322.3.2(3)

Fill is not a substitute for sufficient pile embedment

Elevating the low floor is not the only concern in a coastal high hazard area

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No fill?

How am I going to get my LOMR-F so I can get out of paying for flood insurance?!

NO LOMR-F in Zone VE. End of discussion.

NO BASEMENT in Zone VE. End of discussion.

What about Zone AE, right on the other side of the gutter line?

60.3(e)(7)

"Prohibit man-made alteration of sand dunes and mangrove stands within Zone[…] VE […] on the community's FIRM which would increase potential flood damage."

Mangroves (*Avicennia nitida*, *Rhizophora mangle, Languncularia racemosa*, and *Conocarpus erecta*) do not grow naturally in the Great Lakes.

Sand dunes are present in some parts of the Great Lakes, however, and if altering them would increase the potential for flood damage, man-made alterations must be prohibited.

1612.4(through reference to ASCE 24); G103.7; R322.3.1(2)

ASCE/SEI 24-14 “Flood Resistant Design and Construction”

- Sec. 60.3(e): “accepted standards of practice”
- ASCE 24 is a consensus standard developed by engineering professionals
- Relied upon by International Code Council for International Building Code and International Residential Code

Chapter 6 of ASCE 7 (referenced in ASCE 24) contains direction on calculation and application of flood loads for structural design purposes.

Things to remember about floodplain management regulations in Zone VE:

- Elevate lowest horizontal supporting member to or above BFE on piling or column foundation, with space below open to present no obstruction, or enclosed only with breakaway walls/latticework
- NO FILL FOR STRUCTURAL SUPPORT
- NO DRY-FLOODPROOFING (see above)
- NO LOMR-F (see above)
- ENGINEERING is not optional
- NO, NO, NO, NO, NO BASEMENTS. NO BASEMENTS!

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QUESTIONS?

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