v2

2010 Florida Building Code Wind Standard

Building Codes and Standards

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Florida Department of Business & Professional Regulation

Building Codes and Standards

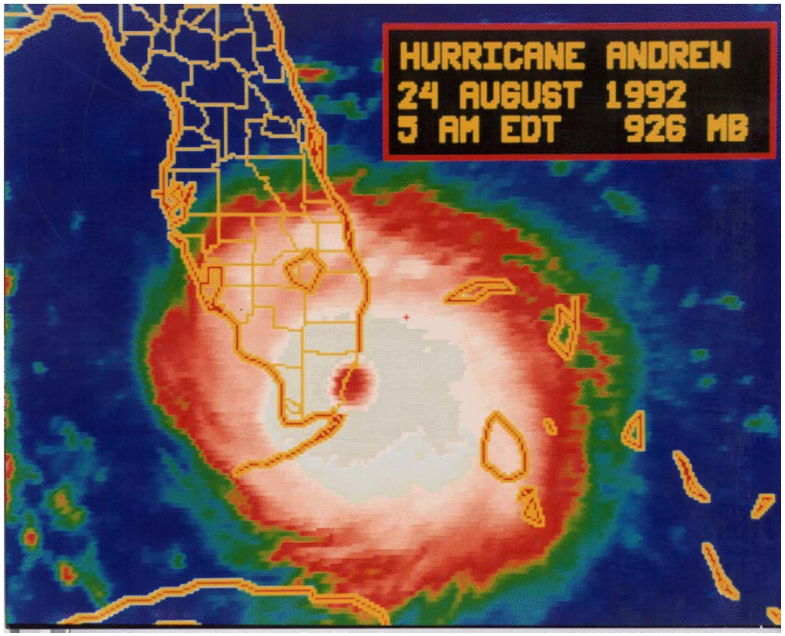
FBC Florida Building Commission

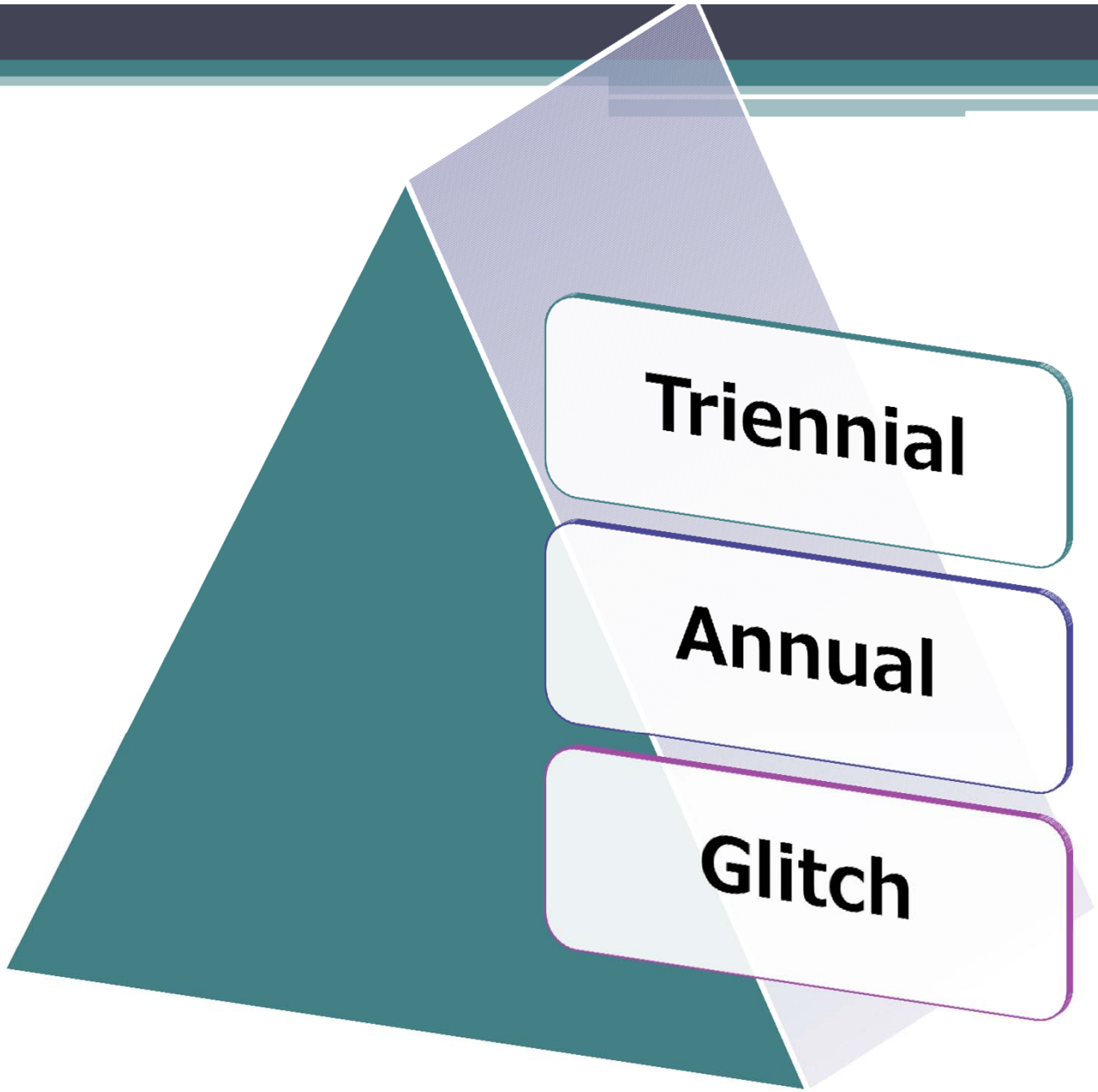
- Contents
  - Part 1 - The Florida Building Code
  - Part 2 – Wind Speeds
  - Part 3 – Impact

Part 1

The

Florida Building Code




Triennial
Annual
Glitch

- How to use the next chart

	2001 FBC	2004 FBC
Effective Date	March 1, 2002	October 1, 2003
Building Volume – Based on...	1997 Southern Building Code	2003 IBC
Plumbing Volume – Based on...	1997 IPC	2003 IPC
Mechanical Volume – Based on...	1998 [illegible]	2003 IMC

The 2004 Florida Building Code Mechanical Volume is based on the 2003 IMC (International Mechanical Code)

Florida Building Code Editions

	2001 FBC	2004 FBC	2007 FBC	2010 FBC
Effective Date	**March 1, 2002**	**October 1, 2005**	**March 1, 2009**	**March 15, 2012**
Building Volume – Based on…	1997 Southern Building Code	2003 IBC	2006 IBC	2009 IBC
Plumbing Volume – Based on…	1997 IPC	2003 IPC	2006 IPC	2009 IPC
Mechanical Volume – Based on…	1998 IMC	2003 IMC	2006 IMC	2009 IMC
Fuel/Gas Volume – Based on…	1998 IFGC	2003 IFGC	2006 IFGC	2009 IFGC
Electrical Volume – Based on…	2002 NEC	2005 NEC	2005 NEC	2005 NEC
Fire Volume – Based on…	2001 FFPC	2004 FFPC	2007 FFPC	2010 FFPC
Existing Building Volume – Based on…	---	2003 IEBC	2006 IEBC	2009 IEBC
Residential Volume – Based on…	---	2003 IRC	2006 IRC	2009 IRC
Energy Conservation Volume – Based on…	---	---	---	2009 IECC
Accessibility Volume – Based on…	---	---	---	2010 ADA

2010 FBC Integration (current process)

Florida Specific Requirement

- 2007 FBC Florida specific requirements
- HVHZ(Miami-Dade and Broward counties) requirements
- Special Occupancy—state rules and statutes
- Correlation requirements with the Florida Fire Prevention Code

Approved Code Changes

Glitch

2009 I-code | Florida Specific | Mods | 2010 FBC

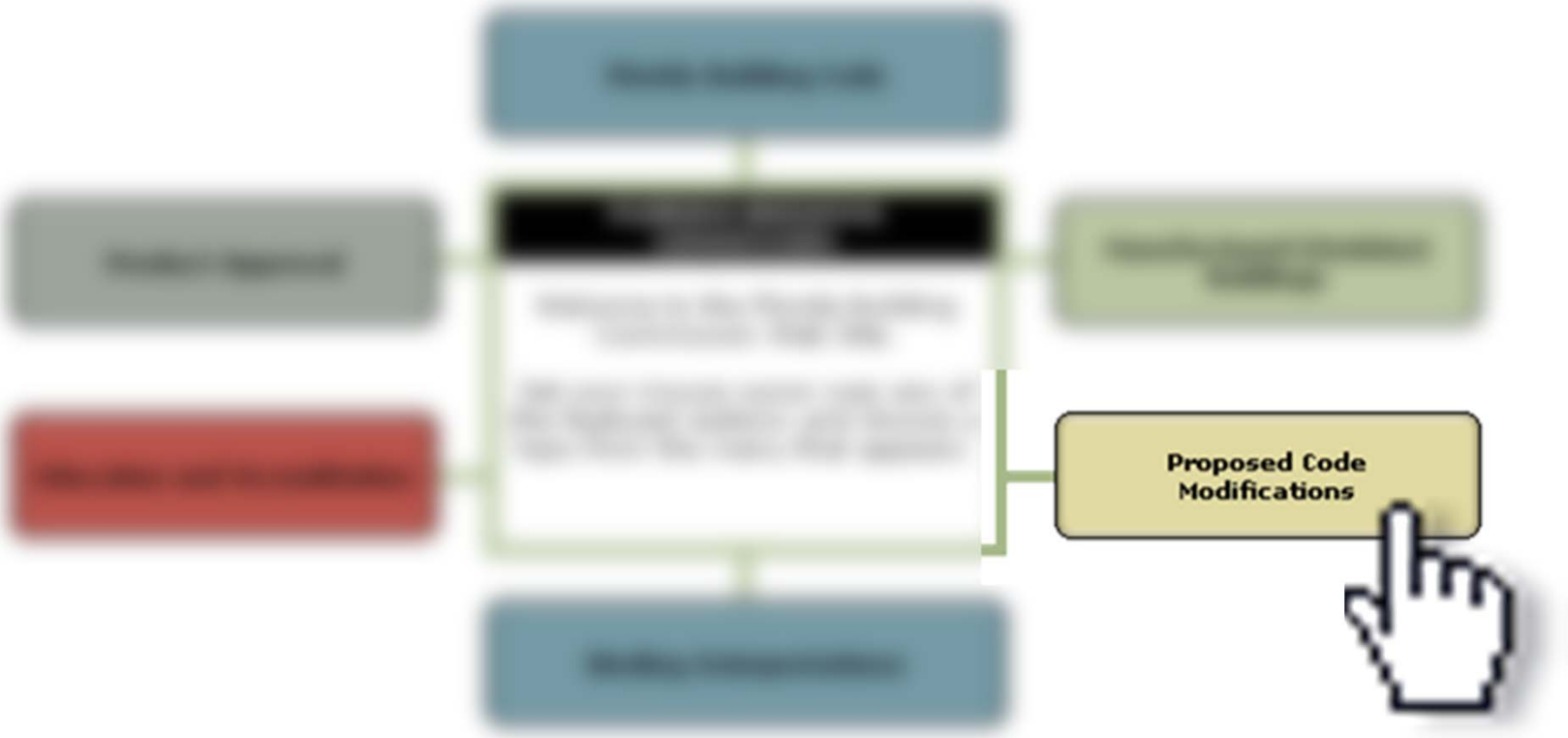
3 Year Cycle

Code development Schedule

- 2009 I- Codes and FBC Supplement posted 2/1/10
- Proposed amendment due and closes 4/2/10
- Proposed amendment posted for comments 4/15/10
- 45 day comment period ends 5/31/10
- TAC review and make recommendations 7/27-8/25
- TAC recommendations posted 9/3/10
- 45 day comment period ends 10/18/10
- TAC review comments on recommendations 11/15/10
- Commission considers TAC recommendation 12/7-8/10
- Code amended to resolve glitches 4/11-6/11
- Code printed 10/1/11
- **Code implemented** 3/15/12

Materials Available

BCIS www.floridabuilding.org Proposed Code Module -



FBC 2010

- **1609.1.1 Determination of wind loads.** Wind loads on every building or structure shall be determined in accordance with Chapters 26 through 30 of ASCE 7 **or the provisions of the alternate all-heights method in Section 1609.6**. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.
-
- **Exceptions:**
- 1. ICC 600 for Group R-2 and R-3 buildings.
- 2. AF&PA WFCM.
- 3. AISI S230.
- 4. Designs using NAAMM FP 1001.
- 5. Designs using TIA-222 for antenna-supporting structures and antennas.
- 6. Wind tunnel tests in accordance with Section 6.6 of ASCE 7. subject to the limitations in Section 1609.1.1.2.

FBC 201 continued

- The wind speeds in Figure 1609A, 1609B and 1609C shall be converted **to nominal wind speeds, V_{asd},** in accordance with Section 1609.3.1 when the provisions of the standards referenced in Exceptions 1 through 5 **and 7** are used unless the wind provisions in the standards are based on Ultimate Wind Speeds **as specified** in ~~**accordance with**~~ Figures 1609A, 1609B, or 1609C **or Chapter 26 of ASCE 7.**
- [S4673]

Part 2 – Wind Speeds

ASCE 7-10

TABLE 1604.5 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

OCCUPANCY CATEGORY	NATURE OF OCCUPANCY
I	**Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to:** • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities.
II	**Buildings and other structures except those listed in Occupancy Categories I, III and IV**
III	**Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to:** • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250. • Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500. • Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000[a]. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV. • Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.
IV	**Buildings and other structures designated as essential facilities, including but not limited to:** • Group I-2 occupancies having surgery or emergency treatment facilities. • Fire, rescue, ambulance and police stations and emergency vehicle garages. • Designated earthquake, hurricane or other emergency shelters. • Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. • Power-generating stations and other public utility facilities required as emergency backup facilities for Occupancy Category IV structures. • Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the maximum allowable quantities of Table 307.1(2). • Aviation control towers, air traffic control centers and emergency aircraft hangars. • Buildings and other structures having critical national defense functions. • Water storage facilities and pump structures required to maintain water pressure for fire suppression.

Risk Category of Buildings and Other Structures

	2010 Florida Building Code – Projected to go into effect 12/31/2011
OCCUPANCY	**CATEGORY NATURE OF OCCUPANCY**
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities.

Risk Category of Buildings and Other Structures Cont.

	2010 Florida Building Code – Projected to go into effect 12/31/2011
OCCUPANCY	**CATEGORY NATURE OF OCCUPANCY**
II	Buildings and other structures except those listed in Occupancy Categories I, III and IV

Risk Category of Buildings and Other Structures Cont

	2010 Florida Building Code – Projected to go into effect 12/31/2011
OCCUPANCY	**CATEGORY NATURE OF OCCUPANCY**
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.

Risk Category of Buildings and Other Structures Cont.

	2010 Florida Building Code – Projected to go into effect 12/31/2011
OCCUPANCY	**CATEGORY NATURE OF OCCUPANCY**
III	• Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000a. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV. • Buildings and other structures not included in Occupancy

Risk Category of Buildings and Other Structures Cont.

	2010 Florida Building Code – Projected to go into effect 12/31/2011
OCCUPANCY	**CATEGORY NATURE OF OCCUPANCY**
IV	Buildings and other structures designated as essential facilities, including but not limited to: • Group I-2 occupancies having surgery or emergency treatment facilities. • Fire, rescue, ambulance and police stations and emergency vehicle garages. • Designated earthquake, hurricane or other emergency shelters.

Risk Category of Buildings and Other Structures Cont.

	2010 Florida Building Code – Projected to go into effect 12/31/2011
OCCUPANCY	**CATEGORY NATURE OF OCCUPANCY**
IV	• Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the maximum allowable quantities of Table 307.1(2). • Aviation control towers, air traffic control centers and emergency aircraft hangars. • Buildings and other structures having critical national defense functions. • Water storage facilities and pump structures required to maintain water pressure for fire suppression.

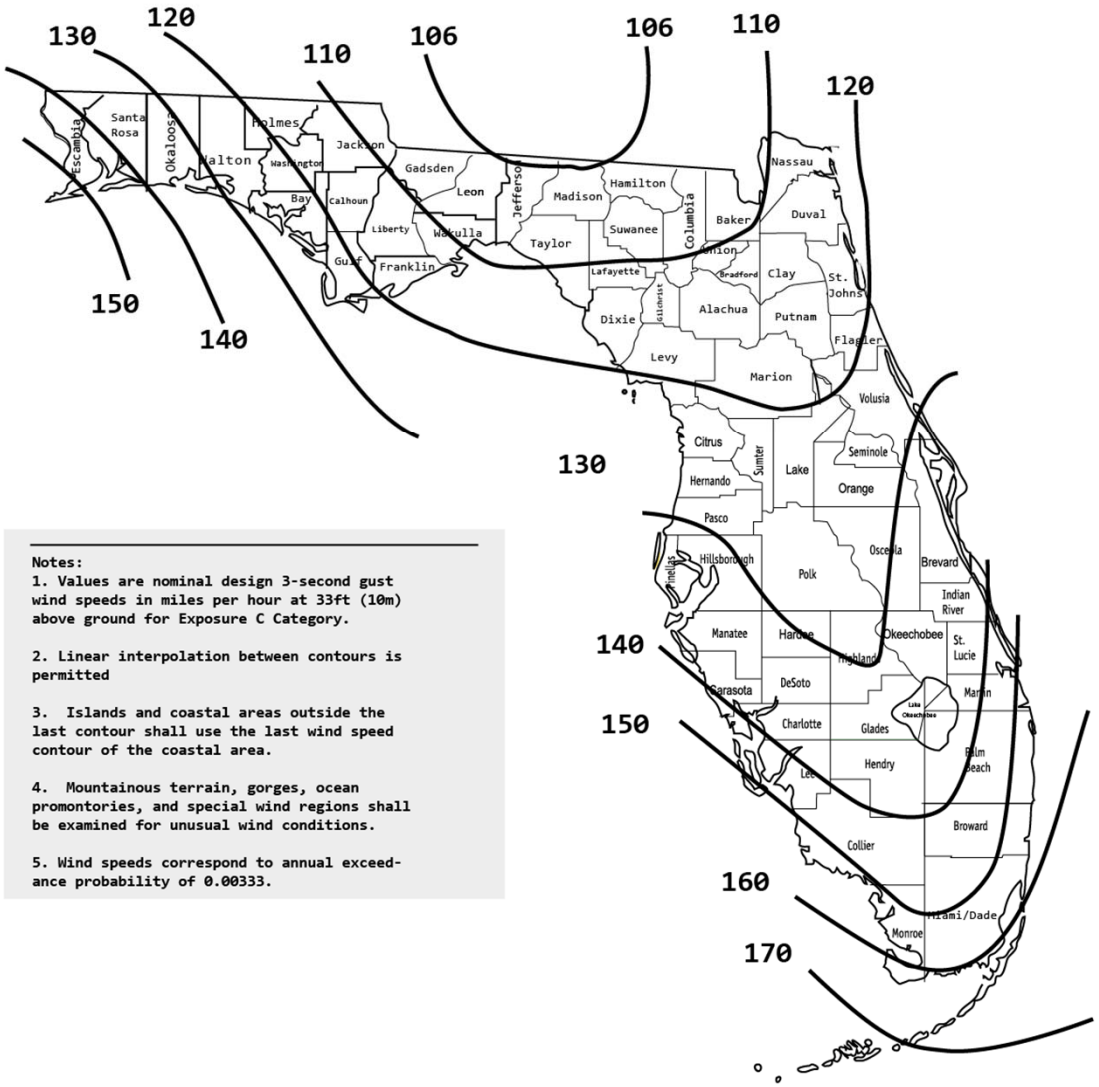
2010 FBC Figure C

2010 FBC

State of Florida

Category I Building and Structures
In Miles Per Hour

Figure C



Notes:
1. Values are nominal design 3-second gust wind speeds in miles per hour at 33ft (10m) above ground for Exposure C Category.

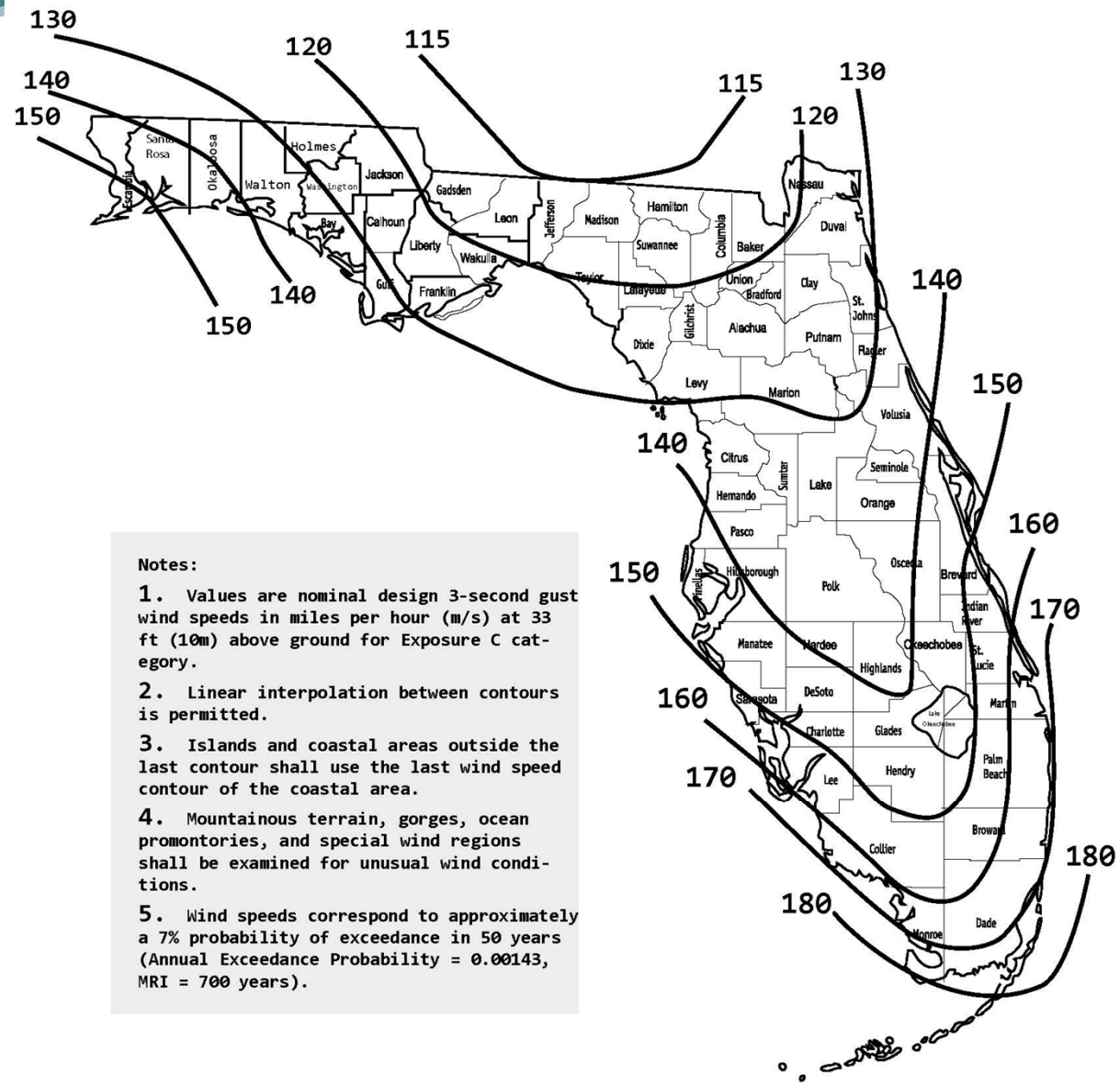
2. Linear interpolation between contours is permitted

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 annual exceedance probability of 0.00333.

FINAL FIGURE A

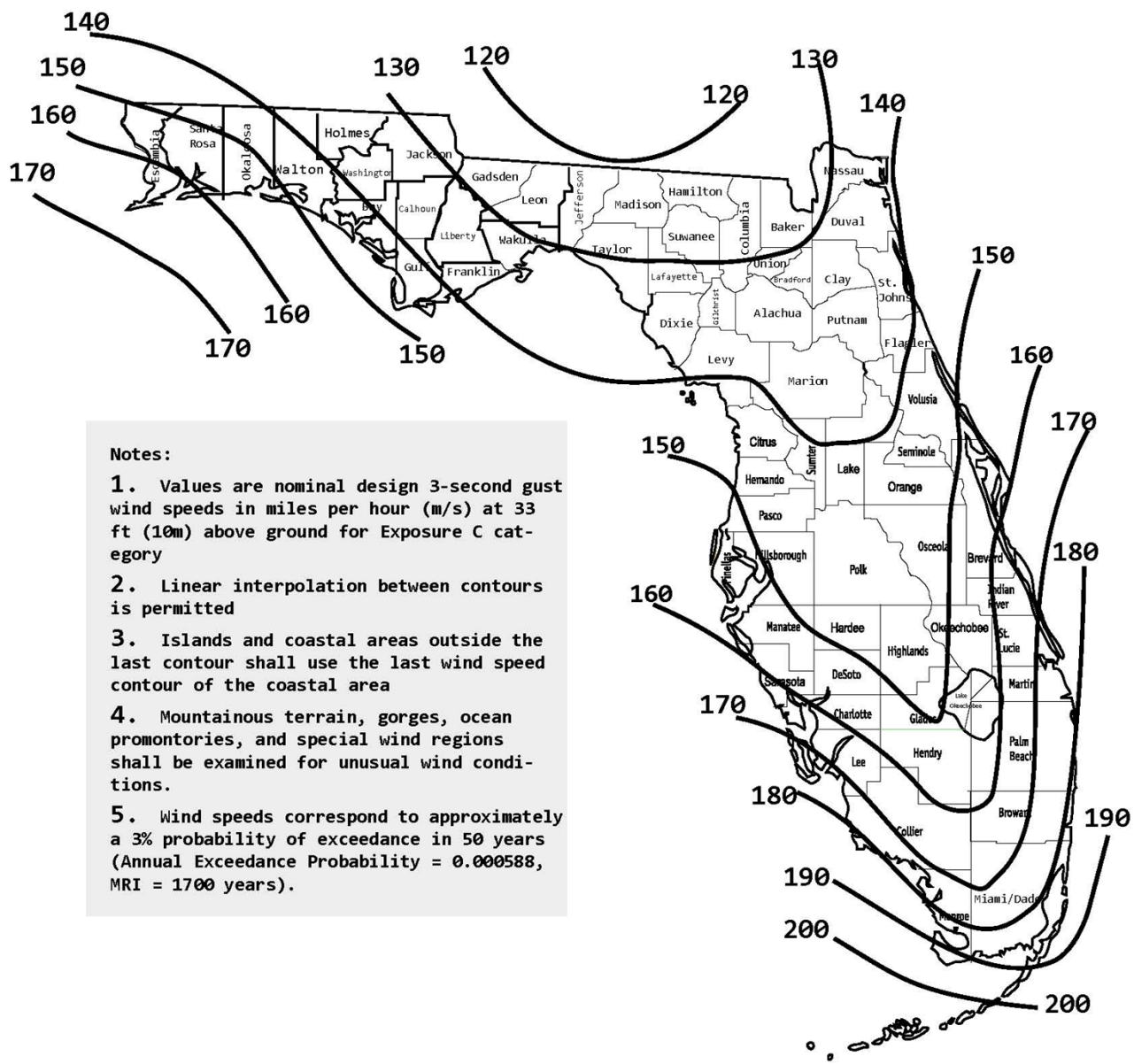


Notes:

1. Values are nominal 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 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).

Figure 1609A Ultimate Design Wind Speeds, V_{ult}, for Risk Category II Buildings and Other Structures

FINAL FIGURE B



Notes:

1. Values are nominal 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 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.000588, MRI = 1700 years).

Figure 1609B Ultimate Design Wind Speeds, V_{ult} ,
for Risk Category III and IV Buildings and other Structures

TABLE C26.5-6
Design Wind Speeds: ASCE 7-93 to ASCE 7-10

ASCE 7-05 Design Wind Speed (3-sec gust in mph)	*ASCE 7-10 Design Wind Speed (3-sec gust in mph)*	*ASCE 7-93 Design Wind Speed (fastest mile in mph)*
85	110*	71
90	115*	76
100	126	85
105	133	90
110	139	95
120	152	104
130	164	114
140	177	123
145	183	128
150	190	133
170	215	152

* Wind speed values of 110 mph and 115 mph were rounded from the "exact" conversions of $85\sqrt{1.6} = 108$ and $90\sqrt{1.6} = 114$ mph, respectively.

ASCE 7 – 05 VS. ASCE 7 – 10 Design Wind Loads

TABLE 1609.3.1
WIND SPEED CONVERSIONS[abc]

V_{ul}	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

V_{asd} = nominal design wind speed
V_{ult} = ultimate design wind speed determined from Figures 1609A, 1609B, or 1609C

ASCE 7 – 05 VS. ASCE 7 – 10 Design Wind Loads

The new maps, when used in combination with the 1.0 load factor on wind for strength design and the 0.6 factor on wind for allowable stress design, **result in a net decrease in design wind loads in Hurricane-Prone Regions.** Parts of southern Florida (due to the re-introduction of Exposure D for coastal areas) are approximately the same when compared to previous editions of the maps. **In the remainder of the Hurricane-Prone Regions of Florida, the design wind pressures are on average approximately *20% less* than the loads determined from ASCE 7-05.**

ASCE 7 – 05 VS. ASCE 7 – 10 Design Wind Loads

Nominal design wind speed "V_{asd}"- using Allowable Stress Design (ASCE 7 - 2005) - old maps

Ultimate design wind speed "V_{ult}" - using Strength Design (ASCE - 2010) - new maps

In order to convert the load "dp/design pressure" from ultimate to nominal you multiply by a factor of .6.

x .6

ASCE 7 – 05 VS. ASCE 7 – 10 Design Wind Loads

2007 FBC	ASCE 7-1 0 Cat. I	ASCE 7 – 10 Cat. B. II	ASCE 7 – 10 Cat. B III & IV	
Palm Beach 170 MPH	130	150	160	
Wall –cc dp - psf	30.4/-33.0	40.5/-43.9	46.1/-50.0	51.1/-56
(X .6)	24.3/-26.34	27.66/-30.0	30.66/-33.6	

HVHZ

- **1620.2** – Change to read as shown.
- 1620.2 Wind velocity (3-second gust) used in structural calculations shall be as follows: follows:
- **Miami-Dade County**
- Risk Category I Buildings and Structures: 165 mph
- Risk Category II Buildings and Structures: 175 mph
- Risk Category III and IV Buildings and Structures: 186 mph
- Broward County
- Risk Category I Buildings and Structures: 156 mph
- Risk Category II Buildings and Structures: 170 mph
- Risk Category III and IV Buildings and Structures: 180 mph
- [S4799]

- Part 3 - Impact

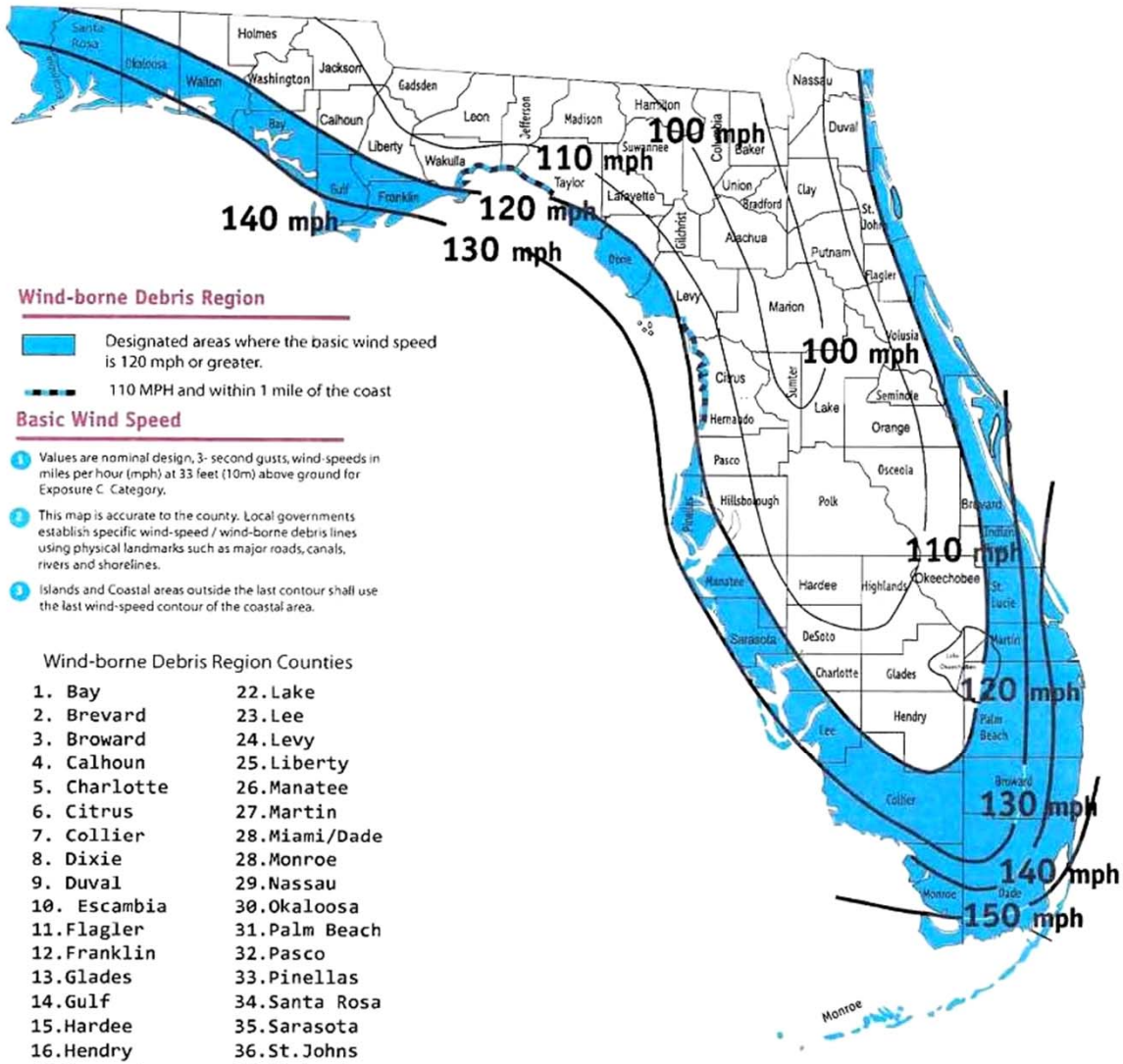
Wind-Borne Debris Region

- Areas within *hurricane- prone regions* located:
- Within **1 mile** (1.61 km) of the coastal mean high water line where the ultimate design wind speed **V_{ult} is 130** (48 m/s) or greater; or
- In areas where the ultimate design wind speed V_{ult} is **140 mph** (53 m/s) or greater~~;~~
- For **Risk Category II** buildings and structures and occupancy **category III** buildings and structures, except health care facilities, the windborne debris region shall be based on **Figure 1609A**. For occupancy **category IV** buildings and structures and occupancy **category III** health care facilities, the windborne debris region shall be based on **Figure 1609B**.

2007 FBC

2007 FBC

Wind-Borne Debris Region



2010 FBC Figure A

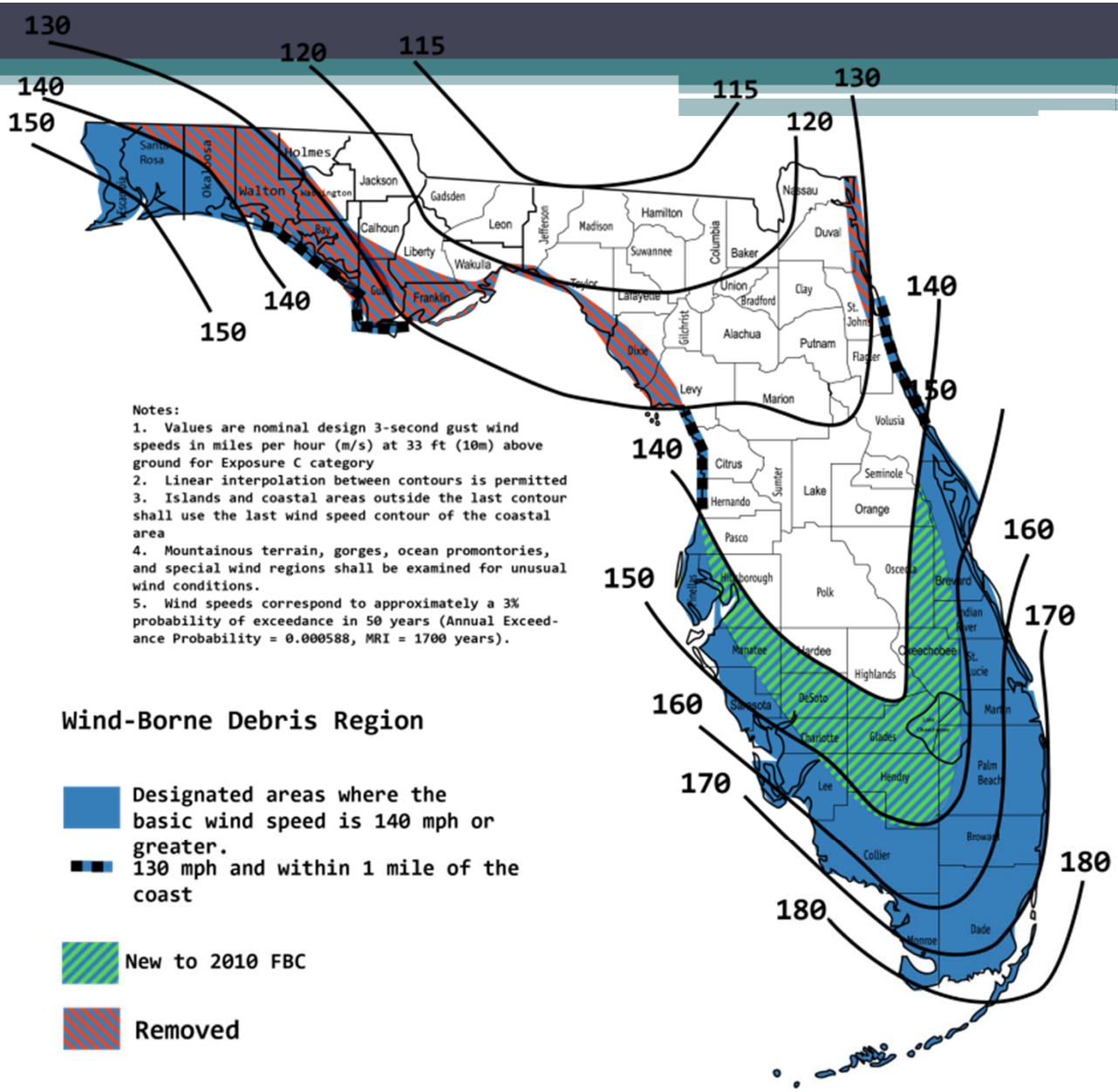


Figure 1609A Wind-Borne Debris Region, Category II and III Buildings and Structures except health care facilities in Miles Per Hour

2010 FBC Figure B

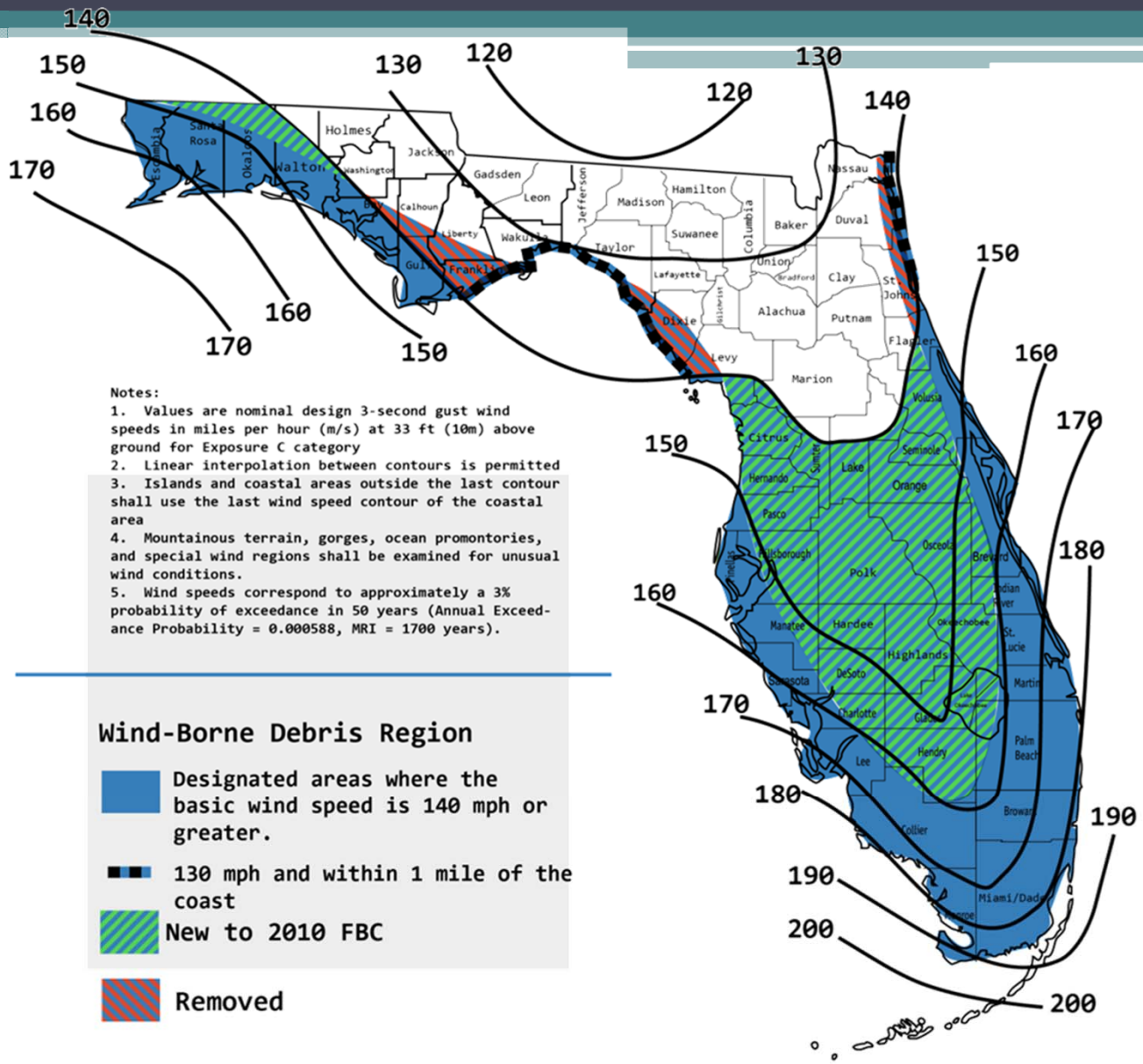
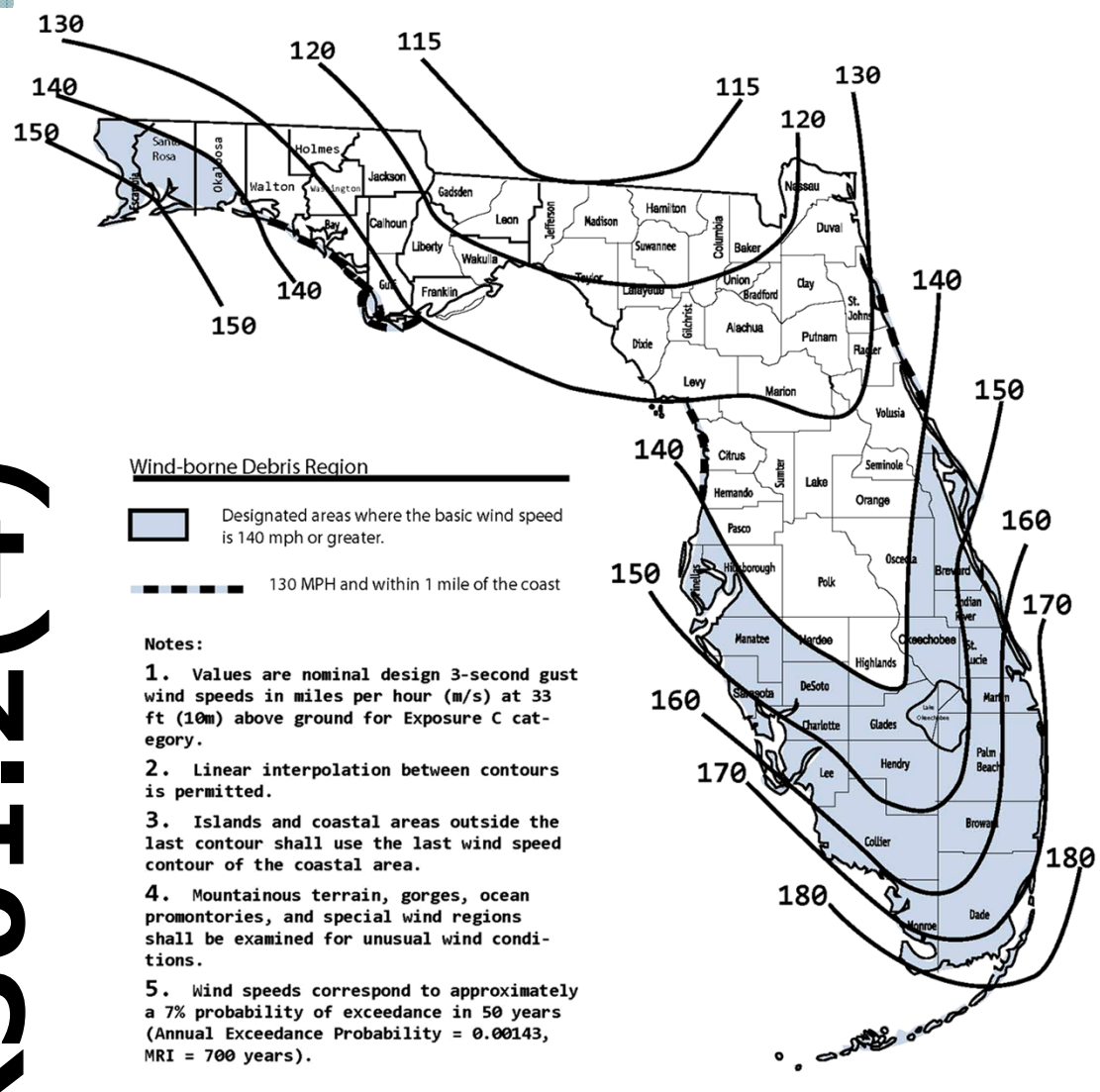


Figure 1609B Risk Category III and IV Buildings and other Structures and Category III healthcare facilities

FINAL FIGURE R301.2(4)



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5. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).

Figure R301.2(4) Ultimate Design Wind Speeds, V_{ult}

Background Information

- Wind speed lines have changed because of the improved science (i.e. computer simulations).
- The updated maps are based on a new and more complete analysis of hurricane characteristics performed over the past 10 years.
- The wind speed indicated for each wind speed line is different for the 2010 standard due to change in wind speed calculation philosophy.
- The wind borne debris was changed from opening protection required for currently for 120 mph and higher wind speeds under current code to opening protection required for 110 mph equivalent current code wind speed (140 mph 2010 wind speeds) and higher wind speeds for the 2010 standard.