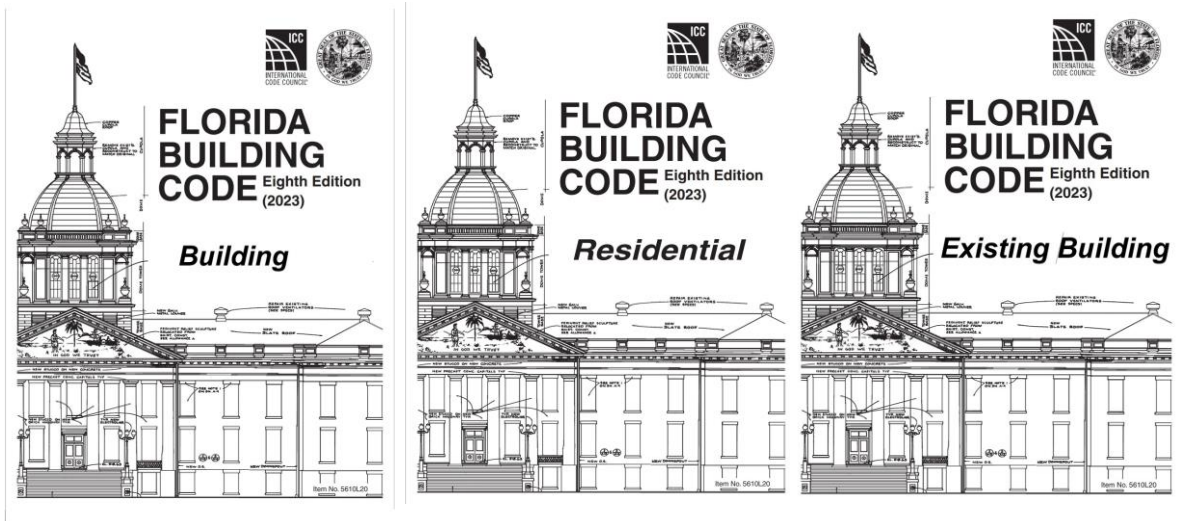
8th Edition (2023) Florida Building Code – Significant Changes Affecting Windows and Doors

Building, Residential, Existing Building

Presented by

T. Eric Stafford, PE

T. Eric Stafford & Associates, LLC



8th Edition (2020) FBC

- Effective Date: December 31, 2023
- Includes many (but not all) updates from the 2021 I-Codes
- Includes many updates from the 2024 I-Codes
- ASCE 7 updated to the 2022 edition
- Draft version available for viewing May 2023

8th Edition (2020) FBC

Topics addressed

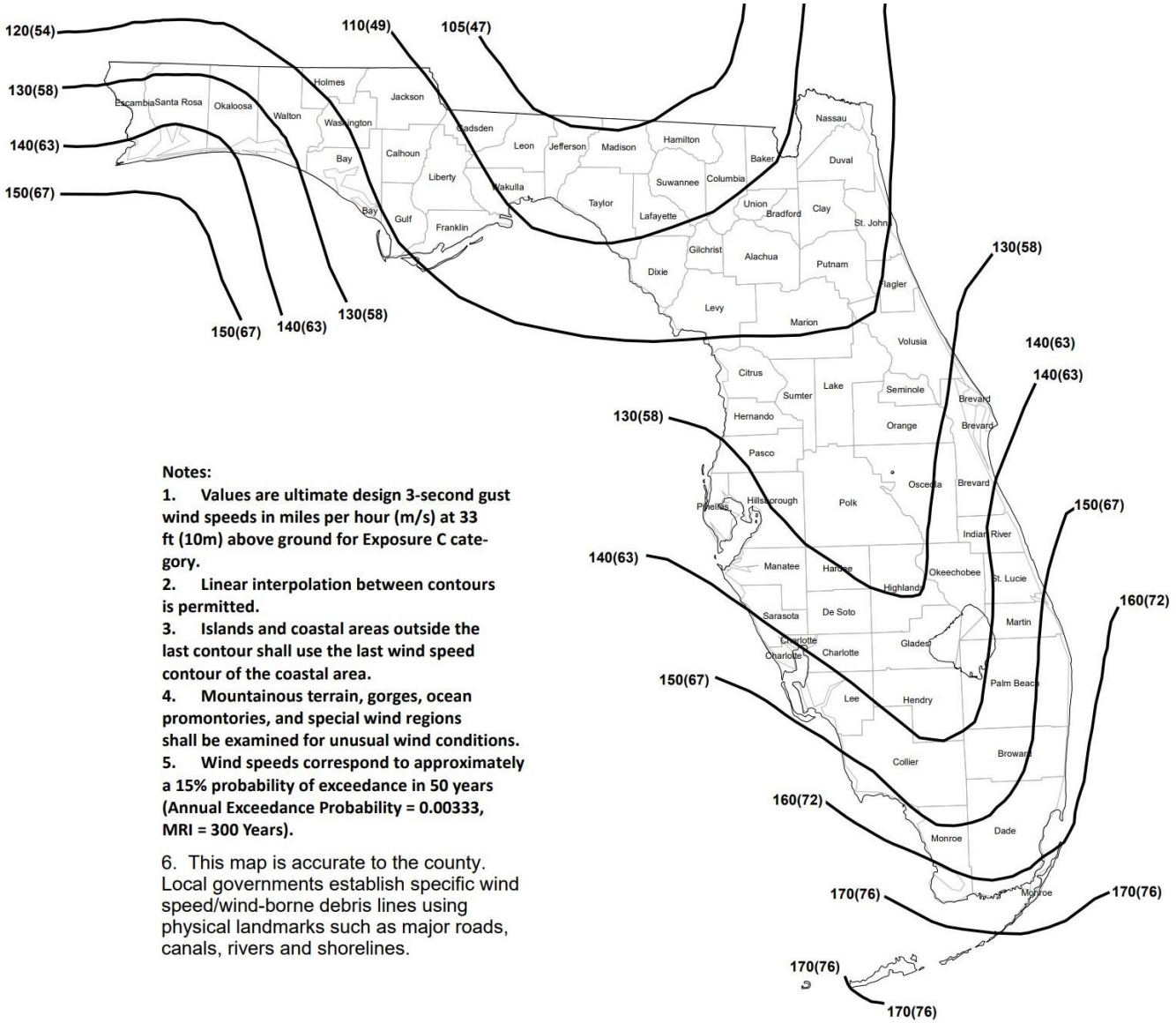
- Changes to wind loading requirements
  - Update to ASCE 7-22
  - Changes to the Basic Wind Speed Maps
  - Changes to the Wind-borne Debris Region
  - Tornado loads
- Emergency escape and rescue openings
- Replacement windows requirements
- Thresholds at Doors

8th Edition (2023) FBC/ASCE 7-22

All wind speed maps have been updated based on improvements to the hurricane hazard and wind field models

- Hurricane wind speeds slightly revised in some areas including State of Florida

Wind speeds are still provided as strength design-level 3 sec. gusts.

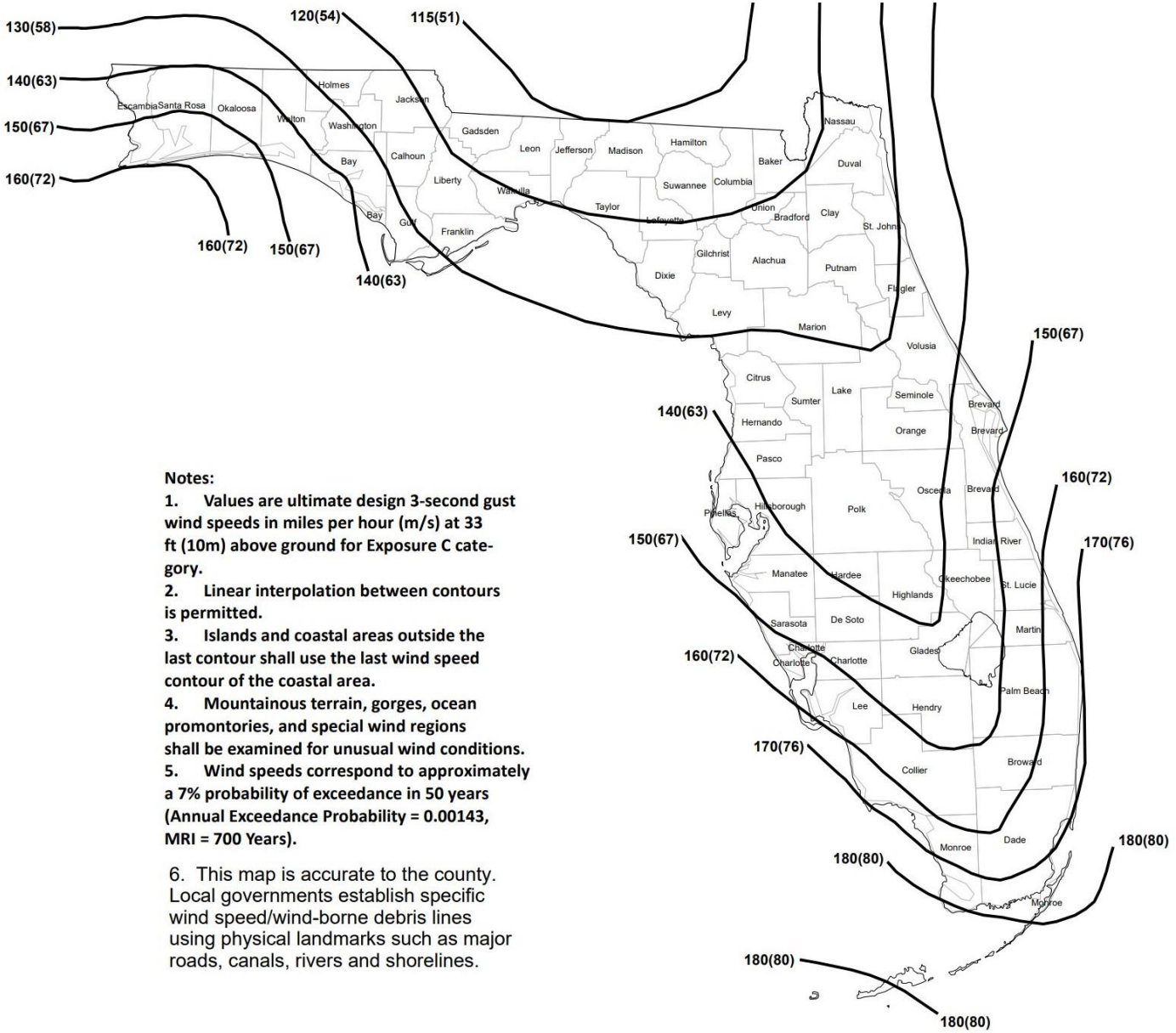


Notes:

1. **Values are ultimate design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.**
2. **Linear interpolation between contours is permitted.**
3. **Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.**
4. **Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.**
5. **Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00333, MRI = 300 Years).**
6. This map is accurate to the county. Local governments establish specific wind speed/wind-borne debris lines using physical landmarks such as major roads, canals, rivers and shorelines.

Risk Category I

Risk Category II



Notes:

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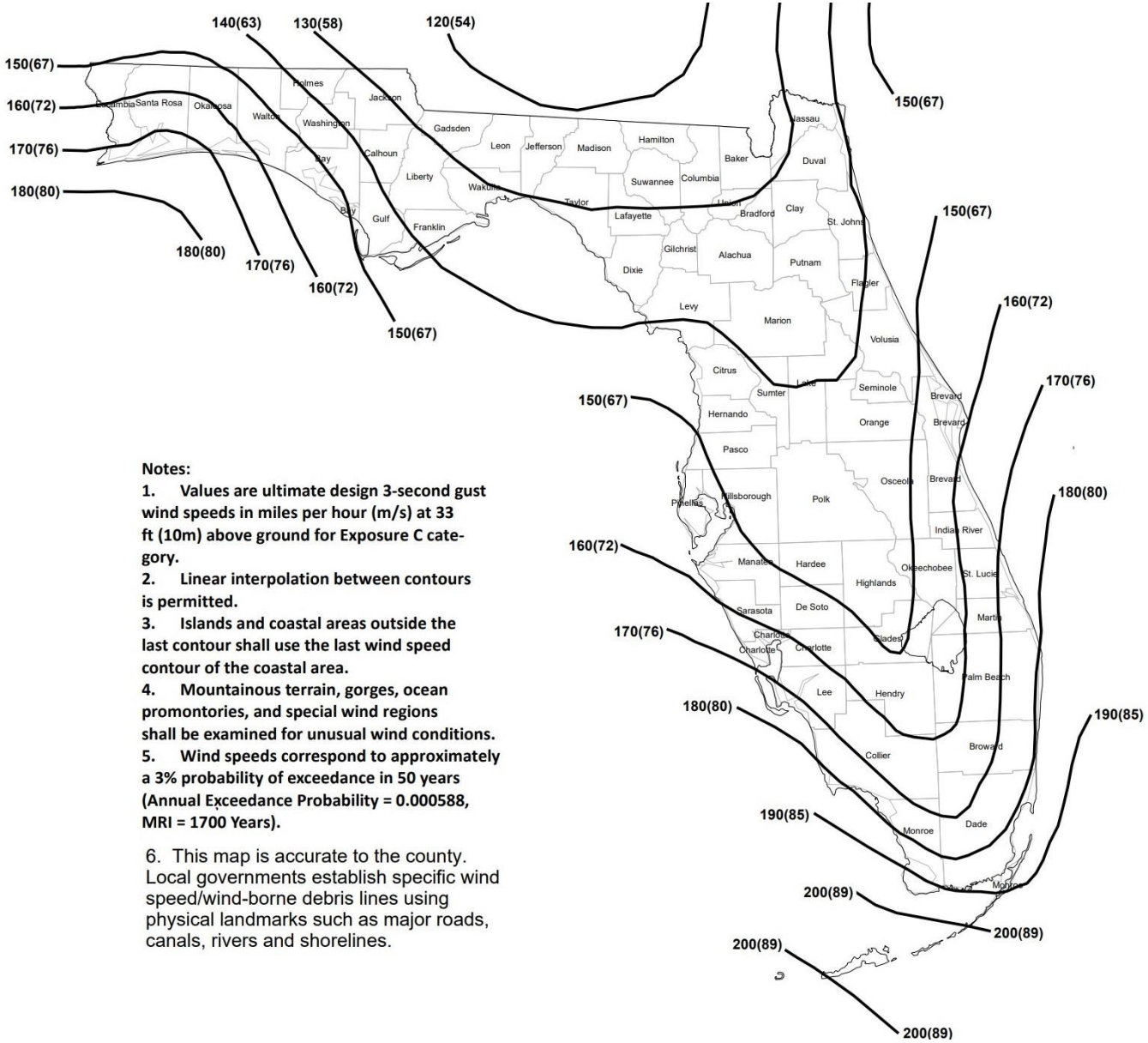
2. **Linear interpolation between contours is permitted.**
3. **Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.**
4. **Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.**
5. **Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).**
6. This map is accurate to the county. Local governments establish specific wind speed/wind-borne debris lines using physical landmarks such as major roads, canals, rivers and shorelines.



Notes:

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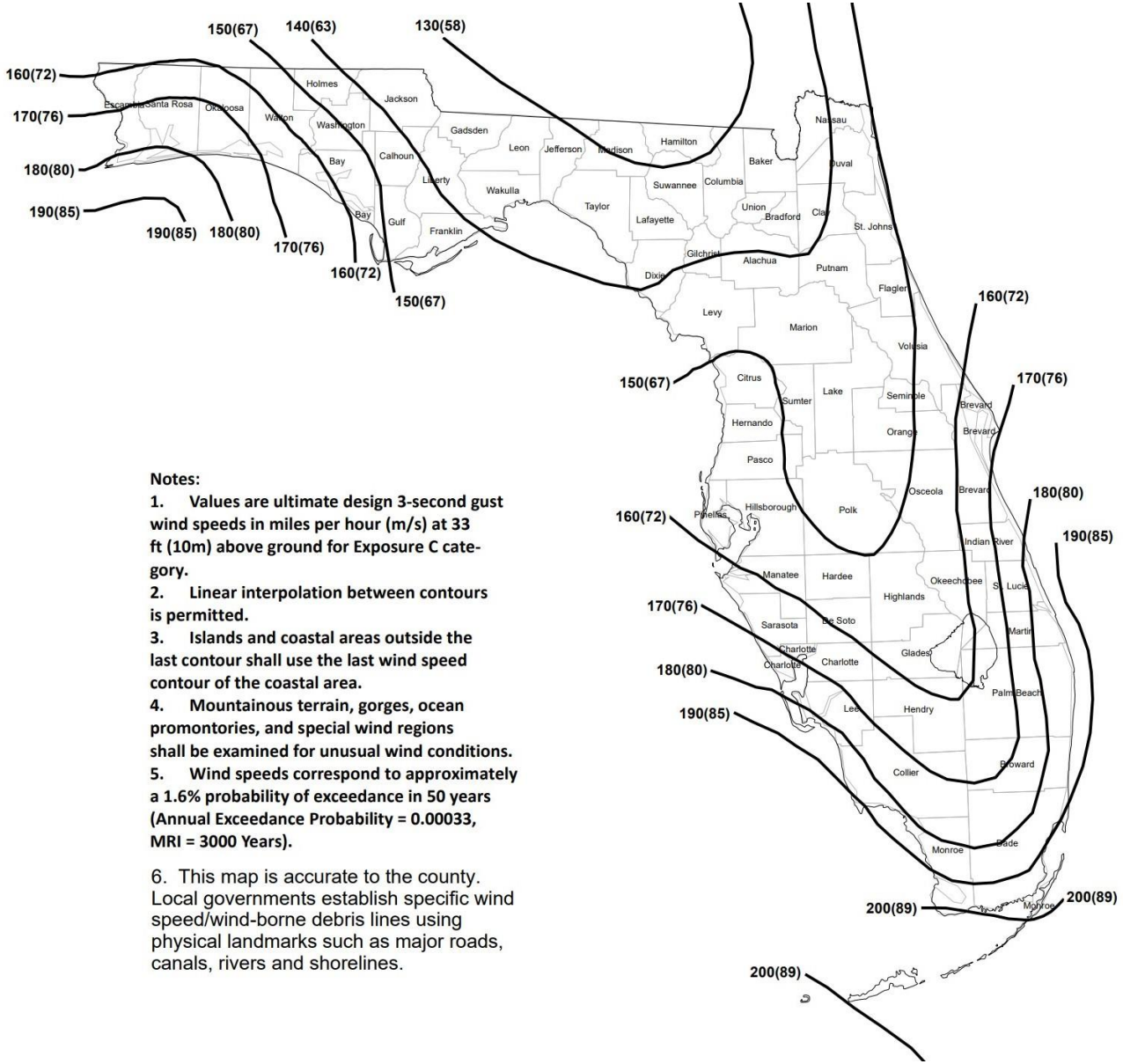
2. **Linear interpolation between contours is permitted.**
3. **Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.**
4. **Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.**
5. **Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.000588, MRI = 1700 Years).**
6. This map is accurate to the county. Local governments establish specific wind speed/wind-borne debris lines using physical landmarks such as major roads, canals, rivers and shorelines.

Risk Category III



Notes:

1. **Values are ultimate design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.**
2. **Linear interpolation between contours is permitted.**
3. **Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.**
4. **Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.**
5. **Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3000 Years).**
6. This map is accurate to the county. Local governments establish specific wind speed/wind-borne debris lines using physical landmarks such as major roads, canals, rivers and shorelines.

Risk Category IV

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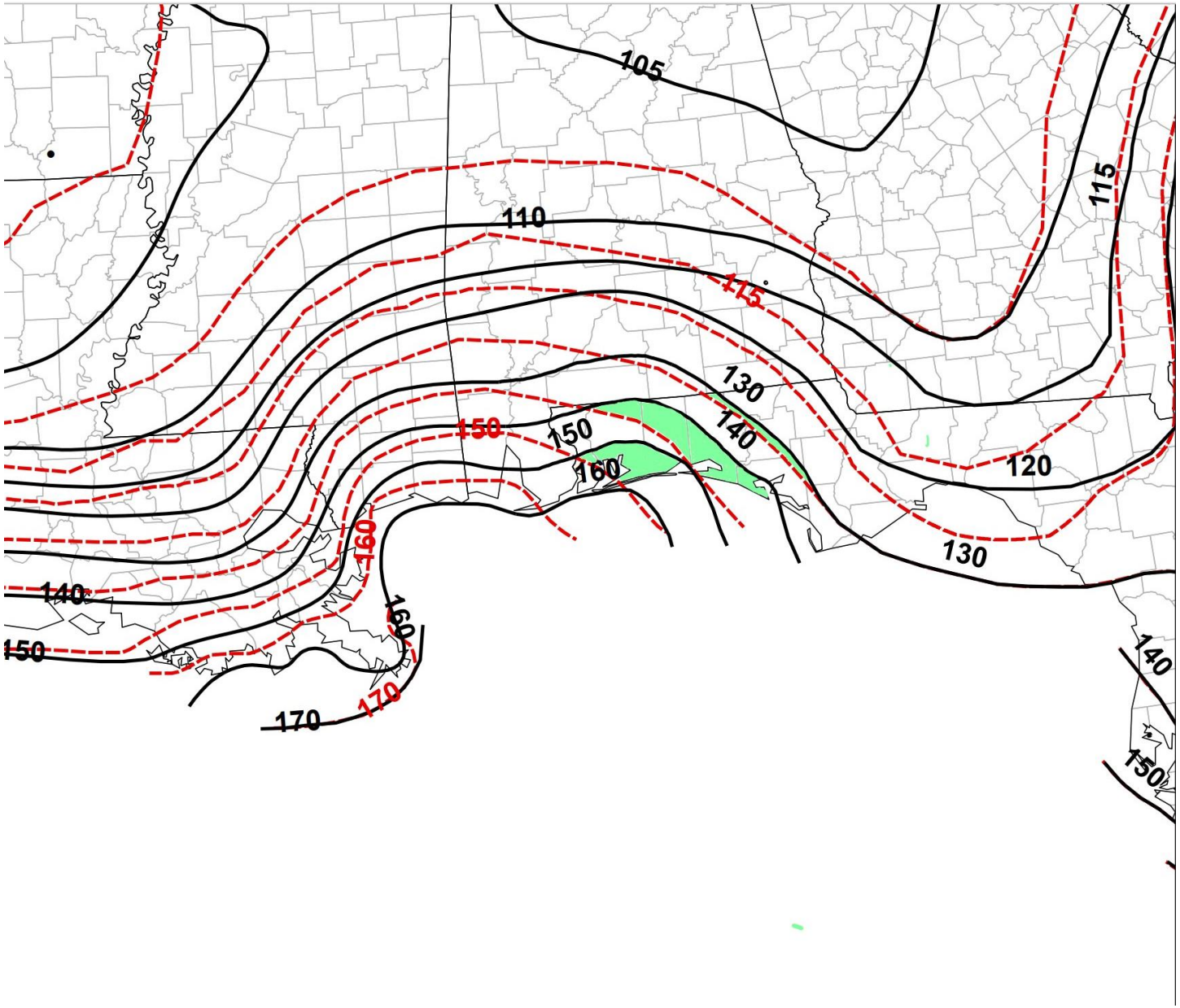
Net Effects

- Wind speeds increased in the panhandle
- Remainder of the peninsula is unchanged from the 7th Edition (2020) FBC



ASCE 7-22 Wind Speed Changes for Risk Category II

8th Edition (2023) FBC/ASCE 7-22

New note added to all wind speed maps

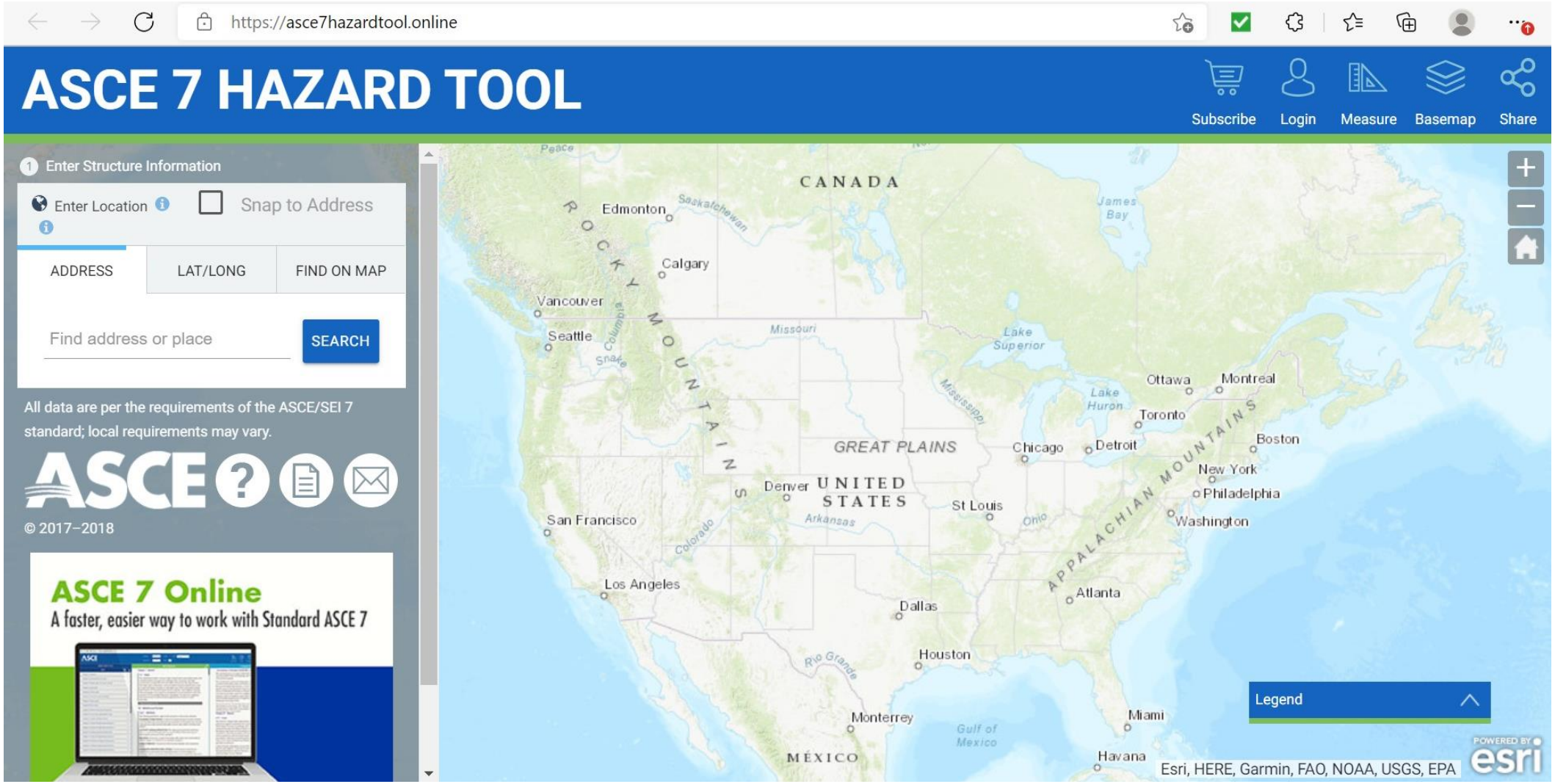
Permits the use of the ASCE Hazard Tool for determining wind speeds

Note for FBCB wind speed maps

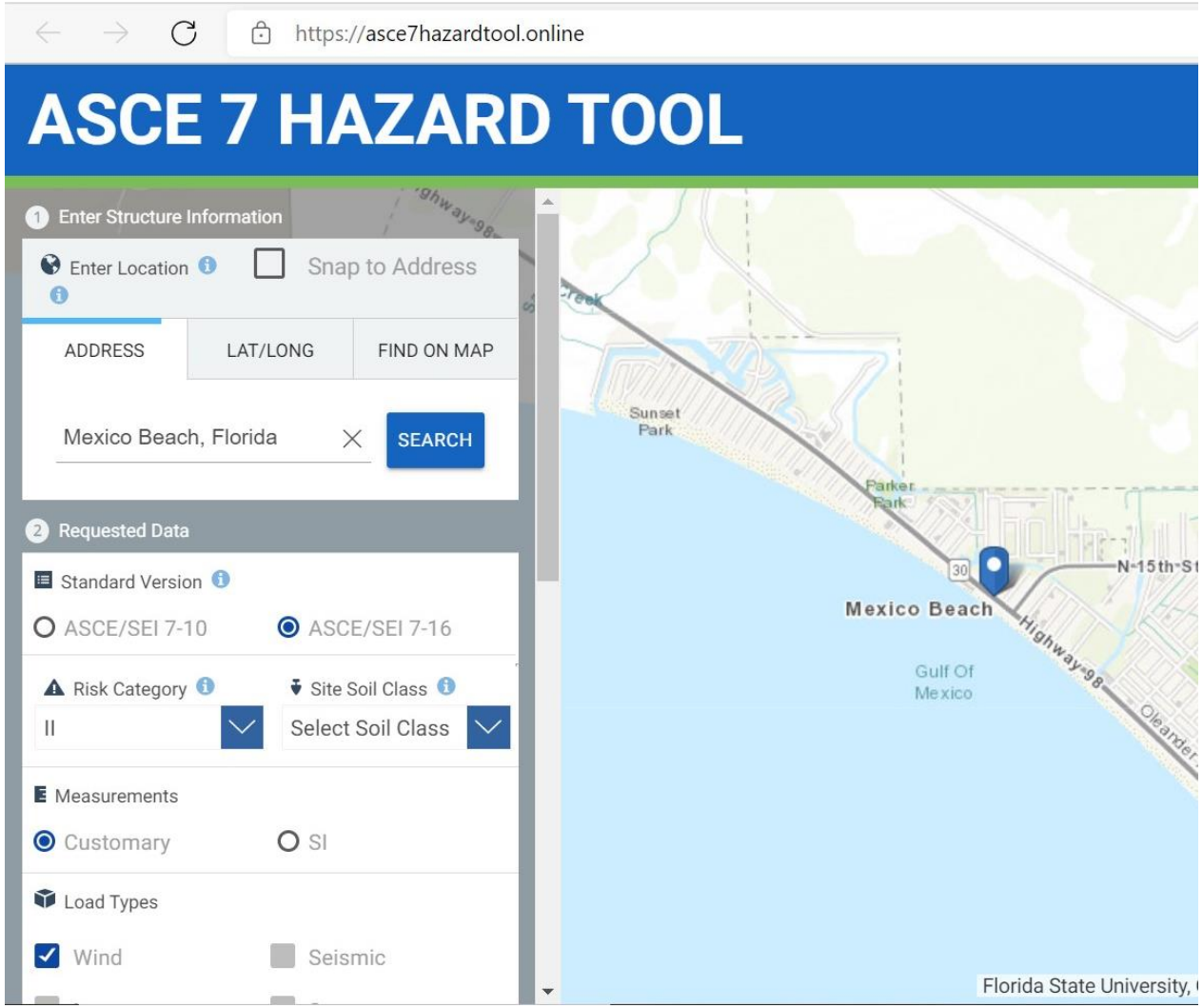
7. Location-specific wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or equivalent.

ATC Hazard by Location website **will not** be updated for ASCE 7-22

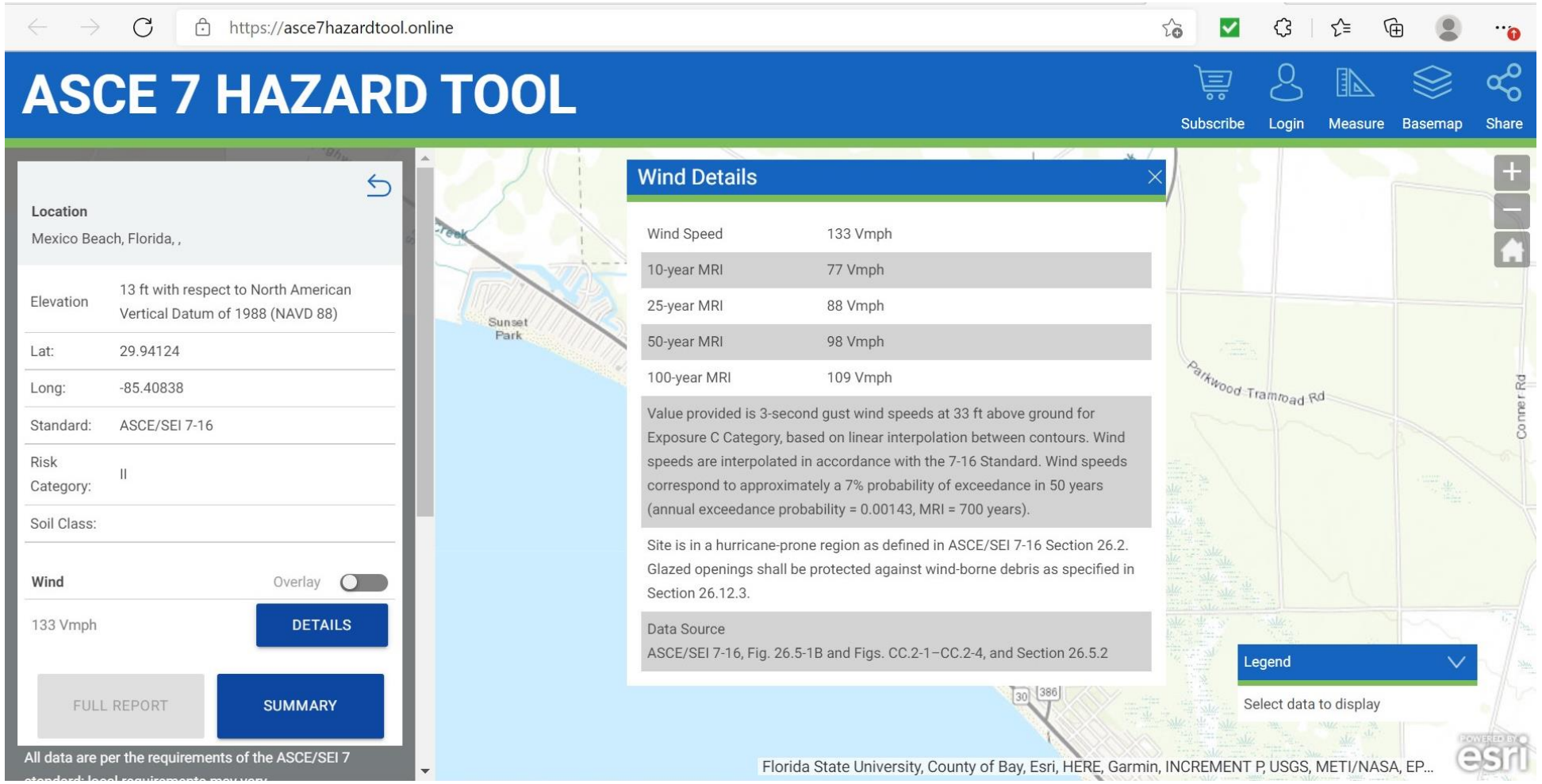
ASCE 7-22 Basic Wind Speed Database



ASCE 7-22 Basic Wind Speed Database



ASCE 7-22 Basic Wind Speed Database



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Significant change to identifying the Wind-borne Debris Regions for wind speeds between 130 and 140 mph

- "Coastal mean high water line" is not a mapped or defined term
- Resulted in confusion and misinterpretation
- For these areas, hurricane wind speed is governed by over water condition

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Wind-borne Debris Regions

Significant change to identifying the Wind-borne Debris Regions for wind speeds between 130 and 140 mph

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- Resulted in confusion and misinterpretation
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WIND-BORNE DEBRIS REGION. Areas within hurricane-prone regions located:

1. Within 1 mile (1.61 km) of the ~~coastal~~ mean high water line where an Exposure D condition exists upwind at the water line and the ultimate design wind speed, Vult, is 130 mph (58 m/s) or greater; or
2. In areas where the ultimate design wind speed, Vult, is 140 mph (63.6 m/s) or greater.

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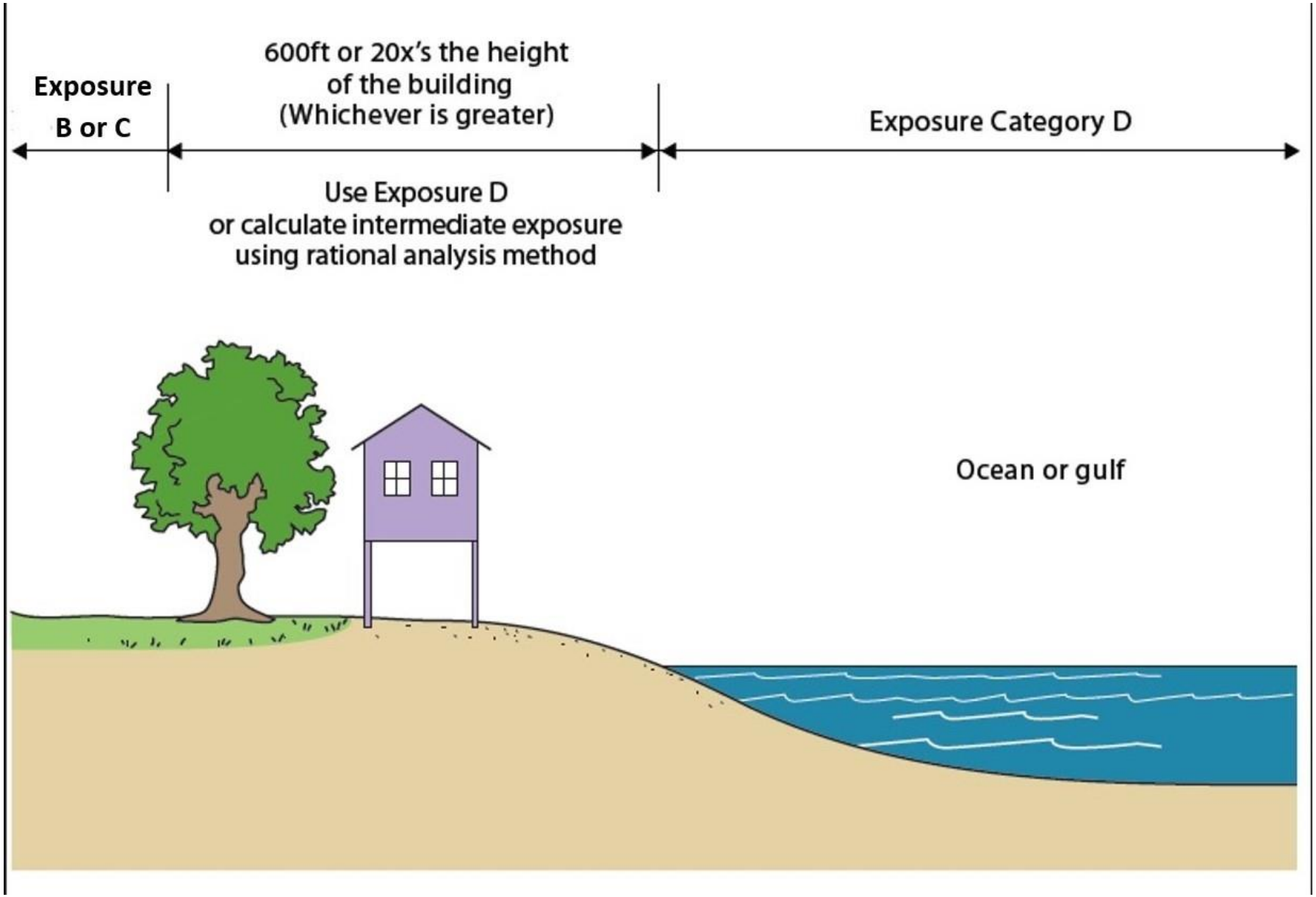
Exposure D condition summary:

- Site exposed to water surfaces in upwind direction for 5,000 ft or 20 times the height of building or structure
- Applies in Exposure B and C areas within 600 ft or 20 times the height of building of an Exposure D condition.


Exposure
B or C
600ft or 20x's the height
of the building
(Whichever is greater)
Exposure Category D
Use Exposure D
or calculate intermediate exposure
using rational analysis method
Ocean or gulf

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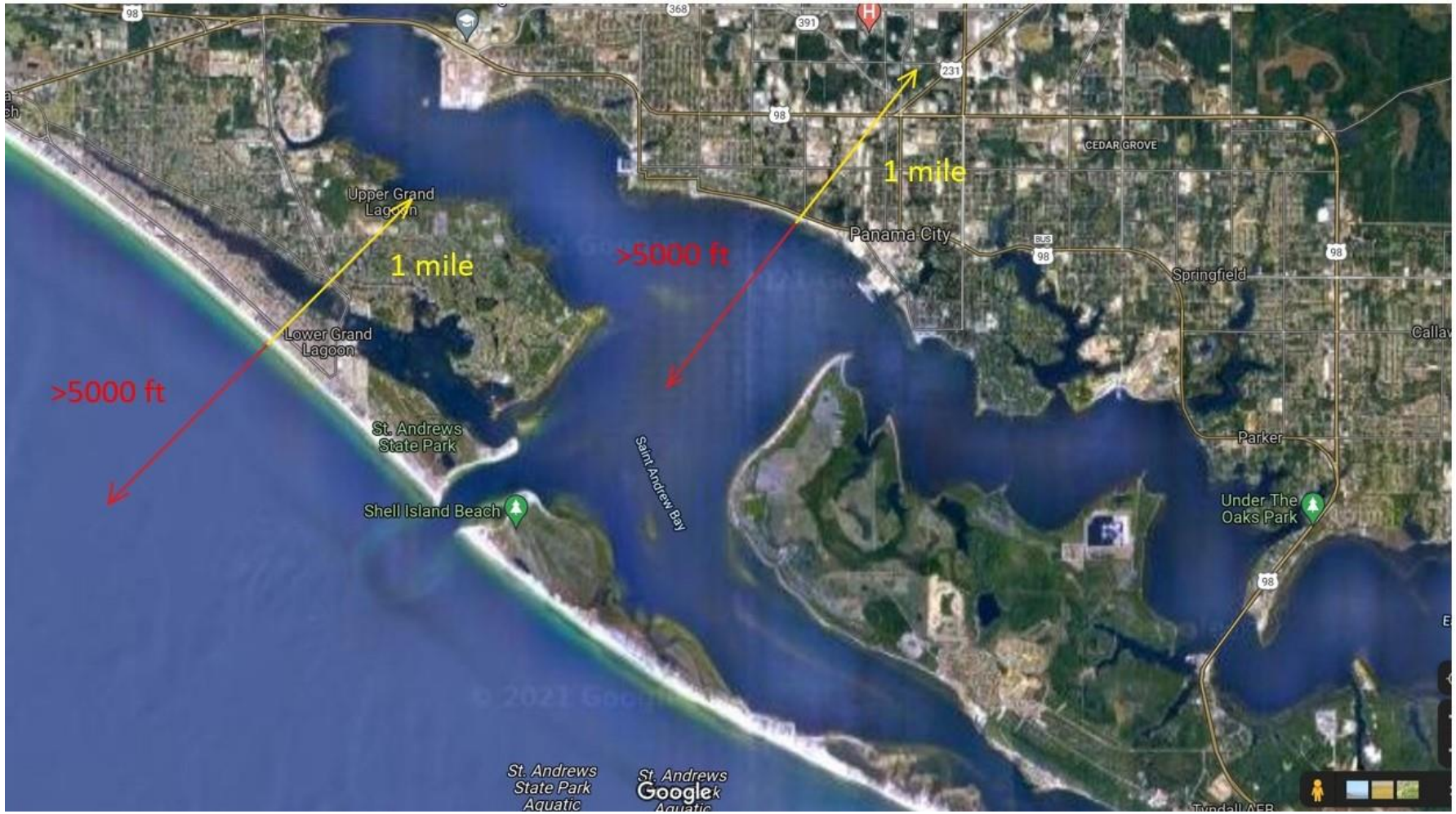
Wind-borne Debris Regions



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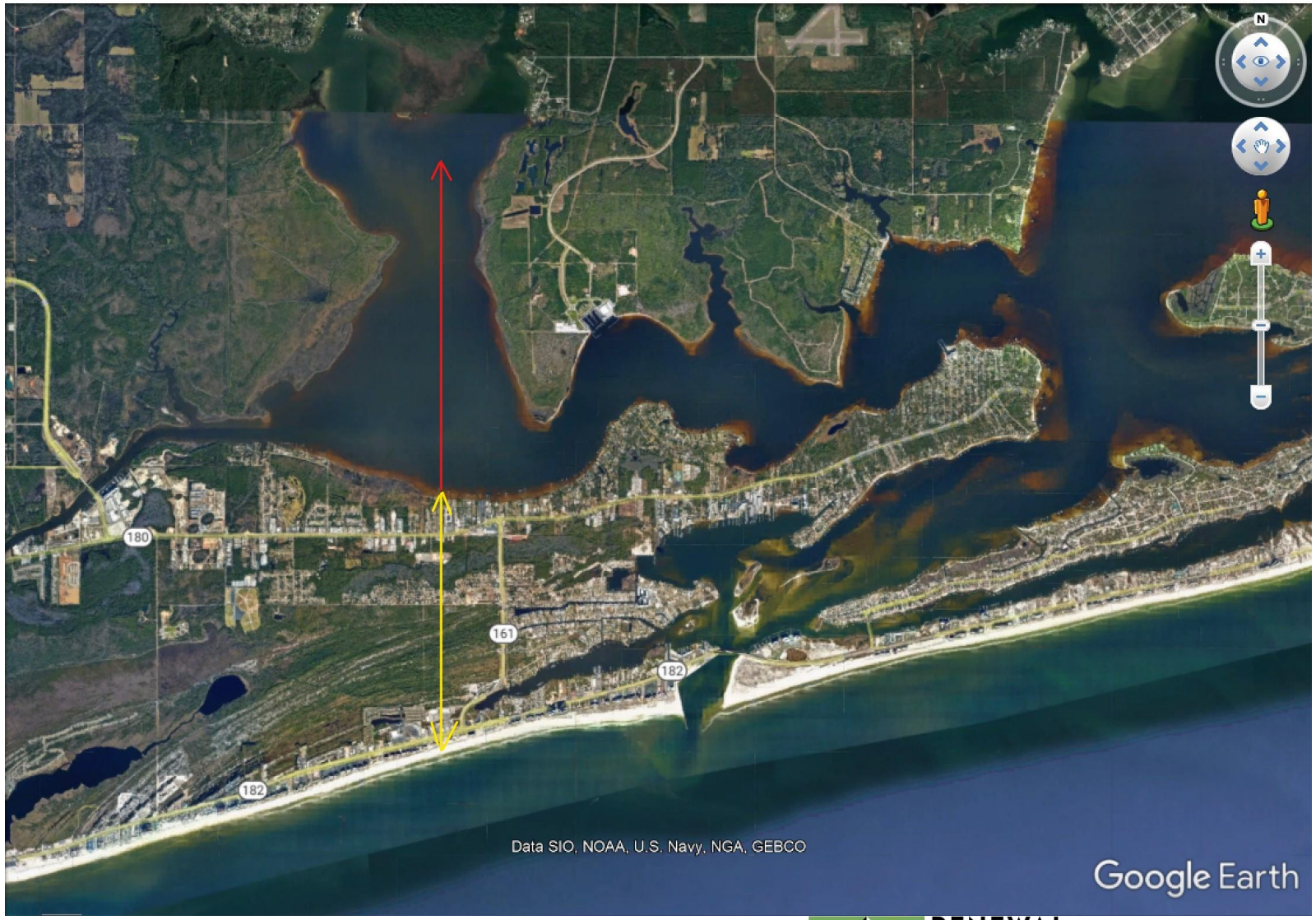
Wind-borne
Debris
Regions



8th Edition (2023) FBC/ASCE 7-22

ASCE 7 has historically not addressed tornadoes

ASCE 7-16 added some guidance in the commentary on recommendations for designing for tornadoes

- Pick wind speed based on EF scale rating
- Recommended adjustments to various coefficients
- Simplified adjustments

8th Edition (2023) FBC/ASCE 7-22

ASCE 7-22

New Chapter 32 specifically addresses tornado design

- Tornado hazard maps
- Design criteria

Design for tornadoes only required for certain Risk Category III and IV buildings located in the tornado-prone region.

FBCB

1609.5 Tornado Loads. The design and construction of Risk Category III and IV buildings and other structures shall be in accordance with Chapter 32 of ASCE 7, except as modified by this code.

ASCE 7-22

26.1.1 Scope Buildings and other structures, including the main wind force resisting system (MWFRS) and all components and cladding (C&C) thereof, shall be designed and constructed to resist the wind loads determined in accordance with Chapters 26 through 31.

Risk Category III and IV buildings and other structures, including the MWFRS and all C&C thereof, shall also be designed and constructed to resist tornado loads determined in accordance with Chapter 32, as applicable.

User Note: A building or other structure designed for wind loads determined exclusively in accordance with Chapter 26 cannot be designated as a storm shelter without meeting additional critical requirements provided in the applicable building code and ICC 500, the ICC/NSSA Standard for the Design and Construction of Storm Shelters. See Commentary Section C26.1.1 for an in-depth discussion on Storm Shelters.

ASCE 7-22

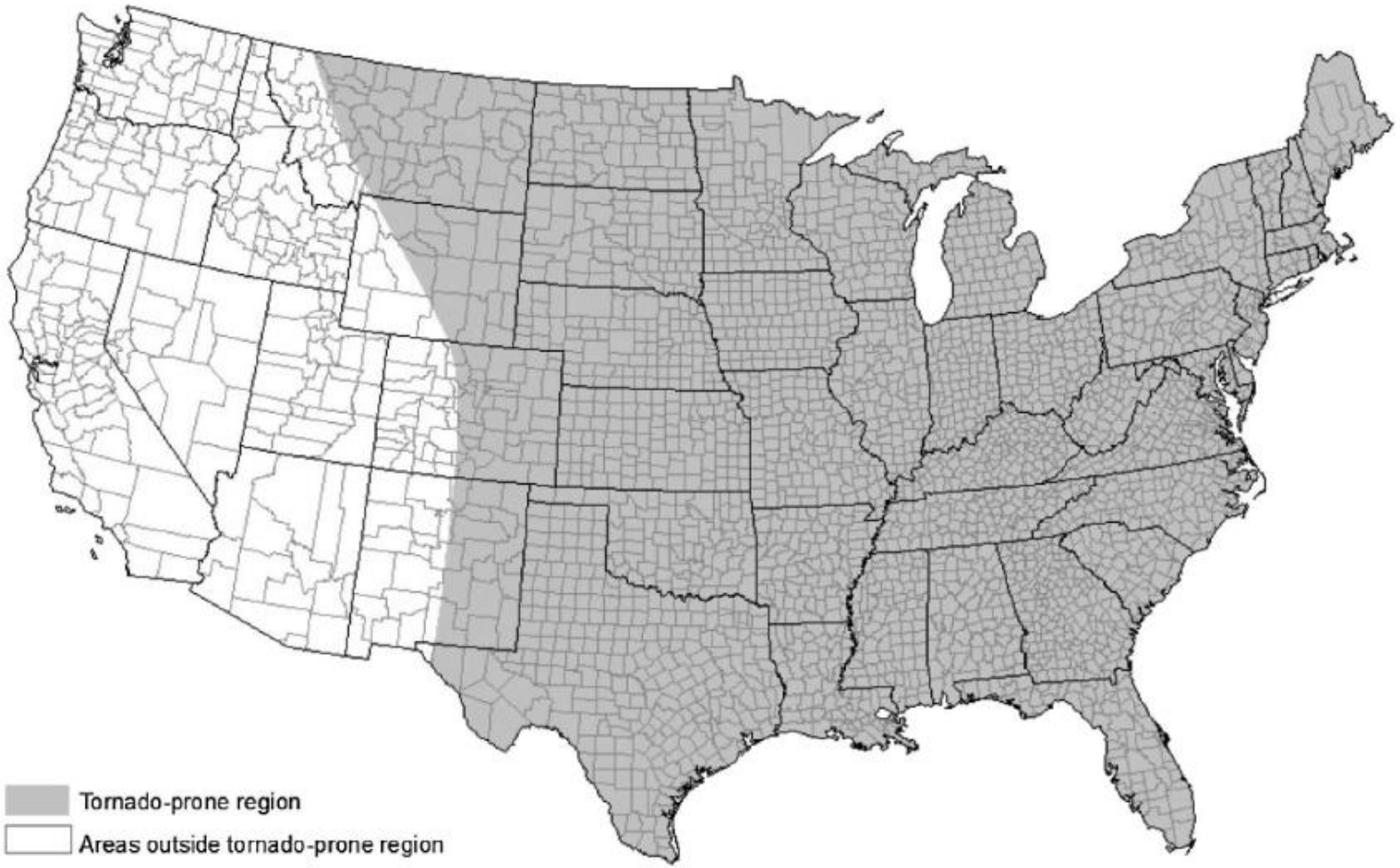


Figure 32.1-1. Tornado-prone region.

ASCE 7-22

User Note: The tornado loads specified in this chapter provide reasonable consistency with the reliability delivered by the existing criteria in Chapters 26 and 27 for MWFRS, and therefore are only required for Risk Category III and IV buildings and other structures (see Return Period discussion in Section C32.5.1 for more information). The tornado loads are based on tornado speeds using 1,700- and 3,000-year return periods for Risk Category III and IV, respectively (which are the same return periods used for basic wind speeds in Chapter 26). The tornado speed at any given geographic location will range from approximately Enhanced Fujita Scale EF0 – EF2 intensity, depending on the risk category and effective plan area of the building or other structure (see Section C32.5.1). Options for protection of life and property from more intense tornadoes include construction of a storm shelter and/or design for longer-return-period tornado speeds as provided in Appendix G, including performance-based design. A building or other structure designed for tornado loads determined exclusively in accordance with Chapter 32 cannot be designated as a storm shelter without meeting additional critical requirements provided in the applicable building code and ICC 500, the ICC/NSSA Standard for the Design and Construction of Storm Shelters. See Commentary Section C32.1.1 for an in-depth discussion on storm shelters.

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Exceptions to tornado design:

- Buildings outside the tornado-prone region in Figure 32.1-1
- Tornado speed, V_T < 60 mph
- V_T ≥ 60 mph but less than the following
  1. For Exposure B: V_T < 0.5V
  2. For Exposure C: V_T < 0.6V
  3. For Exposure D: V_T < 0.67V

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Tornado speeds for each map are based on location and the Effective Plan Area, A_e, of the building or other structure

- Tornado speed is also a function of the size and shape of the footprint
- Due to comparatively small widths of tornadoes relative to the plan size of some structures

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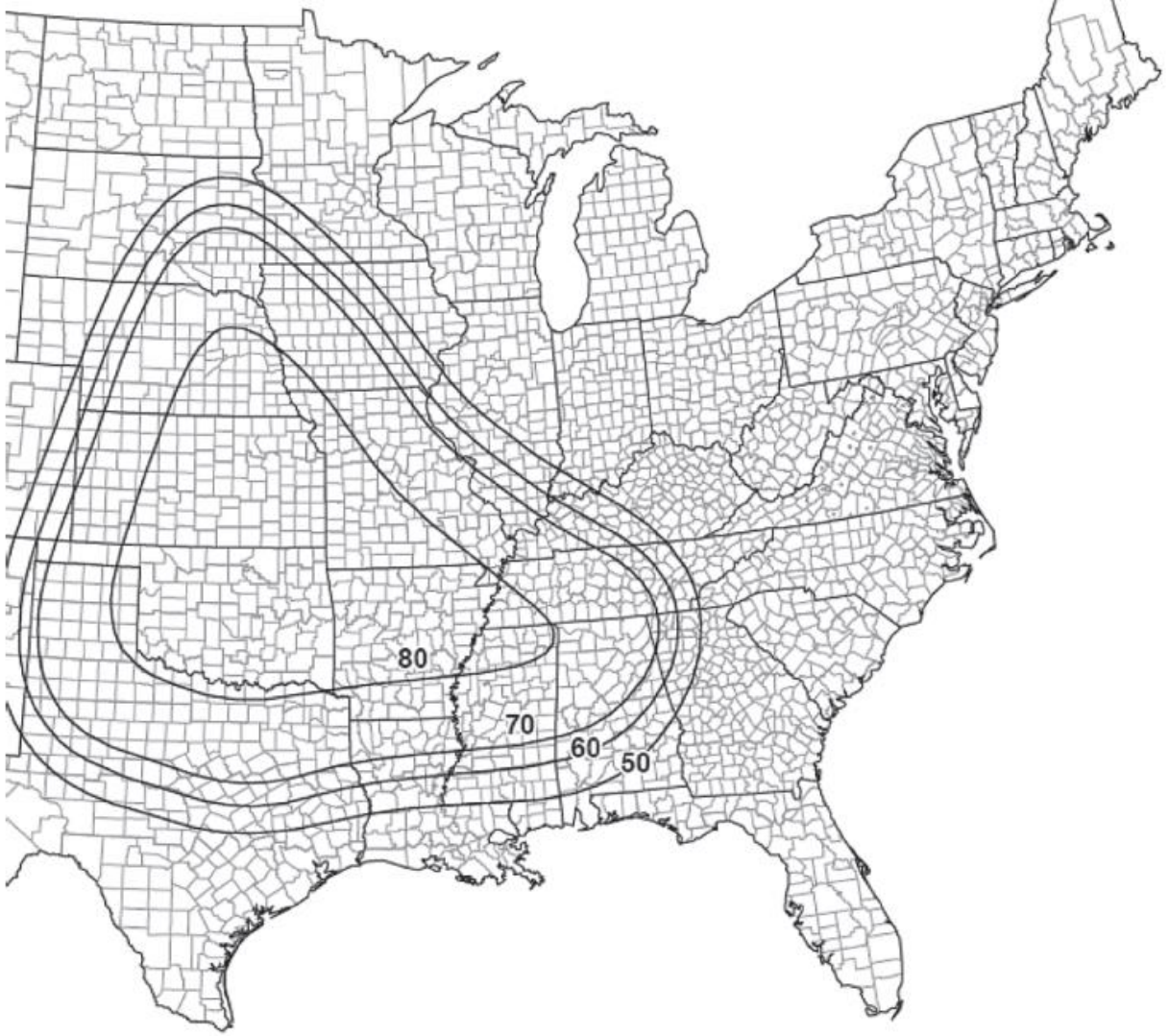
Effective plan area, A_e

- Takes into account the plan size and shape
- The tornado strike probability for U-shaped plan is essentially the same as for a building that has a rectangular plan that encloses the U



4. Islands, coastal areas, and land boundaries outside the last contour shall use the last tornado speed contour.
5. Tornado speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).
6. Location-specific tornado speed is permitted to be determined using the ASCE Tornado Design Geodatabase, available at the ASCE 7 Hazard Tool (http://asce7hazardtool.online) or approved equivalent.

Figure 32.5-1B (*Continued*). Tornado speeds for Risk Category III buildings and other structures, for effective plan area of 2,000 ft^2 (186 m^2).

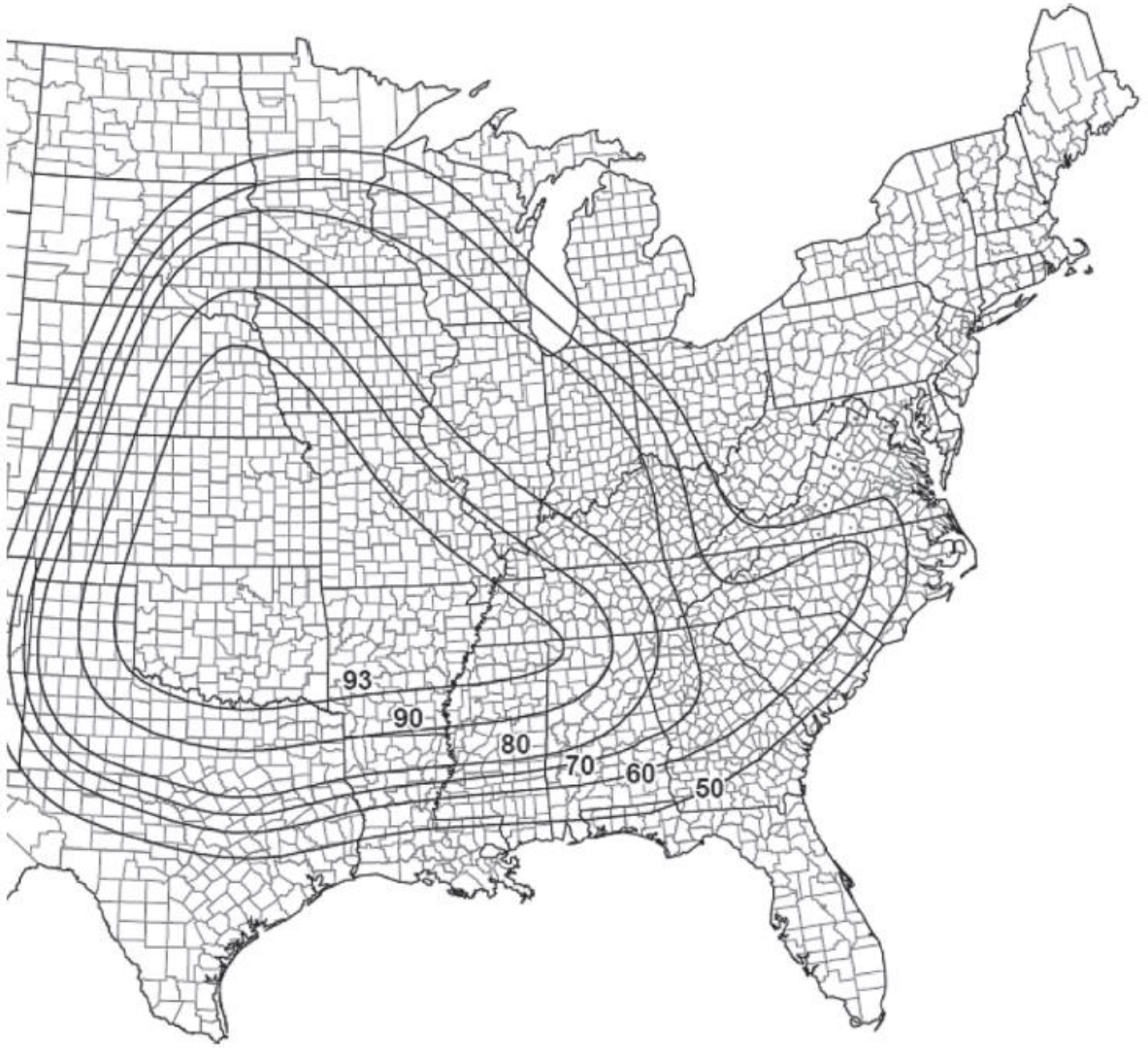


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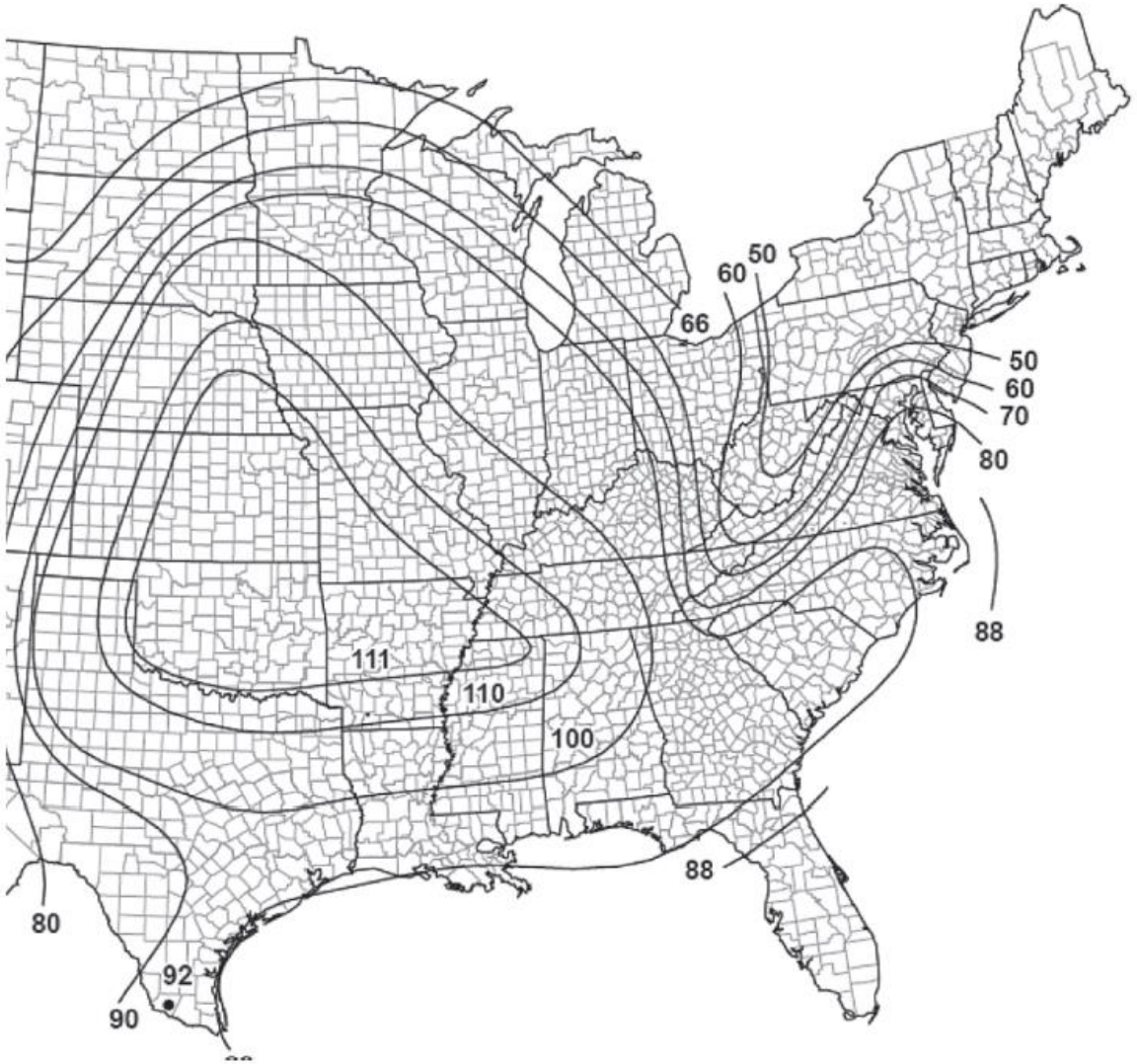
Figure 32.5-1E (*Continued*). Tornado speeds for Risk Category III buildings and other structures, for effective plan area of 100,000 ft^2 (9,290 m^2).



4. Islands, coastal areas, and land boundaries outside the last contour shall use the last tornado speed contour.
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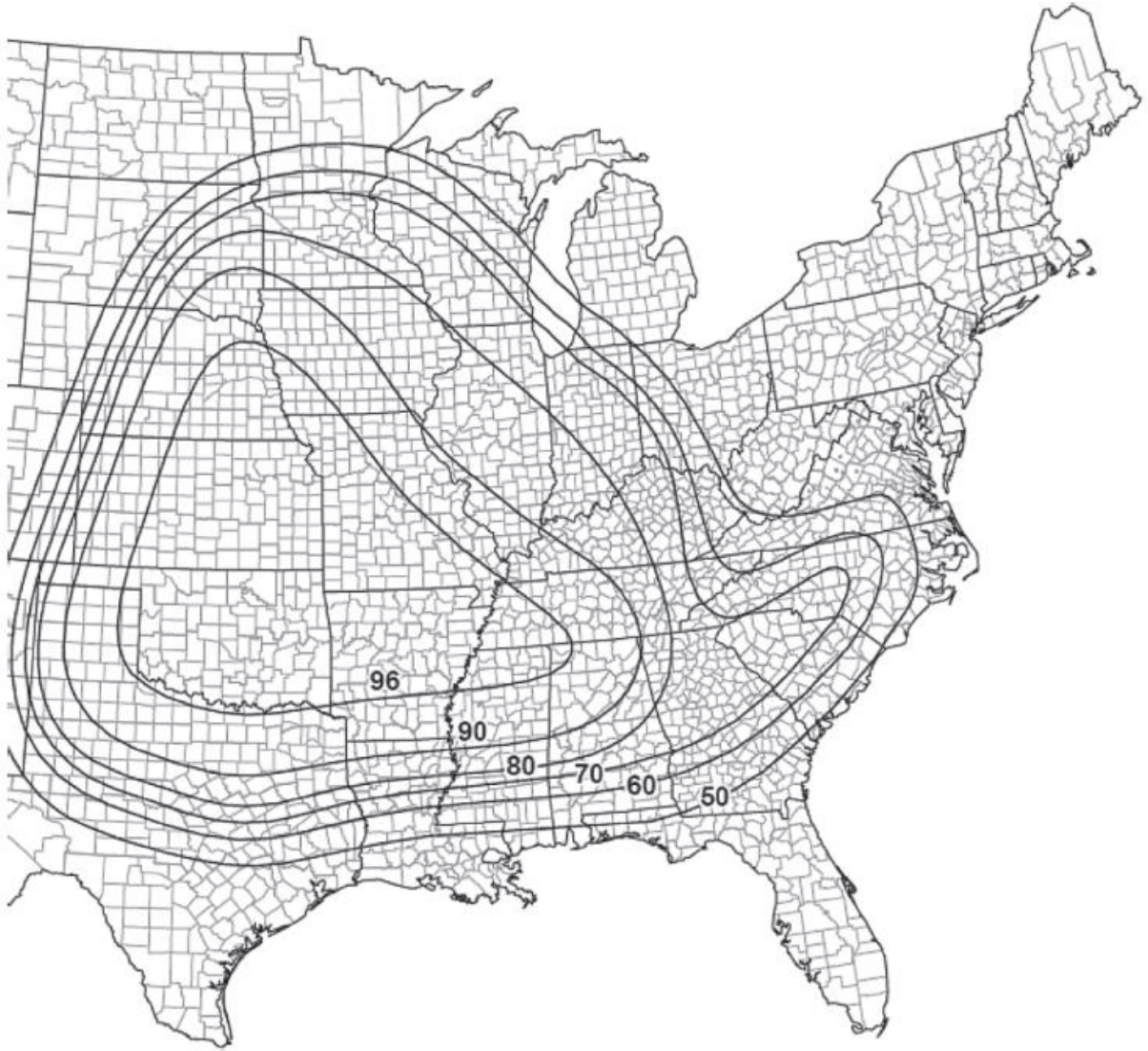
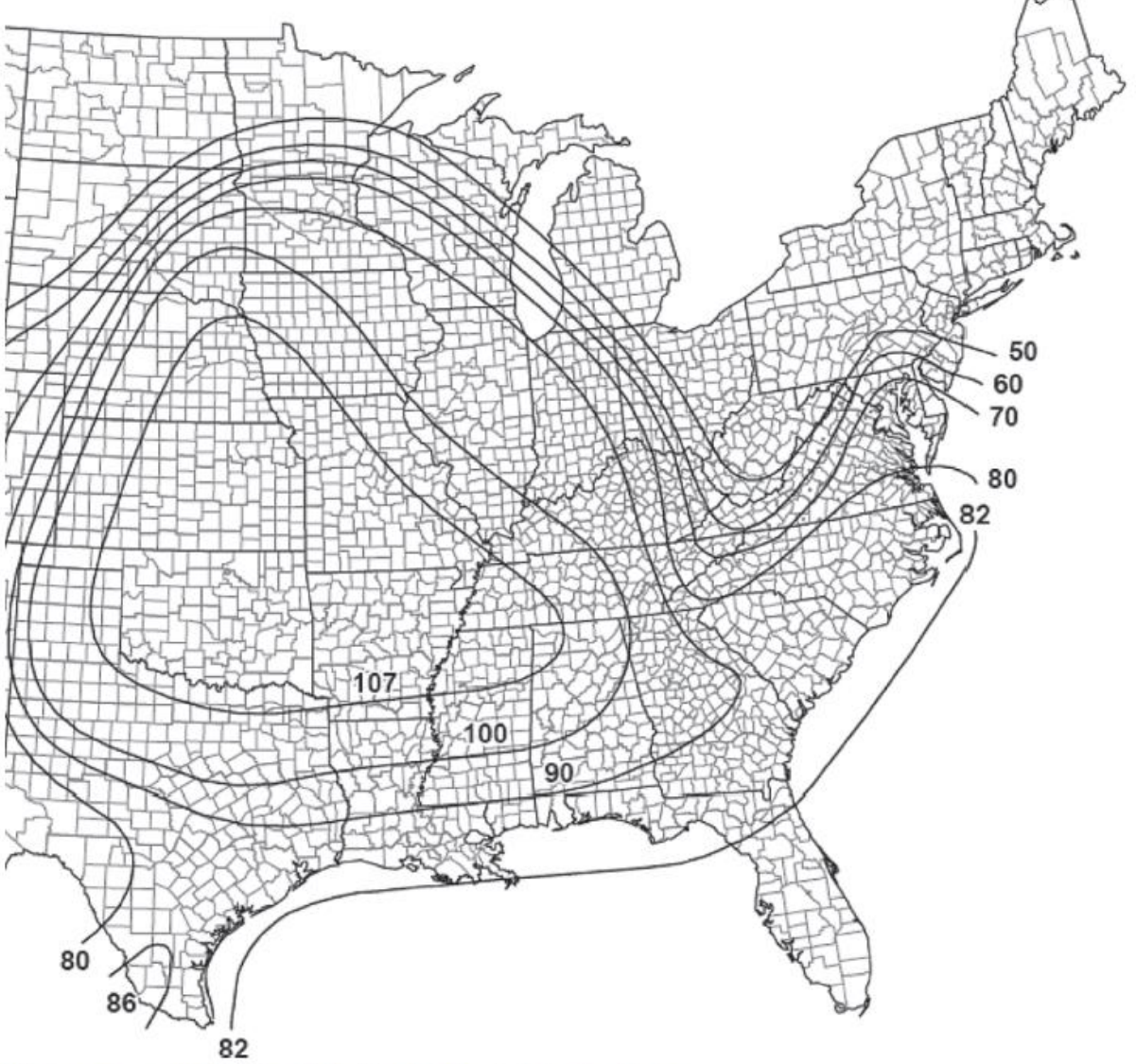
6. Location-specific tornado speed is permitted to be determined using the ASCE Tornado Design Geodatabase, available at the ASCE 7 Hazard Tool (http://asce7hazardtool.online) or approved equivalent.

Figure 32.5-1G (*Continued*). Tornado speeds for Risk Category III buildings and other structures, for effective plan area of 1,000,000 ft^2 (92,903 m^2).



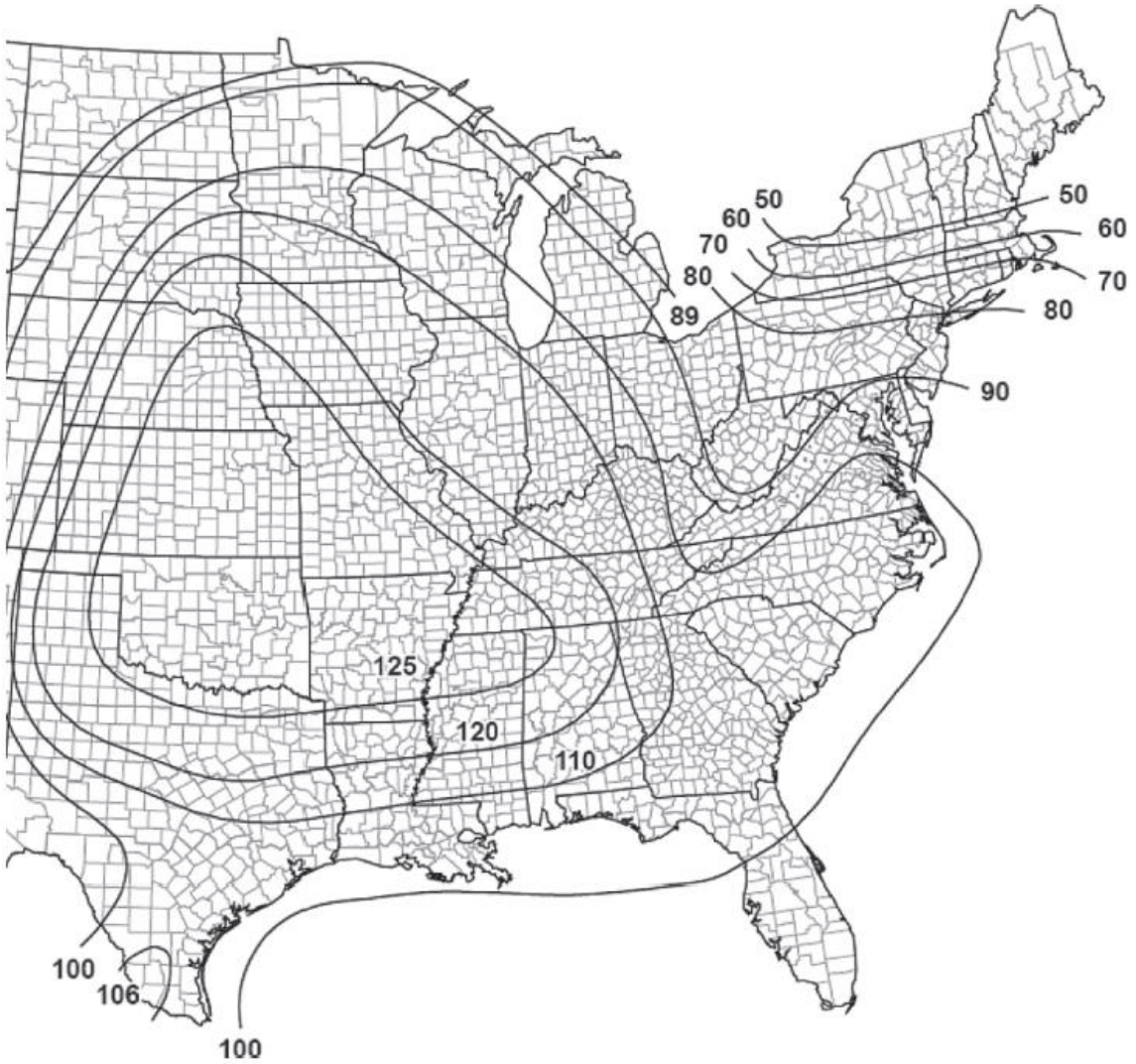
4. Islands, coastal areas, and land boundaries outside the last contour shall use the last tornado speed contour.
5. Tornado speeds correspond to approximately a 1.7% probability of exceedance in 50 years (annual exceedance probability = 0.00033, MRI = 3,000 years).
6. Location-specific tornado speed is permitted to be determined using the ASCE Tornado Design Geodatabase, available at the ASCE 7 Hazard Tool (http://asce7hazardtool.online) or approved equivalent.

Figure 32.5-2B (*Continued*). Tornado speeds for Risk Category IV buildings and other structures, for effective plan area of 2,000 ft^2 (186 m^2).



4. Islands, coastal areas, and land boundaries outside the last contour shall use the last tornado speed contour.
5. Tornado speeds correspond to approximately a 1.7% probability of exceedance in 50 years (annual exceedance probability = 0.00033, MRI = 3,000 years).
6. Location-specific tornado speed is permitted to be determined using the ASCE Tornado Design Geodatabase, available at the ASCE 7 Hazard Tool (http://asce7hazardtool.online) or approved equivalent.

Figure 32.5-2E (*Continued*). Tornado speeds for Risk Category IV buildings and other structures, for effective plan area of 100,000 ft^2 (9,290 m^2).



4. Islands, coastal areas, and land boundaries outside the last contour shall use the last tornado speed contour.
5. Tornado speeds correspond to approximately a 1.7% probability of exceedance in 50 years (annual exceedance probability = 0.00033, MRI = 3,000 years).
6. Location-specific tornado speed is permitted to be determined using the ASCE Tornado Design Geodatabase, available at the ASCE 7 Hazard Tool (http://asce7hazardtool.online) or approved equivalent.

Figure 32.5-2G (*Continued*). Tornado speeds for Risk Category IV buildings and other structures, for effective plan area of 1,000,000 ft^2 (92,903 m^2).

8th Edition (2023) FBC/ASCE 7-22

Tornado Loads

- If tornado loads apply, they will have to be checked even if the tornado speed V_T is less than design wind speed V_{ult},.
- In general, calculations are similar to normal wind calculations
  - Some coefficients are different
  - For windows and doors:
    - Kd = 1.0
    - If impact protection provided GC_{pi} = +0.55/-0.18
    - If impact protection **NOT** provided GC_{pi} = +0.55/-0.55
    - Impact protection in accordance with ASTM E1886 and ASTM E1996

8th Edition (2023) FBC/ASCE 7-22

Other changes in ASCE 7-22

- Small adjustment to K_z values
  - Slightly lower pressures for Exposure B at mean roof heights of 40 ft and up and for Exposure C at mean roof heights of 140 ft and up
- All simplified procedures have been deleted
  - Simplified component and cladding pressures retained in the FBCR and updated for ASCE 7-22

8th Edition (2023) FBCB

New language added clarifying that the threshold height for exterior doors are allowed at a height necessary to comply with the water testing requirements of Section 1709.5

FBCB

1010.1.~~7~~6 Thresholds. Thresholds at doorways shall not exceed 3 /4 inch (19.1 mm) in height above the finished floor or landing for sliding doors serving dwelling units or 1 /2 inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than 1 /4 inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope).

Exceptions:

1. No change
2. For exterior doors serving dwelling units, or sleeping units, thresholds at doorways shall be allowed at a height necessary to comply with the water resistance requirements of Section 1709.5. ~~not exceed the height required to pass the water resistance test of AAMA/WDMA/CSA 101/I.S.2/ A440, or TAS 202 for high-velocity hurricane zones, or the maximum allowable height difference between interior floor levels. Exterior floor level shall comply with Table 1010.1.7.~~

8th Edition (2023) FBCB

Emergency Escape and Rescue Openings

New language added to FBCB permitting the use of window opening control devices on EERO's

- Coordinates with FBCR

FBCB

1030.4 Operational constraints. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools. Window-opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening. Bars, grilles, grates or similar devices are permitted to be placed…

8th Edition (2023) FBCB

Emergency Escape and Rescue Openings

New language added to FBCB requiring doors used as EERO's to be a swinging or sliding door

- Coordinates with FBCR

FBCB

1030.3.1 Emergency escape and rescue doors. Where a door is provided as the required emergency escape and rescue opening, it shall be a swinging door or a sliding door.

8th Edition (2023) FBCR

Emergency Escape and Rescue Openings

New language added to FBCR permitting fall prevention devices on EERO's

- Fall prevention devices are within the scope of ASTM F2090

FBCR

R310.1.1 Operational constraints and opening control devices. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge. Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening.

8th Edition (2023) FBCR

Emergency Escape and Rescue Openings

Maximum height from the floor clarified

- Correlates with the FBCB

FBCR

~~R310.2.2~~R310.2.3 ~~Window sill height.~~ Maximum height from floor. ~~Where a window is provided as the emergency~~ Emergency escape and rescue ~~opening~~ openings, ~~it~~ shall have ~~a sill height of not more than~~ the bottom of the clear opening not greater than 44 inches (1118 mm) above the floor~~; where the sill height is below *grade*, it shall be provided with a window well in accordance with Section R310.2.3~~.

8th Edition (2023) FBCEB

Replacement windows
Window opening control devices and emergency escape and rescue openings

- Correlating changes made to Sections 505.2 (prescriptive compliance method) and 702.5 (Alterations – Level 1)
- Clarifies that whether replacing the sash and frame, or the sash only and existing frame remains, the fall prevention requirements apply in both applications
- General clarifications to correlate with other changes to the code

8th Edition (2023) FBCEB

Replacement windows

New language added applying to where a change of occupancy would require emergency escape and rescue openings.

Similar to existing language for replacement windows and emergency escape and rescue openings as shown below:

2020 FBCEB

505.3 Replacement window emergency escape and rescue openings. Where windows are required to provide emergency escape and rescue openings in Group R-2 and R-3 occupancies and one- and two-family dwellings and townhouses regulated by the Florida Building Code, Residential, replacement windows shall be exempt from the requirements of Sections 1030.2, 1030.3 and 1030.5 of the Florida Building Code, Building and Sections R310.2.1, R310.2.2 and R310.2.3 of the Florida Building Code, Residential, provided the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement of the window is not part of a change of occupancy.

Window opening control devices complying with ASTM F2090 shall be permitted for use on windows required to provide emergency escape and rescue openings.

8th Edition (2023) FBCEB

FBCEB

1012.5.6 Existing emergency escape and rescue openings. Where a change of occupancy would require emergency escape and rescue opening in accordance with Section 1030.1 of the Florida Building Code, Building operable windows serving as the emergency escape and rescue opening shall comply with the following:

1. An existing operable window shall provide a minimum net clear opening of 4 square feet (0.38 m^2) with a minimum net clear opening height of 22 inches (559 mm) and a minimum net clear opening width of 20 inches (508 mm).
2. A replacement window where such window complies with both of the following:
    - 2.1. The replacement window meets the size requirements in Item 1.
    - 2.2. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window

Questions?