



# Flood Resistant Construction and the 6<sup>th</sup> Edition Florida Building Code (2017)

June 2017

Hurricanes and other storms that result in flooding have caused billions of dollars in damage across all parts of Florida. Local jurisdictions throughout the state recognize, plan for and manage development in flood hazard areas. To participate in the National Flood Insurance Program (NFIP), communities agree to regulate all development in flood hazard areas mapped by the Federal Emergency Management Agency (FEMA).

Once an owner or developer makes a decision to construct, add to or substantially improve a building in a flood hazard area, certain requirements intended to minimize future flood damage must be satisfied. Flood provisions for buildings are in the *Florida Building Code* (FBC), making it easier for design professionals and builders to address the requirements along with other applicable load and design requirements.

The flood provisions of the FBC achieve two broad objectives:

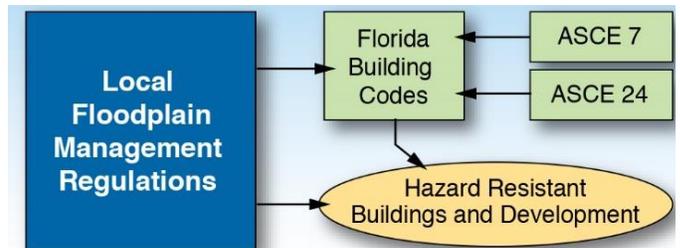
- As with the rest of the code, the flood provisions help fulfill the purpose of safeguarding public health, safety, and general welfare. Many Florida communities and property owners can attest that designing and constructing buildings to account for flood loads and conditions significantly reduce damage. FEMA reports that structures built to NFIP criteria experience 80% less damage through reduced frequency and severity of losses. Buildings that sustain less damage are more quickly reoccupied, facilitating recovery.

**Access to the FBC.** The FBC is accessible online through the Commission's webpage, listed under Resources. Download excerpts of the 6<sup>th</sup> Edition FBC flood provisions from the Florida Division of Emergency Management webpage, listed under Resources.

- The flood provisions fulfill some of the requirements necessary for communities that participate in the NFIP. FEMA states the flood provisions of the International Code Series®, which is the foundation of the FBC, meet or exceed the NFIP requirements for buildings and structures. However, NFIP communities are responsible for regulating all development, including activities that are not within the scope of the codes.

**Degree of Safety Warning.** The degree of flood protection afforded by the flood provisions in the FBC is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur, flooding land outside of mapped flood hazard areas.

This is accomplished by the adoption of local floodplain management regulations (see graphic). Relying on the model ordinance developed by the Florida Division of Emergency Management (DEM) and approved by FEMA, nearly all Florida communities have adopted local regulations explicitly written to rely on the FBC to satisfy the NFIP requirements for buildings (see last page).



Florida Statute s. 553.73(5) was amended in 2010 to allow communities to adopt local administrative amendments to implement the flood provisions of the FBC and local technical amendments to adopt flood provisions that are more stringent than the FBC (also called “higher standards”). Under most circumstances, local amendments will not sunset when the state adopts a new edition of the code. Model language for some higher standards is available on the DEM webpage (see Resources).

**DISCLAIMER** – This piece is intended to give the reader only general factual information current at the time of publication. This piece is not a substitute for professional advice and should not be used for guidance or decisions related to a specific design or construction project. This piece is not intended to reflect the opinion of any of the entities agencies or organizations identified in the materials and if any opinions appear are those of the individual author and should not be relied upon in any event. Applicable to 6th Edition Florida Building Code.

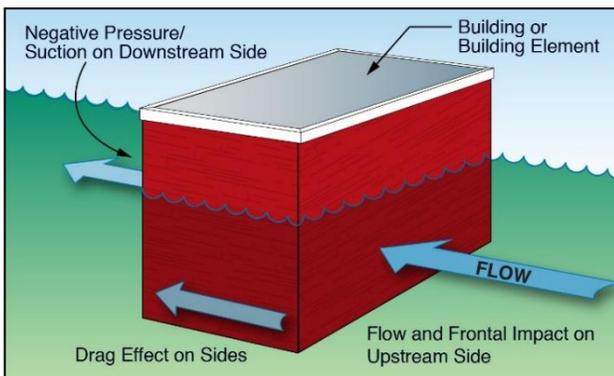
## Flood Resistant Construction

The NFIP – and the FBC – requires communities to ensure that new buildings and structures in flood hazard areas are designed and constructed to resist the effects of flood hazards and flood loads. The same requirements apply to existing buildings if proposed work is determined to constitute substantial improvement or repair of substantial damage (both terms are defined in the FBC).

Chapter 16 of the *FBC, Building* requires designers to develop flood loads, which involves determining flood conditions (flood depth, velocity, scour/erosion, and wave/debris impact). Flood loads and load combinations are described in Chapter 5 of ASCE 7, *Minimum Design Loads for Buildings and Other Structures*. Section R322 of the FBC, Residential requires dwellings to be designed and constructed in accordance with specific provisions.

Although hydrostatic load, a function of water depth, is the most obvious load and the easiest to compute, other loads may be more important in final designs. Flood conditions necessary to compute hydrodynamic loads are more difficult to determine (see graphic) and may require consultation with civil or hydraulic engineers. The FBC, Residential requires a design professional to prepare designs for homes in coastal high-hazard areas and Coastal A Zones, but not in other flood zones (see next section for descriptions of flood zones). Designers and builders are cautioned to evaluate whether any flood conditions (such as velocities or waves) may warrant a closer look at flood loads.

Other aspects of flood-resistant construction found in the FBC include the use of flood damage-resistant materials, requirements for enclosures below elevated buildings, and the location of electrical, plumbing, heating, ventilation, and air-conditioning (HVAC) equipment, swimming pools, and tanks.



## Flood Hazard Areas and Flood Conditions

Flood Insurance Rate Maps (FIRMs) prepared by FEMA are the most common flood hazard maps adopted by Florida communities. Designers and builders should check with individual communities to determine whether a locally-prepared map is used for regulatory purposes. FIRMs identify flood hazard areas associated with the base flood (the 1%-annual-chance or “100-year” flood). Some FIRMs also identify areas subject to flooding by the less frequent 500-year flood.

FIRMs identify flood hazard areas based on characteristics of flooding:

- Zone A, AE, A1–30, AO, and AH. These zones include flood hazard areas along rivers and streams, in isolated areas where floodwaters accumulate without draining to a waterway and in coastal areas inland of Zone V and along many shorelines. Floodways are designated along some rivers and streams.
- Zone V, VE, V1–30, and VO. These zones identify coastal high-hazard areas found along open coastlines where, during the base flood, waves are expected to be 3 feet and higher.
- Limit of Moderate Wave Action. When shown, the LiMWA identifies the inland extent of 1.5-foot waves and the area between the LiMWA and the Zone V boundary or shoreline is designated as Coastal A Zone.
- Zone X (shaded) identifies areas subject to flooding by the 500-year flood and Zone X (unshaded) identifies land areas that are outside of the 100- and 500-year flood hazard areas.

**Coastal A Zone.** Revised FIRMs for coastal communities may have a Limit of Moderate Wave Action (LiMWA) delivered. The area between the LiMWA and the Zone V boundary or the shore is designated the “Coastal A Zone.”

Some site-specific flood conditions can be determined using FIRMs and associated Flood Insurance Studies, while others can be estimated using the best available information (for a general discussion, see the checklist in Appendix C in FEMA P-936, *Floodproofing Non-Residential Buildings*):

- Flood depth, used to compute lateral and vertical hydrostatic loads, is determined by subtracting the ground elevation from the base flood elevation (BFE) shown on the FIRM. Lateral hydrostatic loads need not be considered for enclosures below elevated buildings that have flood openings to allow floodwater to flow in and out automatically. Vertical (buoyant) hydrostatic loads are calculated for

elements below the BFE and may be important when soils are saturated.

- Flood velocity, used to compute hydrodynamic load, may be estimated in riverine areas if the Flood Insurance Study has a floodway data table or by using standard methods for estimating open-channel flow velocities (see FEMA’s *Recommended Procedures for Flood Velocity Data Development*. In coastal areas there is more uncertainty in estimating flood velocity, which is speed of the mass movement of floodwater, not breaking waves (e.g., as a storm surge moves onshore or recedes). A number of FEMA references include a graph showing velocity as a function of stillwater flood depth (see FEMA P-55, *Coastal Construction Manual*).
- Debris in moving water can impart a considerable impact load when it collides with buildings. Whether debris is likely to be present, and the types and sizes of debris, cannot be determined from flood maps and studies. ASCE 7 Chapter 5 commentary provides guidance for consideration of debris impact loads.
- Wave loads, important in coastal areas, depend largely on wave height. Wave height is a function of stillwater flood depth and may be approximated using information in Flood Insurance Studies. The magnitude of wave loads can be 10 times or more than wind forces. ASCE 7 Chapter 5 commentary provides guidance on determining wave loads.
- Erosion and scour may affect the stability of foundations and the loss of supporting soils should be considered because it affects flood loads. Refer to FEMA P-55 for guidance on the effects of erosion and scour.
- Duration of flooding, although not a direct contribution to flood loads, is a condition that warrants consideration. Long-duration flooding is more likely to delay reoccupancy and is a factor in whether dry floodproofing measures can be used for nonresidential buildings (not allowed in Zone V). Also, long-duration flooding is likely to cause nonstructural damage even if flood damage-resistant materials are used.

If BFEs are not shown on the flood hazard map, the FBC gives the building official the authority to require the permit applicant to obtain and use data from another source or to determine the design flood elevation (DFE) using accepted engineering practices. Many communities provide applicants with BFE or flood depth information, and some communities may allow the use of approximation methods, such as interpolating the special flood hazard area boundary based on topographic mapping.

**New Flood Requirements in the 6<sup>th</sup> Ed. FBC.** For easy identification in the following descriptions, underlining identifies the flood requirements that are new to the 6<sup>th</sup> Edition FBC.

## FBC, Building – Chapter 1 Administration

Chapter 1 establishes the applicability of the code and describes how the code is to be applied and enforced. This chapter includes flood provisions in a number of sections:

- Hunting “camps” are exempt from the FBC unless certain conditions apply, including location in the “100-year floodplain” (Sec. 102.2).
- Site plans should show flood hazard areas, floodways, and DFEs (Sec. 107.2.5).

**BFE and DFE.** The codes use the term DFE, which is the same as the BFE unless the community adopts a map showing a more extensive flood hazard area than the SFHA with flood elevations higher than the BFE. Some communities adopt additional maps to show areas prone to flooding outside of the SFHA.

- The minimum plan review criteria include flood hazard areas, flood zones, DFE, lowest floor elevations, enclosures and flood damage-resistant materials (Sec. 107.3.5).
- The authority to issue permits on the basis of affidavits (Sec. 105.1 and Sec. 107.6.1) does not extend to the flood load and flood resistant requirements of the FBC to preserve the NFIP requirement that local officials review and approve permits.
- As part of required inspections, submission of certifications (prepared by a Florida licensed professional surveyor) of the lowest floor elevation are required upon placement of the lowest floor and prior to further vertical construction. Final (“as-built”) certifications must be submitted as part of the final inspection (Sec. 110.3).
- Certificates of occupancy are to include a statement that the elevation certificate has been provided and is retained in the community’s records (Sec. 111.2).

Also see flood provisions in Sec. 102.2.5 (certain exemptions that may be adopted by enforcement districts), Sec. 102.7 (relocation of manufactured buildings), and Sec. 117.1 (variances in flood hazard areas, which refers to local floodplain management regulations).

## FBC, Building

Most, but not all, flood provisions in the FBC, Building are found in Sec. 1612, Flood Loads (see Table 1612.1 for a listing of all flood provisions in the FBC). The following highlight key provisions:

- In Sec. 1612.3, flood hazard areas are established by local floodplain management ordinances, which adopt flood hazard maps and supporting data. FEMA Flood Insurance Studies and Flood Insurance Rate Maps (FIRMs) are specified. Some Florida communities adopt locally prepared studies and maps.

**Special Detailed Requirements Based on Use and Occupancy.** Special detailed requirements (Chapter 4) based on use and occupancy include flood provisions in Sec. 449 (hospitals), Sec. 450 (nursing homes), Sec. 453 (educational facilities), and Sec. 454 (pools).

- Detailed specifications for flood-resistant design are not included in the code. Rather, Sec. 1612.4 refers to ASCE 24, Flood Resistant Design and Construction, for specific requirements. A number of requirements in ASCE 24 are based on the Flood Design Class that is assigned in Sec. 1603.1.7 (see ASCE 24 for Flood Design Classes, which are similar to risk categories).

**Notice of Local Higher Standards (Freeboard).** Many Florida communities adopt requirements for additional elevation above the minimum in the FBC, ranging from 2 to 4 feet above the BFE. This added factor of safety is called “freeboard.” Buildings that are higher than the BFE sustain less damage and owners pay lower Federal flood insurance premiums (see graphic).

- Elevation requirements depend on flood zone. See the summary of elevation requirements in Highlights of ASCE 24-14 prepared by FEMA. Elevation requirements above the BFE start at +1 foot (Flood Design Class 2) and go up to +2 feet or the 500-year flood elevation, whichever is higher (Flood Design Class 4).
- Coastal A Zones, if designated, are treated as Zone V, although backfilled stemwalls are permitted if foundation designs account for scour.
- Specific requirements for enclosures below elevated buildings are based on flood zone. All enclosure walls must have flood openings, including walls intended to breakaway under wave loads. Enclosures are limited to uses for parking, storage and building access.

- The use of dry floodproofing (only nonresidential occupancies in Zone A) is limited depending on flood velocities and adequate warning time to implement measures that require human intervention. A Florida amendment to ASCE 24 permits dry floodproofing in Coastal A Zones provided designs account for wave loads and potential erosion and scour.
- Utility equipment and machinery that serve buildings are required to be elevated or meet a specific performance expectation. Similar requirements are found in the *FBC, Mechanical; FBC, Plumbing; and FBC, Fuel Gas*.
- Sec. 1612.5 requires submission of elevation certification (also see Sec. 110.3, Inspections) and, if pertinent to specific buildings, design documentation for dry floodproofing, engineered openings, foundation and anchorage, and breakaway walls. Design documentation must be prepared and sealed by registered design professionals.
- Sec. 1804.4 includes requirements for grading and fill. Where allowed in flood hazard areas, fill shall be placed, compacted, and sloped to be stable under flood conditions.
- Sec. 3109 includes requirements for buildings seaward of the Coastal Construction Control Line (CCCL). Areas seaward of the CCCL that are also mapped as flood hazard areas are subject to the more restrictive of the flood requirements. This section is revised in the 6<sup>th</sup> Edition FBC to minimize differences with Sec. 1612 and ASCE 24.
- Buildings in “high-velocity hurricane zones” (Broward and Miami-Dade counties) are required to comply with the specific provisions for those zones and also the requirements of Sec. 1612, if located in flood hazard areas (Sec. 1601.1).

**BASF CCCL Fact Sheet.** Visit [www.buildingasafeflorida.org](http://www.buildingasafeflorida.org) to download a fact sheet summary of the revised CCCL requirements.

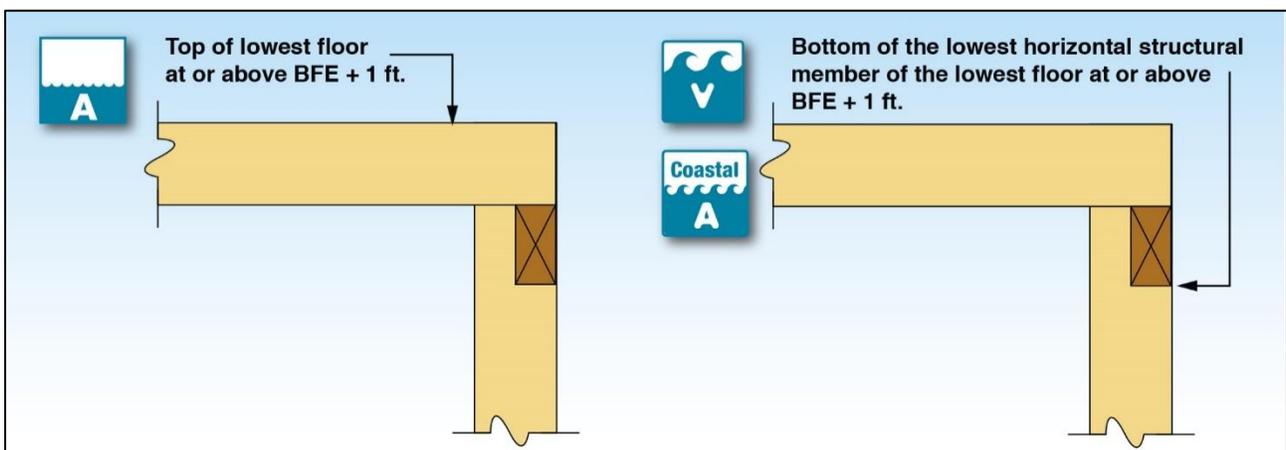
## FBC, Residential

Most, but not all, flood provisions in the FBC, Residential are found in Sec. R322, *Flood-Resistant Construction* (see FBC, Building Table 1612.1 for a listing of all flood provisions in the *FBC, Residential*). Unlike the *FBC, Building*, which refers to ASCE 24, the *FBC, Residential* includes detailed requirements. Dwellings seaward of the CCCL must be in accordance with Sec. 3109 of the *FBC, Building*. The following highlight key provisions:

- New in the 6<sup>th</sup> Edition, areas subject to wave heights between 1 ½ and 3 feet are delineated (by Limit of Moderate Wave Action) or otherwise designated by the community as Coastal A Zones (CAZ). If CAZs are designated, dwellings in CAZs must comply with the requirements for Zone V in Sec. R322.3.
- In Table R301.2(1), communities adopt local floodplain management ordinances to specify the date of entry into the NFIP and the title and date of the current Flood Insurance Study and FIRMs.
- Sec. R309.3 requires garages to be elevated or, if below the BFE and used solely for parking, access or storage, meet the requirements of Sec. 322 (for enclosed areas below the BFE).
- Sec. R322.1 includes general provisions that apply to dwellings in all flood hazard areas (including Zone A, Zone V, and Coastal A Zones):
  - Dwellings proposed in identified floodways are required to be designed and constructed according to ASCE 24. This requirement recognizes that flooding is deeper and usually flows faster in floodways, which include the channel and adjacent lands that should be reserved to convey floodwaters. Obstructing flow in floodways can cause increases in flood depths, which may cause increased damage on adjacent properties.
  - Sec. R322.1.1 permits use of ASCE 24 in all flood hazard areas as an alternative to the requirements of Sec. R322.
  - In areas commonly referred to as “approximate Zone A” where FIRMs do not specify BFEs, the building official may require use of data available from another source or may require the applicant to

determine flood elevations using accepted engineering practices. Keeping a record of elevations used previously is a good practice so that future permit decisions can be based on the same data.

- The lowest floor is defined as the floor of the lowest enclosed area, but does not include unfinished enclosures below elevated dwellings that comply with the code (see graphic below).
- Unfinished enclosures under elevated buildings are permitted if used only for parking, building access or limited storage (or crawlspace). Building officials should ensure that plans specify enclosed areas are only for those uses. An owner who subsequently modifies an enclosure in any way that alters compliance with these requirements may be subject to higher Federal flood insurance premiums.
- Utility equipment and machinery that serve buildings must be elevated or meet a specific performance expectation that generally cannot be met by typical installations.
- Use of flood damage-resistant materials is required below the elevations required in R322.2 (Zone A) and R322.3 (Zone V and Coastal A Zone). These materials are capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. FEMA Technical Bulletin 2, *Flood Damage-Resistant Materials Requirements*, is referenced for materials and installation methods.
- Dwellings seaward of the CCCL that are also in mapped flood hazard areas must comply with the more restrictive of Sec. 3109 of the *FBC, Building* and Sec. R322.



- Sec. R322.2 includes specific requirements that apply in flood hazard areas commonly referred to as “Zone A.” (except in Coastal A Zones, which are subject to Sec. R322.3). The Zone A requirements include:

- Minimum elevation requirements call for the lowest floor (see graphic left, previous page), including basement, to be at or above the BFE plus 1 foot or DFE, whichever is higher. The additional elevation, called “freeboard,” is required in all flood hazard areas. (see graphic below) Basements and all areas that are below grade on all sides are not permitted.

- The area below elevated dwellings may be enclosed by foundation walls or framed walls. To minimize damage due to hydrostatic loads, flood openings are required (see FEMA Technical Bulletin 1, *Openings in Foundation Walls and Walls of Enclosures*). Flood openings may be prescriptive (providing 1 square inch of net open area for each square foot of enclosed area) or engineered (requires design certification). Measurement of net open area must account for the presence of louvers, blades, screens, and faceplates.

**Enclosures and Flood Insurance.** Federal flood insurance is more expensive if Zone V buildings have enclosures below the BFE, even if the walls are compliant breakaway walls. Insurance is even more expensive if enclosures are larger than 300 square feet.

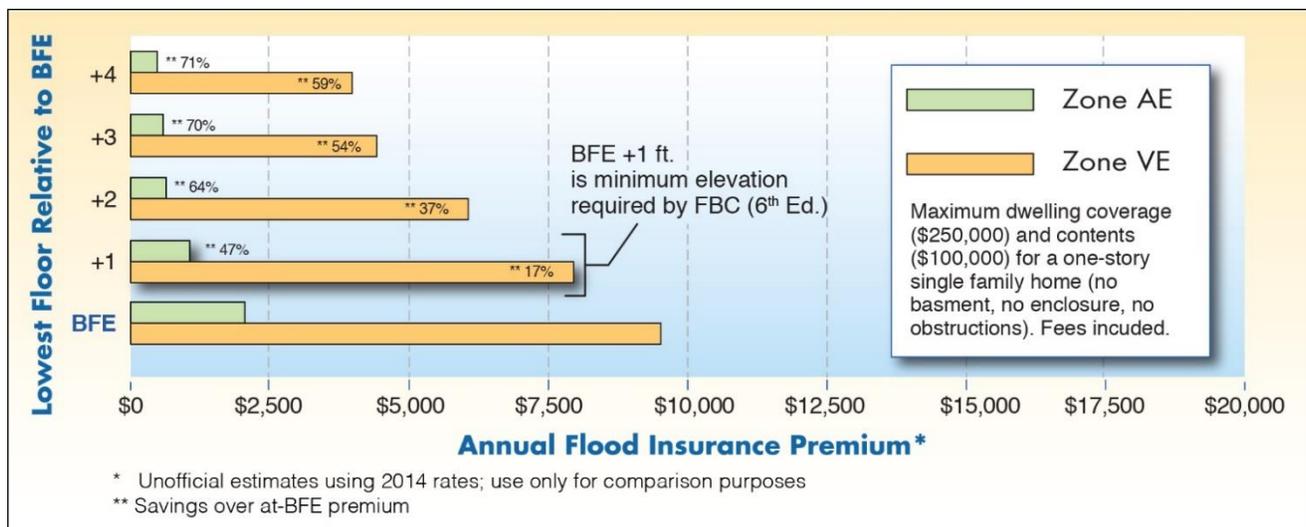
- Tanks may be installed underground or on-grade (if anchored to resist flood loads) or elevated on platforms.

- Sec. R322.3 includes specific requirements that apply in coastal high-hazard areas, commonly referred to as “Zone V,” and Coastal A Zones:

- Minimum elevation requirements call for the bottom of the lowest horizontal structural member of the lowest floor(see graphic previous page, right) to be elevated to or above the BFE plus 1 foot or DFE, whichever is higher. The additional elevation, called “freeboard,” is required in all flood hazard areas. (see graphic below)

- Foundations are limited to pilings or columns because they present the least obstruction to the passage of waves. In CAZ, backfilled stemwalls are permitted if foundations have deep footings to account for scour. Foundation designs are required to be certified by a registered design professional.

- The area under elevated homes must be free of obstruction (see FEMA Technical Bulletin 5, *Free-of-Obstruction Requirements*). The area may be enclosed with insect screening or open lattice or, if enclosed by walls, the walls must be designed to break away under flood loads without causing damage to the foundation or elevated building. FEMA Technical Bulletin 9, *Design and Construction Guidance for Breakaway Walls Below Elevated Coastal Buildings*, includes prescriptive requirements for breakaway walls. The code specifies that utility components are not permitted to be mounted on or penetrate breakaway walls because post-flood investigations have determined that walls with such components do not break away cleanly. Flood openings are required in breakaway walls to minimize wall failure under relatively shallow flooding.



- An exterior door is required in the doorway at the top of stairways that provide access to dwellings and that are enclosed by breakaway walls.
- Tanks may be installed underground (if anchored to resist flood loads) or elevated on platforms.
- Dwellings in flood hazard areas in “high-velocity hurricane zones” (Broward and Miami-Dade counties) are required to comply with the specific provisions for those zones and also the requirements of Sec. R322 (also see Sec. R301.1 and Sec. R401.1).
- In Zone A, above-ground pools, on-ground pools and in-ground pools that involve placement of fill are allowed without any special requirements unless located in a floodway, in which case documentation must be provided to evaluate the effects of the encroachment on flood elevations. Pools in Zone V are required to conform to the requirements of ASCE 24, which preclude obstructing flow that causes damage to other buildings. For consistency, Chapter 41, Swimming Pools, cross-references to Sec. R322.
- Chapters with specifications for mechanical systems, HVAC systems, duct construction, combustion air, boilers and water heaters, special piping and storage systems, fuel gas, plumbing, plumbing fixtures, sanitary drainage and vent systems all include flood provisions. In general, the pertinent sections refer to Sec. R322.1.6.

## FBC, Existing Building

A fundamental premise of the FBC, Existing Building is that work on an existing building does not lessen the compliance or conformance of the structure. It is important to keep this in mind when considering projects that repair, alter, add to, or otherwise improve buildings in flood hazard areas that were originally built to comply with flood-resistant requirements. For example, the open area under buildings required to be elevated on pilings is permitted to be enclosed by walls only if the walls comply with the flood-resistant construction requirements and if the use of the resulting enclosure is limited only to parking, building access or storage.

The first step when considering work on an existing building in a flood hazard area is to determine whether the proposed work constitutes “substantial improvement” (SI) or repair of “substantial damage” (SD). If a proposal is determined to be SI/SD, then the existing building is required to be brought into compliance with the requirements for new construction found in Sec. 1612 of the FBC, Building or R322 of the FBC, Residential, as applicable.

The SI/SD determination is made by comparing the cost of all of the proposed work to the market value of the building (excluding land) before the work is undertaken. If a proposal

is to repair a damaged building, the market value is the value of the building before the damage occurred. When the cost equals or exceeds 50% of the market value, the work is determined to be substantial improvement or repair of substantial damage. In 2010, FEMA published FEMA P-758, Substantial Improvement/Substantial Damage Desk Reference, to summarize extensive guidance, include sample letters and an informative sample packet for applicants, designers and builders (Appendix D). Communities should establish procedures for consistent handling of applications to do work on existing buildings.

**Notice of Local Amendments (Cumulative SI).** Some Florida communities enforce “cumulative” SI over a specified period of time (e.g., 1, 5 or 10 years or life of the building). These communities keep records and evaluate whether each subsequent proposal to improve or repair a building will trigger the SI requirement to bring the building into compliance with the requirements for new construction.

The flood provisions of the FBC, Existing Building are found in several chapters (see Table 1612.1 for a listing of all flood provisions in the FBC, Existing Building):

- Repairs. Chapter 6 has a general requirement that requires compliance when the repair of a building in a flood hazard area constitutes substantial improvement (Sec. 601.3). Sec. 606.2.4 also specifies that buildings that have sustained substantial damage shall be brought into compliance. Compliance refers to the requirements for new construction in Sec. 1612 of the FBC, Building or Sec. R322 of the FBC, Residential, as applicable.
- Alterations – Levels 1, 2, and 3. Chapter 7, Alterations – Level 1, has a general requirement that requires compliance when alterations constitute substantial improvement (Sec. 701.3). Because the requirements for alterations are cumulative, the requirement in Chapter 7 also applies to Level 2 alterations (Chapter 8) and Level 3 alterations (Chapter 9).
- Additions. Handling additions is complicated by the fact that some circumstances prompt compliance of the addition as well as the base building. Sec. 1103.5 distinguishes between horizontal additions that are structurally connected and those that are not structurally connected. It also specifies that if vertical additions or foundation work are determined to constitute substantial improvement, then base buildings must be brought into compliance. New or replacement foundations must

**Reconstruction is New Construction.** Reconstruction of a building that is demolished or so significantly damaged that it cannot be repaired is new construction, even if the old foundation can be reused.

comply, without requiring SI/SD determinations. DEM's guidance listed in Resources is based on FEMA P-758.

- **Historic Buildings.** The key to proper enforcement of the flood provisions is whether a historic building meets the exception in Sec. 1201.3. The FBC, Existing Building defines "historic buildings," however, the definition is not entirely consistent with the definition used by the NFIP. The NFIP allows historic buildings in flood hazard areas to be improved and repaired without bringing them into compliance provided the buildings are qualified. Importantly, any proposed work must not preclude such buildings from continued listing as historic. FEMA guidance suggests building officials require applicants to obtain evidence of continued designation from the appropriate authority or a qualified historic resources professional.
- **Relocated or Moved Buildings.** Sec. 1302.6 specifies that buildings relocated or moved into flood hazard areas are required to comply with the flood provisions of Sec. 1612 or R322, as applicable (no determination of substantial improvement). This means new foundations must meet the elevation and other requirements based on the flood zone of the new location.
- **Prescriptive Compliance.** The sections that articulate the prescriptive compliance method for additions, alterations, and repairs and each specify that if the work constitutes SI/SD, then the existing building must be brought into compliance with the requirements for new construction (Chapter 4). Similarly, the performance compliance method includes the same requirement (Chapter 14).

## FBC, Mechanical, Plumbing, Fuel Gas

Each of the mechanical, plumbing and fuel gas codes includes similar provisions requiring equipment and systems to be located at or above the elevation specified in Sec. 1612.4 (thus matching the elevation of the building) or to meet a specific performance expectation that generally cannot be met by typical installations. See Table 1612.1 for a listing of all flood provisions in these codes. Of particular note:

- Each code specifies that systems and equipment shall not be mounted on or penetrate walls intended to break away under flood loads (applies in Zone V and Coastal A Zones).
- *FBC, Mechanical* requires ducts to be located above the elevation specified in Sec. 1612.4 or designed and constructed to prevent water from entering or accumulating and to resist flood loads.

## Local Floodplain Management Regulations

Florida communities adopt local floodplain management regulations to regulate development activities in identified flood hazard areas. The regulations (typically called "ordinances"), in conjunction with the *Florida Building Code*, meet or exceed the minimum requirements of the NFIP. Development other than buildings includes subdivision of land; filling, grading, and other site improvements and utility installations; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development. Importantly, to fulfill the NFIP requirements, floodplain management ordinances also regulate structures, and facilities that are exempt from the *Florida Building Code*.

Local floodplain management regulations are administered in conjunction with the *Florida Building Code*. Key features include:

- Adoption of Flood Insurance Studies and FIRMs to establish flood hazard areas (flood zones).
- Designation of the Floodplain Administrator; in many communities, the Building Official is designated the Floodplain Administrator, while in others the position is assigned to a different office.
- Duties of the Floodplain Administrator, including review of applications for development other than buildings, inspection of permitted development and flood hazard areas, maintenance of records.
- Details of the process for making substantial damage and substantial improvement determinations.
- Specifications for determining flood elevations in areas without BFEs on FIRMs.
- Procedures, limitations, and conditions for evaluating requests for variances, including variances from the flood provisions of the *Florida Building Code*.
- Requirements for the following:
  - Subdivisions, including manufactured home parks and subdivisions
  - Site improvements and utilities (sanitary sewage facilities and water supply facilities)
  - Placement of fill
  - Manufactured homes, recreational vehicles (including park trailers)
  - Tanks (above-ground and underground)

- Limitations on development in floodways, including fill, fences, retaining walls, roads and watercourses, in addition to buildings and structures. Applications must be accompanied by analyses to determine proposed activities do not increase flood levels.
- General requirements for any development not specifically addressed, including:
  - Anchoring to prevent flotation, collapse or lateral movement resulting from flood loads
  - Use of flood damage-resistant materials
  - Mechanical, plumbing and electrical systems elevated or protected

**Assistance from DEM.** DEM is designated by the Governor to be the link between Florida communities and the NFIP. Changes to floodplain management ordinances should be reviewed by DEM prior to adoption. Contact the State Floodplain Management Office for guidance.

## Resources

DBPR Building Code Information System, 6<sup>th</sup> Edition  
Florida Building Code (2017), International Code Council, Inc.; [www.FloridaBuilding.org](http://www.FloridaBuilding.org).

DEM Local Ordinance & Building Code Resources (excerpts of the FBC and Highlights of ASCE 24-14); [www.floridadisaster.org/Mitigation/SFMP/lobc\\_resources.htm](http://www.floridadisaster.org/Mitigation/SFMP/lobc_resources.htm).

ASCE 7, Minimum Design Loads for Buildings and Other Structures (2010).

ASCE 24, Flood Resistant Design and Construction (2014).

FEMA, Recommended Procedures for Flood Velocity Data Development (November 2012); [www.fema.gov/media-library/assets/documents/29944](http://www.fema.gov/media-library/assets/documents/29944).

FEMA P-55, Coastal Construction Manual (Fourth Edition, April 2011); [www.fema.gov/media-library/assets/documents/3293](http://www.fema.gov/media-library/assets/documents/3293).

FEMA P-936, Floodproofing Non-Residential Buildings (July 2013); [www.fema.gov/media-library/assets/documents/34270](http://www.fema.gov/media-library/assets/documents/34270).

FEMA P-758, Substantial Improvement/Substantial Damage Desk Reference (May 2010); [www.fema.gov/media-library/assets/documents/18562](http://www.fema.gov/media-library/assets/documents/18562).

NFIP Technical Bulletins: A series of guidance on a variety of floodplain management topics; [www.fema.gov/media-library/resources-documents/collections/4](http://www.fema.gov/media-library/resources-documents/collections/4).

## Answers to Specific Questions

Florida Division of Emergency Management, State Floodplain Program Office: 1-850-815-4556 and [floods@em.myflorida.com](mailto:floods@em.myflorida.com).

Florida Building Commission: 1-850-487-1824 and [www.FloridaBuilding.org](http://www.FloridaBuilding.org).

### Don't know where to go for an answer to a specific question?

Contact Building A Safer Florida, Inc. 1-850-222-2772 and [www.buildingasaferflorida.org](http://www.buildingasaferflorida.org).