

d) FEMA 348 Protecting Building Utilities from Flood Damage

e) FEMA 499 Home Builder's Guide to Coastal Construction Technical Fact Sheets

Article IV. PROVISIONS FOR FLOOD HAZARD REDUCTION

A. General Standards

Development may not occur in the Special Flood Hazard Area (SFHA) where alternative locations exist due to the inherent hazards and risks involved. Before a permit is issued, the applicant shall demonstrate that new structures cannot be located out of the SFHA and that encroachments onto the SFHA are minimized. In all areas of special flood hazard the following provisions are required:

1. **Anchoring** – All new construction and substantial improvements shall be anchored to prevent flotation, collapse, and lateral movement of the structure.
2. **Flood Resistant Materials and Equipment** – All new construction and substantial improvements shall be constructed with flood resistant materials and utility equipment resistant to flood damage in accordance with Technical Bulletin 2, *Flood Damage-Resistant Materials Requirements*, dated 8/08, and available from the Federal Emergency Management Agency.
3. **Minimize Flood Damage** – All new construction and substantial improvements shall be constructed by methods and practices that minimize flood damages,
4. **Critical Development** – shall be elevated to the 500 year flood elevation or be elevated to the highest known historical flood elevation (where records are available), whichever is greater. If no data exists establishing the 500 year flood elevation or the highest known historical flood elevation, the applicant shall provide a hydrologic and hydraulic engineering analysis that generates 500 year flood elevation data,
5. **Utilities** – Electrical, ventilation, plumbing, heating and air conditioning equipment (including ductwork), and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of the base flood plus 1 feet.
6. **Water Supply Systems** – All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system,
7. **Sanitary Sewage Systems** – New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters, On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding,

8. **Gas Or Liquid Storage Tanks** – All gas or liquid storage tanks, either located above ground or buried, shall be anchored to prevent floatation and lateral movement resulting from hydrodynamic and hydrostatic loads.
9. **Alteration, Repair, Reconstruction, Or Improvements** – Any alteration, repair, reconstruction, or improvement to a structure that is in compliance with the provisions of this ordinance, shall meet the requirements of "new construction" as contained in this ordinance. This includes post-FIRM development and structures.
10. **Non-Conforming Buildings or Uses** – Non-conforming buildings or uses may not be enlarged, replaced, or rebuilt unless such enlargement or reconstruction is accomplished in conformance with the provisions of this ordinance. Provided, however, nothing in this ordinance shall prevent the repair, reconstruction, or replacement of an existing building or structure located totally or partially within the floodway, provided that the bulk of the building or structure below base flood elevation in the floodway is not increased and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance,
11. **American with Disabilities Act (ADA)** – A building must meet the specific standards for floodplain construction outlined in Article IV.B, as well as any applicable ADA requirements. The ADA is not justification for issuing a variance or otherwise waiving these requirements. Also, the cost of improvements required to meet the ADA provisions shall be included in the costs of the improvements for calculating substantial improvement.

B. Specific Standards

In all areas of special flood hazard (Zones A, AE, AH, AO, A1-30, V, and VE) where base flood elevation data has been provided, as set forth in Article I.D or outlined in the Duties and Responsibilities of the Local Administrator Article III.E., the following provisions are required:

1. **Residential Construction** – New construction and substantial improvement of any residential structure (including manufactured homes) shall have the lowest floor elevated no lower than 1 feet above the base flood elevation. No basements are permitted. Should solid foundation perimeter walls be used to elevate a structure, flood openings sufficient to automatically equalize hydrostatic flood forces, shall be provided in accordance with the elevated buildings requirements in Article IV B.4.
2. **Non-Residential Construction**
 - a) New construction and substantial improvement of any commercial, industrial, or non-residential structure (including manufactured homes) shall have the lowest floor elevated no lower than 1 feet, above the level of the base flood elevation. Should solid foundation perimeter walls be used to elevate a structure, flood openings sufficient to automatically equalize hydrostatic flood forces, shall be provided in accordance with the elevated buildings requirements in

Article IV B.4. No basements are permitted. Structures located in A-zones may be floodproofed in lieu of elevation provided that all areas of the structure below the required elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy.

- b) A registered, professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certifications shall be provided to the official as set forth in the floodproofing certification requirements in Article III.D.2.a. A variance may be considered for wet-floodproofing agricultural structures in accordance with the criteria outlined in Article V.D of this ordinance. Agricultural structures not meeting the criteria of Article V.D must meet the non-residential construction standards and all other applicable provisions of this ordinance. Structures that are floodproofed are required to have an approved maintenance plan with an annual exercise. The Local Administrator must approve the maintenance plan and notification of the annual exercise shall be provided to it.

3. **Manufactured Homes**

- a) Manufactured homes that are placed or substantially improved on sites outside a manufactured home park or subdivision, in a new manufactured home park or sub-division, in an expansion to an existing manufactured home park or subdivision, or in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, must be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated no lower than 1 feet above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.
- b) Manufactured homes that are to be placed or substantially improved on sites in an existing manufactured home park or subdivision that are not subject to the provisions for residential construction in Article IV.B.1 of this ordinance must be elevated so that the lowest floor of the manufactured home is elevated no lower 1 feet than above the base flood elevation, and be securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement.
- c) Manufactured homes shall be anchored to prevent flotation, collapse, and lateral movement. For the purpose of this requirement, manufactured homes must be anchored to resist flotation, collapse, and lateral movement in accordance with Section 40-29-10 of the *South Carolina Manufactured Housing Board Regulations*, as amended. Additionally, when the elevation requirement would be met by an elevation of the chassis 36 inches or less above the grade at the site, the chassis shall be supported by reinforced piers or engineered foundation. When the elevation of the chassis is above 36 inches in height an engineering certification is required.

- d) An evacuation plan must be developed for evacuation of all residents of all new, substantially improved or substantially damaged manufactured home parks or subdivisions located within flood-prone areas. This plan shall be filed with and approved by the local administrator and the local Emergency Preparedness Coordinator.
4. **Elevated Buildings** – New construction and substantial improvements of elevated buildings that include fully enclosed areas below the lowest floor that are usable solely for the parking of vehicles, building access, or limited storage in an area other than a basement, and which are subject to flooding shall be designed to preclude finished space and be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.
- a) Designs for complying with this requirement must either be certified by a professional engineer or architect or meet or exceed all of the following minimum criteria:
- (1) Provide a minimum of two openings on different walls having a *total net area* of not less than one square inch for every square foot of enclosed area subject to flooding.
 - (2) The bottom of each opening must be no more than 1 foot above the higher of the interior or exterior grade immediately under the opening,
 - (3) Only the portions of openings that are below the base flood elevation (BFE) can be counted towards the required net open area.
 - (4) Openings may be equipped with screens, louvers, valves, or other coverings or devices provided they permit the automatic flow of floodwaters in both directions.
 - (5) Fill placed around foundation walls must be graded so that the grade inside the enclosed area is equal to or higher than the adjacent grade outside the building on at least one side of the building.
- b) Hazardous Velocities - Hydrodynamic pressure must be considered in the design of any foundation system where velocity waters or the potential for debris flow exists. If flood velocities are excessive (greater than 5 feet per second), foundation systems other than solid foundations walls should be considered so that obstructions to damaging flood flows are minimized.

c) Enclosures below Lowest Floor

- (1) Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment used in connection with the premises (standard exterior door) or entry to the living area (stairway or elevator).
 - (2) The interior portion of such enclosed area shall not be finished or partitioned into separate rooms, must be void of utilities except for essential lighting as required for safety, and cannot be temperature controlled.
 - (3) One wet location switch and/or outlet connected to a ground fault interrupt breaker may be installed below the required lowest floor elevation specified in the specific standards outlined in Article IV.B.1, 2 and 3.
 - (4) All construction materials below the required lowest floor elevation specified in the specific standards outlined in Article IV.B 1, 2, 3 and 4 should be of flood resistant materials.
5. **Floodways** – Located within areas of special flood hazard established in Article I.D, are areas designated as floodways. The floodway is an extremely hazardous area due to the velocity of floodwaters that carry debris and potential projectiles and has erosion potential. The following provisions shall apply within such areas:
- a) No encroachments, including fill, new construction, substantial improvements, additions, and other developments shall be permitted unless:
 - (1) It has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood. Such certification and technical data shall be presented to the local administrator.
 - (2) A Conditional Letter of Map revision (CLOMR) has been approved by FEMA. A Letter of Map Revision must be obtained upon completion of the proposed development.
 - b) If Article IV.B.5a is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Article IV.
 - c) No manufactured homes shall be permitted, except in an existing manufactured home park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring and the elevation standards of Article IV B.3 and the encroachment standards of Article IV.B.5(a) are met.

- d) Permissible uses within floodways may include: general farming, pasture, outdoor plant nurseries, horticulture, forestry, wildlife sanctuary, game farm, and other similar agricultural, wildlife, and related uses. Also, lawns, gardens, play areas, picnic grounds, and hiking and horseback riding trails are acceptable uses, provided that they do not employ structures or fill. Substantial development of a permissible use may require a no-impact certification. The uses listed in this subsection are permissible only if and to the extent that they do not cause any increase in base flood elevations or changes to the floodway configuration.

6. Recreational Vehicles

- a) A recreational vehicle is ready for highway use if it is:
 - (1) on wheels or jacking system
 - (2) attached to the site only by quick-disconnect type utilities and security devices; and
 - (3) has no permanently attached additions
- b) Recreational vehicles placed on sites shall either be:
 - (1) on site for fewer than 180 consecutive days; or
 - (2) be fully licensed and ready for highway use, or *meet* the development permit and certification requirements of Article III.D, general standards outlined in Article IV.A, and manufactured homes standards in Article IV.B.3 and B.4.

7. **Map Maintenance Activities** – The National Flood Insurance Program (NFIP) requires flood data to be reviewed and approved by FEMA. This ensures that flood maps, studies and other data identified in Article I.D accurately represent flooding conditions so appropriate floodplain management criteria are based on current data. The following map maintenance activities are identified:

- a) Requirement to Submit New Technical Data

- (1) For all development proposals that impact floodway delineations or base flood elevations, the community shall ensure that technical or scientific data reflecting such changes be submitted to FEMA as soon as practicable, but no later than six months of the date such information becomes available. These development proposals include; but not limited to:
 - (a) Floodway encroachments that increase or decrease base flood elevations or alter floodway boundaries;