Proposed Code Modifications

This document created by the Florida Department of Business and Professional Regulation - 850-487-1824

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Modified: 8**

Total Mods for report: 63

Sub Code: Building

SP7210

1

Date Submitted	12/12/2018	**Section**	451	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments **No** | **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Identifies the operating room size for an ASC

Rationale

Identifies the minimum size of an operating room in an ASC. Makes editorial correction to section 451.3.1.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Text of Mod 7210 including A1

451.3 Additional physical plant requirements for ambulatory surgical centers.

451.3.1 In addition to the codes and standards referenced in Section 451.2 of this code, the minimum standards of construction and specified minimum essential facilities described in Section 451.3 of this code shall apply to all ambulatory surgical centers as described in Section 451.1 of this code~~.~~ and to all new additions, alterations or renovations to existing ambulatory surgical center on the effective date of the code.

451.3~~-~~.2 ~~Reserved.~~Outpatient Operating Room. All ambulatory surgical centers shall have at least one operating room that has a minimum clear floor area of 270 square feet (25.08 square meters) as described in The Guidelines. Only this size or larger operating room(s) shall be listed as an operating room(s) for purposes of licensure.

451.3.2.1 If provided, smaller operating rooms, and all procedure, examination, or treatment rooms shall meet the requirements for these rooms as described in The Guidelines.

451.3.2.2 In lieu of audible alarm signals, visible alarm-indicating appliances shall be permitted to be used in critical care areas such as the operating room suite and the phase I recovery suite.

Alternate Language

1st Comment Period History

7210-A1

Proponent James gregory **Submitted** 2/16/2019 **Attachments** Yes

Rationale

Adds language to the operating room requirements and other critical care requirements permitting only a strobe to be located inside the Operating Room suite or Phase I recovery suite. This is necessary because some AHJs require horns to be placed inside the OR and this is a serious patient safety concern from the doctors being startled while operating or inserting medical devices.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local enforcement

Impact to building and property owners relative to cost of compliance with code

There is no impact on building and property owners relative to cost of compliance with code

Impact to industry relative to the cost of compliance with code

There is no impact on industry relative to the cost of compliance with code

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Provides a safe environment for the patient in a surgical center.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provides a more logical application of the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction

Does not degrade the effectiveness of the code

Improves the code for patient safety.

451.3.2.2 In lieu of audible alarm signals, visible alarm-indicating appliances shall be permitted to be used in critical care areas such as the operating room suite and the phase I recovery suite.

-

451.3 Additional physical plant requirements for ambulatory surgical centers.

451.3.1 In addition to the codes and standards referenced in Section 451.2 of this code, the minimum standards of construction and specified minimum essential facilities described in Section 451.3 of this code shall apply to all ambulatory surgical centers as described in Section 451.1 of this code~~.~~ and to all new additions, alterations or renovations to existing ambulatory surgical center on the effective date of the code.

451.3~~.~~.2 ~~Reserved.~~Outpatient Operating Room. All ambulatory surgical centers shall have at least one operating room that has a minimum clear floor area of 270 square feet (25.08 square meters) as described in The Guidelines. Only this size or larger operating room(s) shall be listed as an operating room(s) for purposes of licensure.

451.3.2.1 If provided, smaller operating rooms, and all procedure, examination, or treatment rooms shall meet the requirements for these rooms as described in The Guidelines.

SP7639

Date Submitted	12/3/2018	**Section**	467	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This is a general revision that corrects some sections, updates some references, adds new clarifying language, and deletes sections that are not relevant.

Rationale

This general revision is required to update for clarity the requirements for inpatient facilities and units. It adds definitions to define new and existing. It adds a reference to the 2018 Guidelines. It updates room requirements and window sill heights to meet CMS requirements. It deletes redundant requirements found in other standards and codes. It clarifies the use of a Type III EES.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Text of Mod 7639-A1

SECTION 467

HOSPICE INPATIENT FACILITIES AND

UNITS AND HOSPICE ~~RESIDENCES~~ RESIDENTIAL FACILITIES

467.1 Scope. All hospice inpatient facilities and units and ~~residences~~ residential facilities shall comply with the following design and construction standards. Enforcement and interpretation of these provisions shall be by the state agency authorized by Section 553.73, Florida Statutes.

Note: Other administrative and programmatic provisions may apply. See Department of Elder Affairs (DOEA) Rule 58A-2, Florida Administrative Code, Agency for Health Care Administration (AHCA) Rule 59C-1, Florida Administrative Code, and Chapter 400 Part VI, Florida Statutes.

467.1.2 The following are exempt from review under this ~~part~~ section:

467.1.2.1 Change of ownership of an existing licensed hospice facility or unit.

467.1.2.2 Change of the functional use of a space, room, or area when no physical plant revisions are made or are required to be made by this code.

467.1.3 The Florida Building Code, Existing Building, Section 101.2, Scope exempts state licensed facilities such as hospices from compliance with that code. Any repair, alteration, change of occupancy, addition or relocation of an existing state licensed inpatient hospice facility shall comply with the applicable requirements of this code and this section.

467.2 Physical plant ~~requirements~~ definitions ~~(inpatient facility and unit)~~.

467.2.1 As used in this ~~rule~~ section, “inpatient facility and unit” means the location where inpatient services are provided to hospice patients that are in need of hospice inpatient care.

467.2.2 As used in this section the term “inpatient facility” means a freestanding building or structure that ~~contains only a single inpatient hospice and no other health care facility types.~~ houses inpatient beds licensed exclusively to the hospice program but does not house any inpatient beds licensed to a hospital or nursing home.

467.2.3 As used in this section, the term “unit” means ~~an inpatient hospice that is separately licensed and is part of other health care and support settings.~~ a distinct part section, wing or unit within a hospital or nursing home that houses beds licensed to the hospital or nursing home but which is leased by a hospice for the provision of hospice inpatient care to its patients.

467.2.3 As used in this section, the term “existing” means an inpatient hospice facility, unit or hospice ~~residence~~ residential facility constructed and approved under a previous edition of the *Florida Building Code, Building.*

467.~~2~~.3.~~2~~ Codes and standards.

467.~~2~~.3~~2~~.1 All new inpatient facilities and units ~~and facilities~~, and additions or renovations to existing ~~units and~~ facilities and units shall be in compliance with the requirements for:

467.3.1.1 Institutional Occupancy - Group I-2, Condition 1, as described in Section 308.3 of this code; and

467.3.1.2. The National Fire Protection Association Life Safety Code 101, Chapter 18, New Health Care Occupancy for nursing homes, as described in Rule 69A-3.012, Florida Administrative Code, Standards of the National Fire Protection Association and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

467.3.1.3. Part 1of the *Guidelines for the Design and Construction of Residential Health, Care and Support Facilities* as referenced in Chapter 35 of this code.

467.~~2.2.2~~ 3.1.4 Inpatient sleeping rooms shall be made accessible in accordance with the requirements for medical care facilities of the Florida Building Code, Accessibility.

467.~~2.2.3~~ 3.1.5 In renovations and additions to existing facilities, only that portion of the total facility or unit affected by the project must comply with applicable sections of the codes for new facilities and units.

467.~~2.2.4~~ 3.1.6 Existing portions of the facility that are not included in the renovation or addition but are essential to the functioning of the complete facility, as well as existing areas which receive less than substantial amounts of new work, shall comply with the applicable sections of the codes for existing inpatient facilities and units.

467.~~2.2.5~~ 3.1.7 All existing inpatient facilities and units licensed by the Agency for Health Care Administration shall be in compliance with National Fire Protection Association Life Safety Code 101, Chapter 19, Existing Health Care Occupancy, for nursing homes and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

467.~~2.3~~ 4 Construction requirements. The following shall be provided in each inpatient facility ~~and~~ or unit:

~~467.2.3.1~~ 467.4.1 Each new patient sleeping room shall have a minimum room area exclusive of toilet room, or permanently attached or built-in closets, lockers or wardrobes, of ~~100~~ 120 square feet ~~(9.29~~… m2) per bed for private rooms and ~~80~~ 100 square feet (~~7.70~~ 9.29 m2) per bed for double occupancy rooms.

467.4.1.1 In new construction and additions, the maximum room capacity of each patient room shall be two persons. In double occupancy patient rooms, sleeping areas shall be separated from each other by a wall or partition to increase acoustic and visual privacy. Each person lying in bed shall have direct visual access to an exterior window at all times. For visual privacy, either doors or cubicle curtains to these individual patient sleeping areas shall be provided.

467.4.1.2 The design for privacy shall not restrict a patient's access at any time to the room entrance, resident armchair, toilet or bathroom, wardrobe, exterior window or closet.

~~467.2.3.2~~ 467.4.2 Each patient sleeping room shall have a window(s), with a maximum sill height of 36 inches (…m) for any building constructed after July 5, 2016, or door with a clear glass light in compliance with Section 1205.2 of this code. The window or door shall open directly to an atrium or to the outside of the building with a minimum of 20 feet (6.10 m) in clear and unobstructed vista measured perpendicularly from the window or door.

~~467.2.3.3~~ 467.4.3 Each patient sleeping room shall have a wardrobe, locker or closet suitable for hanging clothing of the patient.

~~467.2.3.4~~ 467.4.4 ~~Other than a patient sleeping room located in a hospital or nursing home, e~~Each patient sleeping room shall have access to a toilet room without having to enter the general corridor area. One toilet room shall serve no more than ~~four~~ two beds and no more than ~~two~~ one resident room~~s~~ unless the hospice unit is located inside of an existing hospital or nursing home.

467.4.4.1 The door shall be side hinged, and swing out from the toilet room, ~~and unless otherwise required by this code~~ or shall be a sliding barn door with, be at least 32 inches (813 mm) wide.

467.4.4.2 The toilet room shall contain a water closet with grab bars on both sides. ~~and an emergency nurse call station.~~

467.4.4.3 The water closet shall be equipped with a bedpan-rinsing device unless the Functional Program as described in Part I of the Guidelines for the Design and Construction of Residential facilities as referenced in Chapter 35 provides for disposable bedpans after every use.

467.4.4.4 There shall be an emergency nurse call station inside of each toilet room.

~~467.2.3~~ 467.4 5 A hand washing facility shall be provided within each patient toilet room or if the hospice unit is located inside of an existing hospital or nursing home, within each patient bedroom.

~~467.2.3~~ 467.4.6 A nurses' station, clean workroom and soiled workroom shall be provided. Access to these rooms shall be from a corridor or ante room.

~~467.2.3~~ 467.4.7 A charting space for clinical staff shall be provided at each nurses' station.

~~467.2.3.~~ 467.4.8 A hand washing facility shall be located in or near each nurses' station.
~~467.2.3.~~ 467.4.9 The clean workroom shall be provided with a work counter, hand wash facility, storage facilities and covered waste receptacle.

~~467.2.3.~~ 467.4.10 The soiled workroom shall be provided with a service sink equipped with rinsing device, work counter, a hand-washing facility, storage facilities, covered waste receptacle and covered linen receptacle.

~~467.2.3.~~ 467.4.11 A drug distribution system shall be provided with provisions for the locked storage of medications. ~~Nothing in this section shall prohibit t~~The use of the clean workroom for drug distribution shall be permitted.

~~467.2.3.~~ 467.4.12 A clean linen storage room or closet shall be provided.

~~467.2.3.~~ 467.4.13 A nourishment station with equipment for preparing or serving nourishments between scheduled meals shall be provided and shall be available for patient, family, volunteers, guests and staff use. Provisions shall be made for the use and storage of small appliances such as coffee makers or toasters. A minimum of two duplex receptacles connected to a small appliance circuit shall be provided.

~~467.2.3.~~ 467.4.14 Nurse call systems. Wired- or wireless-type nurse call systems shall be permitted if they have been tested and approved by a nationally recognized testing laboratory (NRTL) to meet the requirements of UL 1069, 7th edition, published October 12, 2007, as referenced in Chapter 35 of this code. All wireless systems shall have been tested and approved by a nationally recognized testing laboratory (NRTL) to meet the requirements of Section 49, Wireless Systems of UL 1069, 7th edition as referenced in Chapter 35 of this code. All nurse call systems whether wired or wireless shall have electronically supervised visual and audible annunciation in accordance with the supervision criteria of UL 1069, 7th edition for nurse call systems and tested and approved by a nationally recognized testing laboratory (NRTL) to meet those requirements.

467.4.14.1 A nurse call~~ing~~ system accessible by the patient shall be provided in each patient sleeping room. Nurse call master panel shall be provided at the nurses' station. Nurse call duty stations shall be provided in each clean workroom, soiled workroom, medicine preparation room and nourishment room.

~~467.2.3.~~467.4.15 Storage for administrative supplies shall be provided.

~~467.2.3.~~ 467.4.16 Parking for stretchers and wheelchairs in an area out of the path of normal traffic and of adequate size for the unit shall be provided.

~~467.2.3~~ 467.4.17 A janitor's closet with a floor drain and storage space for housekeeping equipment and supplies shall be provided.

~~467.2.3.~~ 467.4.18 A multipurpose lounge suitable and furnished for reception, recreation, dining, visitation, group social activities and worship shall be provided.

~~467.2.3.~~ 467.4.19 A conference or consultation room for patient and family use shall be provided for every hospice facility or unit.

~~467.2.3.~~ 467.4.20 A washer and dryer for patients' personal use shall be provided.

~~467.2.3.~~467.4.21 Bathing facilities.

~~467.2.3.21~~467.4.21.1 A centralized resident bathing room(s) shall be provided with a minimum of one bathtub, hydro tub, or shower for every 20 hospice inpatients or fraction thereof not otherwise served by ~~bath or~~ shower facilities designed to accommodate a shower chair, connected directly to the resident rooms.

~~467.2.3.21~~ 467.4.21.2 A separate private toilet room shall be provided that is directly accessible to each central bathing area with multiple bathing fixtures without requiring entry into the general corridor.

~~467.2.3.21.~~ 467.4.21.3 All showers located in bathing rooms connected directly to the resident rooms shall be designed so that a shower chair can be easily rolled in and out of the shower area.

467.~~2.4.~~5 Details.

467.~~2.4~~.5.1 Fixtures, such as drinking fountains, public telephone, vending machines and portable equipment, shall not be located or stored so as to restrict corridor traffic or reduce the minimum required corridor width.

~~467.2.~~ 467.4.5.2 Doors to patient tub rooms, showers and water closets that swing into the room shall be equipped with reversible hardware that will allow the door to swing out in an emergency.
~~467.2. 4.5.~~ 467.4.5.3 Doors, except those to closets or spaces not subject to occupancy, shall not swing into the exit access corridors.

~~467.2~~ 467.4.5.4 Windows and outer doors, if ~~used for ventilation~~ operable, shall be equipped with insect screens.

~~467.2.~~ 467.4.5.5 Interior thresholds and expansion joint covers shall be made flush with the floor surface.

~~467.2.4.5.~~ 467.4.5.6 Grab bars shall be provided at all patient toilets, showers, and tubs. The bars shall have a clearance of 11 /2 inches (38 mm) to the walls and shall be sufficiently anchored to sustain a concentrated applied load of not less than 250 pounds (113 kg).

~~467.2.4.5.~~ 467.4.5.7 Single paper towel dispensers, soap dispensers and covered waste receptacles shall be provided at all hand washing facilities.

~~467.2.4.5.~~ 467.4.5.8 Staff hand washing facilities shall be fitted with wrist blades and a gooseneck-type spout.

~~467.2.4.5.~~ 467.4.5.9 All hand washing facilities shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113 kg) on the front of the fixture.

467.~~2.5~~ 4.6 Elevators. In new multistory units and facilities an elevator shall be provided in compliance with the requirements of Chapter 30 of the Florida Building Code, Building . In addition, a hospital-type elevator large enough to accommodate a bed and attending staff shall service all patient sleeping rooms and patient treatment areas located above the ground floor. The car shall be at least 5 feet 8 inches (1.73 m) wide by 9 feet (2.74 m) deep and the car doors shall have a clear opening of not less than 4 feet (1.22 m) wide and 7 feet (2.13 m) high.

~~467.2.6~~ 467.4.7 Mechanical system requirements.

~~467.2.6~~ 467.4.7.1 Air conditioning, heating and ventilating systems.

1. All patient occupied areas shall be heated or cooled by individual or central units. Heating units shall be designed to provide a minimum of 72°F (22.22°C) ambient indoor temperature and air conditioning units shall be designed to provide a minimum of 78°F (25.55°C) ambient indoor temperature.

2. All air-supply and air-exhaust systems shall be mechanically operated. Fans serving exhaust systems shall be located at the discharge end of the system.

~~467.2.6.1~~ 467.4.7.1 Carbon monoxide detector. See Section 908.8.

~~467.2.6.~~ 4674. 7 2 Plumbing and other piping systems. Water distribution systems shall be arranged to provide hot water at each hot water outlet at all times. Hot water at shower, bathing, and hand washing facilities for patients' personal use shall not exceed 110°F (43.3°C).

~~467.2.7~~ 467.4.8 Electrical system requirements.

~~467.2.7~~ 467.4.8.1 Lighting.

1. All spaces occupied by people, machinery, and equipment within the building, approaches to building, and parking areas shall have electric lighting.

2. All patients' rooms shall have general lighting and night lighting. General room luminaries shall be switched at the entrance to the patient room.

~~467.2.7~~ 467.4.8.2 Receptacles. All patient rooms shall have hospital grade duplex grounding-type receptacles.

~~467.2~~ 467.4.8.3 ~~8~~ Emergency electrical system.

~~467.2.8~~ 467.4.8.3.1 A Type III essential electrical system shall be provided in all hospice facilities as described in National Fire Protection Association Life Safety Code 99, "Health Care Facilities", and incorporated by reference in Rule 69A-3.012, Florida Administrative Code. The emergency power for this system shall meet the requirements of a Level II, type 10, Class 48 generator as described in National Fire Protection Association Life Safety Code 110, "Emergency Standby Power Systems", and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

~~467.2.8.2 In new construction, the normal main service equipment shall be separated from the emergency distribution equipment by locating it in a separate room.~~

~~Transfer switches shall be considered emergency distribution equipment for this purpose.~~ The essential electrical system shall have at a minimum ~~1~~ one transfer switch. Separate electrical branches are not required.

~~467.2.8.3 Switches for critical branch lighting shall be completely separate from normal switching. The devices or cover plates shall be of a distinctive color.~~
~~Critical branch switches are permitted to be adjacent to normal switches. Switches for life safety lighting are not permitted except as required for dusk-to-dawn automatic control of exterior lighting fixtures.~~

~~467.2.8.4~~ 467.4.8.3.2 There shall be selected life safety lighting provided at a minimum of 1 footcandle (10 lux) and designed for automatic dusk-to-dawn operation along the travel paths from the exits to the public way or to safe areas located a minimum of 30 feet (9.14 m) from the building.

~~467.2.8.5~~ 467.4.8.3.3 A minimum of one elevator per bank serving any patient use floor shall be connected to the ~~equipment branch of the~~ essential electric system and arranged for ~~manual or~~ automatic operation during loss of normal power. Elevator cab lighting, controls, and communication and signal systems shall be connected to the ~~life safety branch. E~~ essential electrical system.

~~467.2.8.6 There shall be a dedicated low-fuel alarm for the day tank supplying the emergency generator driver. A manual pump shall also be provided for the day tank. The alarm shall be located at the generator derangement panel.~~

~~467.2.8.7 Transfer switch contacts shall be of the open type and shall be accessible for inspection and replacement.~~

~~467.2.8.8~~ 467.4.8.3.4 If required by the facility's emergency food plan, there shall be power connected to the ~~equipment branch of the~~ essential electrical system for kitchen refrigerators, freezers and range hood exhaust fans. Selected lighting within the kitchen and dry storage areas shall be connected to the ~~critical branch of the~~ essential electrical system.

467.4.9 Lightning protection.

467.4.9.1 A lightning protection system shall be provided for all new buildings and additions in accordance with NFPA 780, Standard for Installation of Lightning Protection Systems.

467.4.9.2 Where additions are constructed to existing buildings, the existing building's lightning protection system, if present, shall be interconnected to the new lightning protection system.

467.4.9.3 Surge protective devices (SPDs) shall be installed in accordance with NFPA 70, Na6onal Electrical Code, as required by NFPA 780, Standard for the Installation of Lightning Protection Systems for all normal and emergency electrical services.

467.4.9.4 Additional surge protection shall be provided for all low-voltage and power connections to all electronic equipment in critical care areas and life safety systems and equipment such as fire alarm, nurse call, and other critical systems. Protection shall be in accordance with NFPA 70, National Electrical Code and the appropriate IEEE Standards for the type of equipment protected.

467.4.9.5 All communication systems entering or exiting the structure shall have surge protectors installed for each pair of conductors and shall have a visual indication for protector failure to the maximum extent feasible.

467.~~3~~.5 Residential ~~units~~ Facilities.

467.~~3~~5.1 Residential ~~units~~ facilities shall comply with the Florida Building Code, Building and the National Fire Protection Association Life Safety Code 101 as adopted by the Florida Fire Prevention Code.

467.~~3~~5.2 Residential ~~units~~ facilities shall comply with the following codes and standards:

467.~~3~~ 5.2.1 All new facilities and additions and renovations to existing facilities shall be in compliance with:

1. Section 310.6 of this code for Group R-4 occupancy;

2. The National Fire Protection Association Life Safety Code 101, Chapter 32, Residential Board and Care Occupancy and incorporated by reference in Rule 69A-3.012, Florida Administrative Code, and

3. The Florida Building Code, Accessibility for residential facilities.

467~~.3~~ 5.2.2 All existing facilities shall comply with National Fire Protection Association Life Safety Code 101, Chapter 33, Existing Residential Board and Care Occupancy and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

Alternate Language

1st Comment Period History

7639-A1

Proponent James gregory **Submitted** 2/18/2019 **Attachments** Yes

Rationale

These revisions were partially made at the request of the Florida Hospice Association. Most of them are editorial. Added permission to use wireless nurse call and added a lightning protection system to new construction since these are bedridden patients. The Florida Hospice Association supports these revisions to the original modification.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact to enforcement.

Impact to building and property owners relative to cost of compliance with code

Overall there is no cost impact on property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry relative to the cost of compliance with code

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This revision improves the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This revision strengthens or improves the code by providing more precise language.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This revision does not discriminate against materials, products, methods, or systems.

Does not degrade the effectiveness of the code

This revision does not degrade the effectiveness of the code.

SECTION 467

HOSPICE INPATIENT FACILITIES AND

UNITS AND HOSPICE ~~RESIDENCES~~ RESIDENTIAL FACILITIES

-

467.1 Scope. All hospice inpatient facilities and units and ~~residences~~ residential facilities shall comply with the following design and construction standards. Enforcement and interpretation of these provisions shall be by the state agency authorized by Section 553.73, Florida Statutes.

Note: Other administrative and programmatic provisions may apply. See Department of Elder Affairs (DOEA) Rule 58A-2, Florida Administrative Code, Agency for Health Care Administration (AHCA) Rule 59C-1, Florida Administrative Code, and Chapter 400 Part VI, Florida Statutes.

467.1.2 The following are exempt from review under this ~~part~~ section:

467.1.2.1 Change of ownership of an existing licensed hospice facility or unit.

467.1.2.2 Change of the functional use of a space, room, or area when no physical plant revisions are made or are required to be made by this code.

-

467.1.3 The Florida Building Code, Existing Building, Section 101.2, Scope exempts state licensed facilities such as hospices from compliance with that code. Any repair,

alteration, change of occupancy, addition or relocation of an existing state licensed inpatient hospice facility shall comply with the applicable requirements of this code and this section.

467.2 Physical plant ~~requirements~~ definitions ~~(inpatient facility and unit)~~.

467.2.1 As used in this ~~rule~~ section, "inpatient facility and unit" means the location where inpatient services are provided to hospice patients that are in need of hospice inpatient care.

467.2.2 As used in this section the term "inpatient facility" means a freestanding building or structure that ~~contains only a single inpatient hospice and no other health care facility types.~~ houses inpatient beds licensed exclusively to the hospice program but does not house any inpatient beds licensed to a hospital or nursing home.

467.2.3 As used in this section, the term "unit" means ~~an inpatient hospice that is separately licensed and is part of other health care and support settings.~~ a distinct part section, wing or unit within a hospital or nursing home that houses beds licensed to the hospital or nursing home but which is leased by a hospice for the provision of hospice inpatient care to its patients.

-

-

467.2.3 As used in this section, the term "existing" means an inpatient hospice facility, unit or hospice ~~residence~~ residential facility constructed and approved under a previous edition of the *Florida Building Code, Building.*

467.~~2~~.3.~~2~~ Codes and standards.

467.~~2~~.3~~2~~.1 All new inpatient facilities and units ~~and facilities~~, and additions or renovations to existing ~~units and~~ facilities and units shall be in compliance with the requirements for:

467.3.1.1 Institutional Occupancy - Group I-2, Condition 1, as described in Section 308.3 of this code; and

467.3.1.2. The National Fire Protection Association Life Safety Code 101, Chapter 18, New Health Care Occupancy for nursing homes, as described in Rule 69A-3.012, Florida Administrative Code, Standards of the National Fire Protection Association and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

467.3.1.3. Part 1of the *Guidelines for the Design and Construction of Residential Health, Care and Support Facilities* as referenced in Chapter 35 of this code.

-

467.~~2.2.2~~ 3.1.4 Inpatient sleeping rooms shall be made accessible in accordance with the requirements for medical care facilities of the Florida Building Code, Accessibility.

467.~~2.2.3~~ 3.1.5 In renovations and additions to existing facilities, only that portion of the total facility or unit affected by the project must comply with applicable sections of the

codes for new facilities and units.

467.~~2.2.4~~ 3.1.6 Existing portions of the facility that are not included in the renovation or addition but are essential to the functioning of the complete facility, as well as existing areas which receive less than substantial amounts of new work, shall comply with the applicable sections of the codes for existing inpatient facilities and units.

467.~~2.2.5~~ 3.1.7 All existing inpatient facilities and units licensed by the Agency for Health Care Administration shall be in compliance with National Fire Protection

Association Life Safety Code 101, Chapter 19, Existing Health Care Occupancy, for nursing homes and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

467.~~2.3~~ 4 Construction requirements. The following shall be provided in each inpatient facility ~~and~~ or unit:

~~467.2.3.1~~ 467.4.1 Each new patient sleeping room shall have a minimum room area exclusive of toilet room, or permanently attached or built-in closets, lockers or wardrobes, of ~~100~~ 120 square feet ~~(9.29~~… m2) per bed for private rooms and ~~80~~ 100 square feet (~~7.70~~ 9.29 m2) per bed for double occupancy rooms.

467.4.1.1 In new construction and additions, the maximum room capacity of each patient room shall be two persons. In double occupancy patient rooms, sleeping areas shall be separated from each other by a wall or partition to increase acoustic and visual privacy. Each person lying in bed shall have direct visual access to an exterior window at all times. For visual privacy, either doors or cubicle curtains to these individual patient sleeping areas shall be provided.

-

467.4.1.2 The design for privacy shall not restrict a patient’s access at any time to the room entrance, resident armchair, toilet or bathroom, wardrobe, exterior window or closet.

~~467.2.3.2~~ 467.4.2 Each patient sleeping room shall have a window(s), with a maximum sill height of 36 inches (…m) for any building constructed after July 5, 2016, or door with a clear glass light in compliance with Section 1205.2 of this code. The window or door shall open directly to an atrium or to the outside of the building with a minimum of 20 feet (6.10 m) in clear and unobstructed vista measured perpendicularly from the window or door.

~~467.2.3.3~~ 467.4.3 Each patient sleeping room shall have a wardrobe, locker or closet suitable for hanging clothing of the patient.

~~467.2.3.4~~ 467.4.4 ~~Other than a patient sleeping room located in a hospital or nursing home,~~ eEach patient sleeping room shall have access to a toilet room without having to enter the general corridor area. One toilet room shall serve no more than ~~four~~ two beds and no more than ~~two~~ one resident rooms unless the hospice unit is located inside of an existing hospital or nursing home.

467.4.4.1 The door shall be side hinged, and swing out from the toilet room, ~~and unless otherwise required by this code~~ or shall be a sliding barn door with, be at least 32 inches (813 mm) wide.

467.4.4.2 The toilet room shall contain a water closet with grab bars on both sides.

~~and an emergency nurse call station.~~

467.4.4.3 The water closet shall be equipped with a bedpan-rinsing device unless the Functional Program as described in Part I of the Guidelines for the Design and Construction of Residential facilities as referenced in Chapter 35 provides for disposable bedpans after every use.

-

467.4.4.4 There shall be an emergency nurse call station inside of each toilet room.

~~467.2.3~~ 467.4 5 A hand washing facility shall be provided within each patient toilet room or if the hospice unit is located inside of an existing hospital or nursing home, within each patient bedroom.

~~467.2.3~~ 467.4.6 A nurses' station, clean workroom and soiled workroom shall be provided. Access to these rooms shall be from a corridor or ante room.

~~467.2.3~~ 467.4.7 A charting space for clinical staff shall be provided at each nurses' station.

~~467.2.3.~~ 467.4.8 A hand washing facility shall be located in or near each nurses' station.

~~467.2.3.~~ 467.4.9 The clean workroom shall be provided with a work counter, hand wash facility, storage facilities and covered waste receptacle.

~~467.2.3.~~ 467.4.10 The soiled workroom shall be provided with a service sink equipped with rinsing device, work counter, a hand-washing facility, storage facilities, covered

waste receptacle and covered linen receptacle.

~~467.2.3.~~ 467.4.11 A drug distribution system shall be provided with provisions for the locked storage of medications. ~~Nothing in this section shall prohibit t~~The use of the clean workroom for drug distribution shall be permitted.

~~467.2.3.~~ 467.4.12 A clean linen storage room or closet shall be provided.

~~467.2.3.~~ 467.4.13 A nourishment station with equipment for preparing or serving nourishments between scheduled meals shall be provided and shall be available for patient, family, volunteers, guests and staff use. Provisions shall be made for the use and storage of small appliances such as coffee makers or toasters. A minimum of two duplex receptacles connected to a small appliance circuit shall be provided.

~~467.2.3.~~ 467.4.14 Nurse call systems. Wired- or wireless-type nurse call systems shall be permitted if they have been tested and approved by a nationally recognized testing laboratory (NRTL) to meet the requirements of UL 1069, 7th edition, published October 12, 2007, as referenced in Chapter 35 of this code. All wireless systems shall have

been tested and approved by a nationally recognized testing laboratory (NRTL) to meet the requirements of Section 49, Wireless Systems of UL 1069, 7th edition as

referenced in Chapter 35 of this code. All nurse call systems whether wired or wireless shall have electronically supervised visual and audible annunciation in accordance

with the supervision criteria of UL 1069, 7th edition for nurse call systems and tested and approved by a nationally recognized testing laboratory (NRTL) to meet those requirements.

467.4.14.1 A nurse call~~ing~~ system accessible by the patient shall be provided in each patient sleeping room. Nurse call master panel shall be provided at the nurses' station. Nurse call duty stations shall be provided in each clean workroom, soiled workroom, medicine preparation room and nourishment room.

~~467.2.3.~~467.4.15 Storage for administrative supplies shall be provided.

~~467.2.3.~~ 467.4.16 Parking for stretchers and wheelchairs in an area out of the path of normal traffic and of adequate size for the unit shall be provided.

~~467.2.3~~ 467.4.17 A janitor's closet with a floor drain and storage space for housekeeping equipment and supplies shall be provided.

~~467.2.3.~~ 467.4.18 A multipurpose lounge suitable and furnished for reception, recreation, dining, visitation, group social activities and worship shall be provided.

~~467.2.3.~~ 467.4.19 A conference or consultation room for patient and family use shall be provided for every hospice facility or unit.

~~467.2.3.~~ 467.4.20 A washer and dryer for patients' personal use shall be provided.

~~467.2.3.~~467.4.21 Bathing facilities.

~~467.2.3.21~~467.4.21.1 A centralized resident bathing room(s) shall be provided with a minimum of one bathtub, hydro tub, or shower for every 20 hospice inpatients or fraction thereof not otherwise served by ~~bath or~~ shower facilities designed to accommodate a shower chair, connected directly to the resident rooms.

~~467.2.3.21~~ 467.4.21.2 A separate private toilet room shall be provided that is directly accessible to each central bathing area with multiple bathing fixtures without requiring entry into the general corridor.

~~467.2.3.21.~~ 467.4.21.3 All showers located in bathing rooms connected directly to the resident rooms shall be designed so that a shower chair can be easily rolled in and out of the shower area.

467.~~2.4.~~5 Details.

467.~~2.4.~~5.1 Fixtures, such as drinking fountains, public telephone, vending machines and portable equipment, shall not be located or stored so as to restrict corridor traffic or reduce the minimum required corridor width.

~~467.2.~~ 467.4.5.2 Doors to patient tub rooms, showers and water closets that swing into the room shall be equipped with reversible hardware that will allow the door to swing out in an emergency.

~~467.2. 4.5.~~ 467.4.5.3 Doors, except those to closets or spaces not subject to occupancy, shall not swing into the exit access corridors.

~~467.2~~ 467.4.5.4 Windows and outer doors, if ~~used for ventilation~~ operable, shall be equipped with insect screens.

~~467.2.~~ 467.4.5.5 Interior thresholds and expansion joint covers shall be made flush with the floor surface.

~~467.2.4.5.~~ 467.4.5.6 Grab bars shall be provided at all patient toilets, showers, and tubs. The bars shall have a clearance of 11 /2 inches (38 mm) to the walls and shall be sufficiently

anchored to sustain a concentrated applied load of not less than 250 pounds (113 kg).

~~467.2.4.5.~~ 467.4.5.7 Single paper towel dispensers, soap dispensers and covered waste receptacles shall be provided at all hand washing facilities.

~~467.2.4.5.~~ 467.4.5.8 Staff hand washing facilities shall be fitted with wrist blades and a gooseneck-type spout.

~~467.2.4.5.~~ 467.4.5.9 All hand washing facilities shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113 kg) on the front of the fixture.

467.~~2.5~~ 4.6 Elevators. In new multistory units and facilities an elevator shall be provided in compliance with the requirements of Chapter 30 of the Florida Building Code, Building . In addition, a hospital-type elevator large enough to accommodate a bed and attending staff shall service all patient sleeping rooms and patient treatment areas located above the ground floor. The car shall be at least 5 feet 8 inches (1.73 m) wide by 9 feet (2.74 m) deep and the car doors shall have a clear opening of not less than 4 feet (1.22 m) wide and 7 feet (2.13 m) high.

~~467.2.6~~ 467.4.7 Mechanical system requirements.

~~467.2.6~~ 467.4.7.1 Air conditioning, heating and ventilating systems.

1. All patient occupied areas shall be heated or cooled by individual or central units. Heating units shall be designed to provide a minimum of 72°F (22.22°C) ambient indoor temperature and air conditioning units shall be designed to provide a minimum of 78°F (25.55°C) ambient indoor temperature.

2. All air-supply and air-exhaust systems shall be mechanically operated. Fans serving exhaust systems shall be located at the discharge end of the system.

~~467.2.6.1~~ 467.4.7.1 Carbon monoxide detector. See Section 908.8.

~~467.2.6.~~ 4674. 7 2 Plumbing and other piping systems. Water distribution systems shall be arranged to provide hot water at each hot water outlet at all times. Hot water at shower, bathing, and hand washing facilities for patients' personal use shall not exceed 110°F (43.3°C).

~~467.2.7~~ 467.4.8 Electrical system requirements.

~~467.2.7~~ 467.4.8.1 Lighting.

1. All spaces occupied by people, machinery, and equipment within the building, approaches to building, and parking areas shall have electric lighting.

2. All patients' rooms shall have general lighting and night lighting. General room luminaries shall be switched at the entrance to the patient room.

~~467.2.7~~ 467.4.8.2 Receptacles. All patient rooms shall have hospital grade duplex grounding-type receptacles.

~~467.2~~ 467.4.8.3 ~~8~~ Emergency electrical system.

~~467.2.8~~ 467.4.8.3.1 A Type III essential electrical system shall be provided in all hospice facilities as described in National Fire Protection Association Life Safety Code 99, "Health Care Facilities", and incorporated by reference in Rule 69A-3.012, Florida Administrative Code. The emergency power for this system shall meet the requirements of a Level II, type 10, Class 48 generator as described in National Fire Protection Association Life Safety Code 110, "Emergency Standby Power Systems", and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

~~467.2.8.2 In new construction, the normal main service equipment shall be separated from the emergency distribution equipment by locating it in a separate room.~~

~~Transfer switches shall be considered emergency distribution equipment for this purpose.~~ The essential electrical system shall have at a minimum ~~1~~ one transfer switch. Separate electrical branches are not required.

~~467.2.8.3 Switches for critical branch lighting shall be completely separate from normal switching. The devices or cover plates shall be of a distinctive color.~~

~~Critical branch switches are permitted to be adjacent to normal switches. Switches for life safety lighting are not permitted except as required for dusk-to-dawn automatic control of exterior lighting fixtures.~~

~~467.2.8.4~~ 467.4.8.3.2 There shall be selected life safety lighting provided at a minimum of 1 footcandle (10 lux) and designed for automatic dusk-to-dawn operation along

the travel paths from the exits to the public way or to safe areas located a minimum of 30 feet (9.14 m) from the building.

~~467.2.8.5~~ 467.4.8.3.3 A minimum of one elevator per bank serving any patient use floor shall be connected to the ~~equipment branch of the~~ essential electric system and arranged for ~~manual or~~ automatic operation during loss of normal power. Elevator cab lighting, controls, and communication and signal systems shall be connected to the ~~life safety branch. E~~ essential electrical system.

-

~~467.2.8.6 There shall be a dedicated low-fuel alarm for the day tank supplying the emergency generator driver. A manual pump shall also be provided for the day tank. The alarm shall be located at the generator derangement panel.~~

-

~~467.2.8.7 Transfer switch contacts shall be of the open type and shall be accessible for inspection and replacement.~~

~~467.2.8.8~~ 467.4.8.3.4 If required by the facility's emergency food plan, there shall be power connected to the ~~equipment branch of the~~ essential electrical system for kitchen

refrigerators, freezers and range hood exhaust fans. Selected lighting within the kitchen and dry storage areas shall be connected to the ~~critical branch of the~~ essential electrical system.

467.4.9 Lightning protection.

467.4.9.1 A lightning protection system shall be provided for all new buildings and additions in accordance with NFPA 780, Standard for Installation of Lightning Protection

Systems.467.4.9.2 Where additions are constructed to existing buildings, the existing building's lightning protection system, if present, shall be interconnected to the new lightning protection system.

467.4.9.3 Surge protective devices (SPDs) shall be installed in accordance with NFPA 70, Na6onal Electrical Code, as required by NFPA 780, Standard for the Installation of Lightning Protection Systems for all normal and emergency electrical services.

467.4.9.4 Additional surge protection shall be provided for all low-voltage and power connections to all electronic equipment in critical care areas and life safety systems and equipment such as fire alarm, nurse call, and other critical systems. Protection shall be in accordance with NFPA 70, National Electrical Code and the appropriate IEEE Standards for the type of equipment protected.

467.4.9.5 All communication systems entering or exiting the structure shall have surge protectors installed for each pair of conductors and shall have a visual indication for protector failure to the maximum extent feasible.

467.~~3~~.5 Residential ~~units~~ Facilities.

467.~~3~~5.1 Residential ~~units~~ facilities shall comply with the Florida Building Code, Building and the National Fire Protection Association Life Safety Code 101 as adopted by the Florida Fire Prevention Code.

467.~~3~~5.2 Residential ~~units~~ facilities shall comply with the following codes and standards:

467.~~3~~ 5.2.1 All new facilities and additions and renovations to existing facilities shall be in compliance with:

1. Section 310.6 of this code for Group R-4 occupancy;

2. The National Fire Protection Association Life Safety Code 101, Chapter 32, Residential Board and Care Occupancy and incorporated by reference in Rule 69A-3.012, Florida Administrative Code, and

3. The Florida Building Code, Accessibility for residential facilities.

467~~.3~~ 5.2.2 All existing facilities shall comply with National Fire Protection Association Life Safety Code 101, Chapter 33, Existing Residential Board and Care Occupancy

and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

SECTION 467

HOSPICE INPATIENT FACILITIES AND

UNITS AND HOSPICE ~~RESIDENCES~~ RESIDENTIAL FACILITIES

-

467.1 Scope. All hospice inpatient facilities and units and residences shall comply with the following design and construction standards. Enforcement and interpretation of these provisions shall be by the state agency authorized by Section 553.73, Florida Statutes.

Note: Other administrative and programmatic provisions may apply. See Department of Elder Affairs (DOEA) Rule 58A-2, Florida Administrative Code, Agency for Health Care Administration (AHCA) Rule 59C-1, Florida Administrative Code, and Chapter 400 Part VI, Florida Statutes.

467.1.2 The following are exempt from review under this part:

467.1.2.1 Change of ownership of an existing licensed hospice facility or unit.

467.1.2.2 Change of the functional use of a space, room, or area when no physical plant revisions are made or are required to be made by this code.

-

467.1.3 The Florida Building Code, Existing Building, Section 101.2, Scope exempts state licensed facilities such as hospices from compliance with that code. Any repair,

alteration, change of occupancy, addition or relocation of an existing state licensed hospice shall comply with the applicable requirements of this code and this section.

467.2 Physical plant ~~requirements~~ definitions ~~(inpatient facility and unit)~~.

467.2.1 As used in this ~~rule~~ section, “inpatient facility and unit” means the location where inpatient services are provided to hospice patients that are in need of hospice inpatient care.

467.2.2 As used in this section the term “inpatient facility” means a freestanding building or structure that contains only a single inpatient hospice and no other health care facility types.

-

467.2.3 As used in this section, the term “unit” means an inpatient hospice that is separately licensed and is part of other health care and support settings.

-

467.2.3 As used in this section, the term "existing" means an inpatient hospice facility, unit or hospice residence constructed and approved under a previous edition of the *Florida Building Code, Building.*

467.~~2~~.3.~~2~~ Codes and standards.

467.~~2~~.3~~2~~.1 All new inpatient facilities and units ~~and facilities~~, and additions or renovations to existing units and facilities shall be in compliance with the requirements for:

467.3.1.1 Institutional Occupancy - Group I-2, Condition 1, as described in Section 308.3 of this code; and

467.3.1.2. The National Fire Protection Association Life Safety Code 101, Chapter 18, New Health Care Occupancy for nursing homes, as described in Rule 69A-3.012, Florida Administrative Code, Standards of the National Fire Protection Association and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

467.3.1.3. Part 1of the *Guidelines for the Design and Construction of Residential Health, Care and Support Facilities* as referenced in Chapter 35 of this code.

-

467.~~2.2.2~~ 3.1.4 Inpatient sleeping rooms shall be made accessible in accordance with the requirements for medical care facilities of the Florida Building Code, Accessibility.

467.~~2.2.3~~ 3.1.5 In renovations and additions to existing facilities, only that portion of the total facility or unit affected by the project must comply with applicable sections of the

codes for new facilities and units.

467.~~2.2.4~~ 3.1.6 Existing portions of the facility that are not included in the renovation or addition but are essential to the functioning of the complete facility, as well as existing areas which receive less than substantial amounts of new work, shall comply with the applicable sections of the codes for existing inpatient facilities and units.

467.~~2.2.5~~ 3.1.7 All existing inpatient facilities and units licensed by the Agency for Health Care Administration shall be in compliance with National Fire Protection

Association Life Safety Code 101, Chapter 19, Existing Health Care Occupancy, for nursing homes and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

467.~~2.3~~ 4 Construction requirements. The following shall be provided in each inpatient facility ~~and~~ or unit:

~~467.2.3.1~~ 467.4.1 Each new patient sleeping room shall have a minimum room area exclusive of toilet room, or permanently attached or built in closets, lockers or wardrobes, of ~~100~~ 120 square feet ~~(9.29~~… m2) per bed for private rooms and ~~80~~ 100 square feet (~~7.70~~ 9.29 m2) per bed for double occupancy rooms.

467.4.1.1 In new construction and additions, the maximum room capacity of each patient room shall be two persons. In double occupancy patient rooms, sleeping areas shall be separated from each other by a wall or partition to increase acoustic and visual privacy. Each person lying in bed shall have direct visual access to an exterior window at all times. For visual privacy, either doors or cubicle curtains to these individual patient sleeping areas shall be provided.

-

467.4.1.2 The design for privacy shall not restrict a patient's access at any time to the room entrance, resident armchair, toilet or bathroom, wardrobe, exterior window or closet.

~~467.2.3.2~~ 467.4.2 Each patient sleeping room shall have a window(s), with a maximum sill height of 36 inches (…m) or door with a clear glass light in compliance with Section 1205.2 of this code. The window or door shall open directly to an atrium or to the outside of the building with a minimum of 20 feet (6.10 m) in clear and unobstructed vista measured perpendicularly from the window or door.

~~467.2.3.3~~ 467.4.3 Each patient sleeping room shall have a wardrobe, locker or closet suitable for hanging clothing of the patient.

~~467.2.3.4~~ 467.4.4 ~~Other than a patient sleeping room located in a hospital or nursing home,~~ eEach patient sleeping room shall have access to a toilet room without having to enter the general corridor area. One toilet room shall serve no more than ~~four~~ two beds and no more than ~~two~~ one resident rooms unless the hospice unit is located inside of an existing hospital or nursing home.

467.4.4.1 The door shall be side hinged, and swing out from the toilet room, ~~and unless otherwise required by this code~~ or shall be a sliding barn door with , be at least 32 inches (813 mm) wide.

467.4.4.2 The toilet room shall contain a water closet with grab bars on both sides.

~~and an emergency nurse call station.~~

467.4.4.3 The water closet shall be equipped with a bedpan-rinsing device unless the Function Program provides for disposable bedpans after every use.

-

467.4.4.4 There shall be an emergency nurse call station inside of each toilet room.

~~467.2.3~~ 467.4.5 A hand washing facility shall be provided within each patient toilet room or if the hospice unit is located inside of an existing hospital or nursing home, within each patient bedroom.

~~467.2.3~~ 467.4.6 A nurses' station, clean workroom and soiled workroom shall be provided. Access to these rooms shall be from a corridor or ante room.

~~467.2.3~~ 467.4.7 A charting space for clinical staff shall be provided at each nurses' station.

~~467.2.3~~. 467.4.8 A hand washing facility shall be located in or near each nurses' station.

~~467.2.3.~~ 467.4.9 The clean workroom shall be provided with a work counter, hand wash facility, storage facilities and covered waste receptacle.

~~467.2.3.~~ 467.4.10 The soiled workroom shall be provided with a service sink equipped with rinsing device, work counter, a hand-washing facility, storage facilities, covered

waste receptacle and covered linen receptacle.

~~467.2.3.~~ 467.4.11 A drug distribution system shall be provided with provisions for the locked storage of medications. ~~Nothing in this section shall prohibit t~~The use of the clean workroom for drug distribution shall be permitted.

~~467.2.3.~~ 467.4.12 A clean linen storage room or closet shall be provided.

~~467.2.3.~~ 467.4.13 A nourishment station with equipment for preparing or serving nourishments between scheduled meals shall be provided and shall be available for patient, family, volunteers, guests and staff use. Provisions shall be made for the use and storage of small appliances such as coffee makers or toasters. A minimum of two duplex receptacles connected to a small appliance circuit shall be provided.

~~467.2.3.~~ 467.4.14 A nurse calling system accessible by the patient shall be provided in each patient sleeping room. Nurse call master panel shall be provided at the nurses' station. Nurse call duty stations shall be provided in each clean workroom, soiled workroom, medicine preparation room and nourishment room.

~~467.2.3.~~467.4.15 Storage for administrative supplies shall be provided.

~~467.2.3.~~ 467.4.16 Parking for stretchers and wheelchairs in an area out of the path of normal traffic and of adequate size for the unit shall be provided.

~~467.2.3~~ 467.4.17 A janitor's closet with a floor drain and storage space for housekeeping equipment and supplies shall be provided.

~~467.2.3.~~ 467.4.18 A multipurpose lounge suitable and furnished for reception, recreation, dining, visitation, group social activities and worship shall be provided.

~~467.2.3.~~ 467.4.19 A conference or consultation room for patient and family use shall be provided for every hospice facility or unit.

~~467.2.3.~~ 467.4.20 A washer and dryer for patients' personal use shall be provided.

~~467.2.3.~~467.4.21 Bathing facilities.

~~467.2.3.21~~467.4.21.1 A centralized resident bathing room(s) shall be provided with a minimum of one bathtub, hydro tub, or shower for every 20 hospice inpatients or fraction thereof not otherwise served by bath or shower facilities connected directly to the resident rooms.

~~467.2.3.21~~ 467.4.21.2 A separate private toilet room shall be provided that is directly accessible to each central bathing area with multiple bathing fixtures without requiring entry into the general corridor.

~~467.2.3.21.~~ 467.4.21.3 All showers located in bathing rooms connected directly to the resident rooms shall be designed so that a shower chair can be easily rolled in and out of the shower area.

467.~~2.4.~~5 Details.

467.~~2.4~~.5.1 Fixtures, such as drinking fountains, public telephone, vending machines and portable equipment, shall not be located or stored so as to restrict corridor traffic or reduce the minimum required corridor width.

~~467.2.~~ 467.4.5.2 Doors to patient tub rooms, showers and water closets that swing into the room shall be equipped with reversible hardware that will allow the door to swing out in an emergency.

~~467.2. 4.5.~~ 467.4.5.3 Doors, except those to closets or spaces not subject to occupancy, shall not swing into the exit access corridors.

~~467.2~~ 467.4.5.4 Windows and outer doors, if ~~used for ventilation~~ operable, shall be equipped with insect screens.

~~467.2.~~ 467.4.5.5 Interior thresholds and expansion joint covers shall be made flush with the floor surface.

~~467.2.4.5.~~ 467.4.5.6 Grab bars shall be provided at all patient toilets, showers, and tubs. The bars shall have a clearance of 11 /2 inches (38 mm) to the walls and shall be sufficiently

anchored to sustain a concentrated applied load of not less than 250 pounds (113 kg).

~~467.2.4.5.~~ 467.4.5.7 Single paper towel dispensers, soap dispensers and covered waste receptacles shall be provided at all hand washing facilities.

~~467.2.4.5.~~ 467.4.5.8 Staff hand washing facilities shall be fitted with wrist blades and a gooseneck-type spout.

~~467.2.4.5.~~ 467.4.5.9 All hand washing facilities shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113 kg) on the front of the fixture.

467.~~2.5~~ 4.6 Elevators. In new multistory units and facilities an elevator shall be provided in compliance with the requirements of Chapter 30 of the Florida Building Code, Building . In addition, a hospital-type elevator large enough to accommodate a bed and attending staff shall service all patient sleeping rooms and patient treatment areas located above the ground floor. The car shall be at least 5 feet 8 inches (1.73 m) wide by 9 feet (2.74 m) deep and the car doors shall have a clear opening of not less than 4 feet (1.22 m) wide and 7 feet (2.13 m) high.

~~467.2.6~~ 467.4.7 Mechanical system requirements.

~~467.2.6~~ 467.4.7.1 Air conditioning, heating and ventilating systems.

1. All patient occupied areas shall be heated or cooled by individual or central units. Heating units shall be designed to provide a minimum of 72°F (22.22°C) ambient indoor temperature and air conditioning units shall be designed to provide a minimum of 78°F (25.55°C) ambient indoor temperature.

2. All air-supply and air-exhaust systems shall be mechanically operated. Fans serving exhaust systems shall be located at the discharge end of the system.

~~467.2.6.1~~ 467.4.7.1 Carbon monoxide detector. See Section 908.8.

~~467.2.6.~~ 4674. 7 2 Plumbing and other piping systems. Water distribution systems shall be arranged to provide hot water at each hot water outlet at all times. Hot water at shower, bathing, and hand washing facilities for patients' personal use shall not exceed 110°F (43.3°C).

~~467.2.7~~ 467.4.8 Electrical system requirements.

~~467.2.7~~ 467.4.8.1 Lighting.

1. All spaces occupied by people, machinery, and equipment within the building, approaches to building, and parking areas shall have electric lighting.

2. All patients' rooms shall have general lighting and night lighting. General room luminaries shall be switched at the entrance to the patient room.

~~467.2.7~~ 467.4.8.2 Receptacles. All patient rooms shall have hospital grade duplex grounding-type receptacles.

~~467.2~~ 467.4.8.3 ~~8~~ Emergency electrical system.

~~467.2.8~~ 467.4.8.3.1 A Type III essential electrical system shall be provided in all hospice facilities as described in National Fire Protection Association Life Safety Code 99, "Health Care Facilities", and incorporated by reference in Rule 69A-3.012, Florida Administrative Code. The emergency power for this system shall meet the requirements of a Level II, type 10, Class 48 generator as described in National Fire Protection Association Life Safety Code 110, "Emergency Standby Power Systems", and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

~~467.2.8.2 In new construction, the normal main service equipment shall be separated from the emergency distribution equipment by locating it in a separate room.~~

~~Transfer switches shall be considered emergency distribution equipment for this purpose.~~ The-essential electrical system shall have at a minimum 1 transfer switch. Separate electrical branches are not required.

~~467.2.8.3 Switches for critical branch lighting shall be completely separate from normal switching. The devices or cover plates shall be of a distinctive color.~~

~~Critical branch switches are permitted to be adjacent to normal switches. Switches for life safety lighting are not permitted except as required for dusk-to-dawn automatic control of exterior lighting fixtures.~~

~~467.2.8.4~~ 467.4.8.3.2 There shall be selected life safety lighting provided at a minimum of 1 footcandle (10 lux) and designed for automatic dusk-to-dawn operation along

the travel paths from the exits to the public way or to safe areas located a minimum of 30 feet (9.14 m) from the building.

~~467.2.8.5~~ 467.4.8.3.3 A minimum of one elevator per bank serving any patient use floor shall be connected to the ~~equipment branch of the~~ essential electric system and arranged for ~~manual or~~ automatic operation during loss of normal power. Elevator cab lighting, controls, and communication and signal systems shall be connected to the ~~life safety branch.~~ Essential electrical system.

-

~~-467.2.8.6 There shall be a dedicated low-fuel alarm for the day tank supplying the emergency generator driver. A manual pump shall also be provided for the day tank. The alarm shall be located at the generator derangement panel.~~

-

~~467.2.8.7 Transfer switch contacts shall be of the open type and shall be accessible for inspection and replacement.~~

~~467.2.8.8~~ 467.4.8.3.4 If required by the facility's emergency food plan, there shall be power connected to the ~~equipment branch of the~~ essential electrical system for kitchen

refrigerators, freezers and range hood exhaust fans. Selected lighting within the kitchen and dry storage areas shall be connected to the ~~critical branch of the~~ essential electrical system.

467.~~3~~. 5Residential ~~units~~ Facilities.

467.~~3~~5.1 Residential ~~units~~ facilities shall comply with the Florida Building Code, Building and the National Fire Protection Association Life Safety Code 101 as adopted by the Florida Fire Prevention Code.

467.~~3~~5.2 Residential units shall comply with the following codes and standards:

467.~~3~~ 5.2.1 All new facilities and additions and renovations to existing facilities shall be in compliance with:

1. Section 310.6 of this code for Group R-4 occupancy;

2. The National Fire Protection Association Life Safety Code 101, Chapter 32, Residential Board and Care Occupancy and incorporated by reference in Rule 69A-3.012, Florida Administrative Code,~~ and~~

3. The Florida Building Code, Accessibility for residential facilities.

467~~.3~~ 5.2.2 All existing facilities shall comply with National Fire Protection Association Life Safety Code 101, Chapter 33, Existing Residential Board and Care Occupancy

and incorporated by reference in Rule 69A-3.012, Florida Administrative Code.

SP7732

Date Submitted	12/6/2018	**Section**	453.10.5.4	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will move this drainage requirement to the same section as the rest of the drainage requirements.

Rationale

This modification will clarify the drainage requirements by locating this requirement with the other drainage requirements. This modification will also clarify the cushioning material requirements by referencing the document described in section 453.4.5.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the drainage and cushioning material requirements affecting health and safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer drainage and cushioning material requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

Text of Mod 7732 - A2

~~**453.10.5.4** Playgrounds shall be evenly graded and sloped to provide surface drainage.~~

~~**453.10.9 Transmission line right-of-way.** Buildings, play areas, and common use areas shall not be located within a high-voltage power transmission line right-of-way.~~

468.2.2 Playgrounds and equipment. Playgrounds ~~and~~ shall be evenly graded and sloped to provide positive surface drainage. Playground equipment shall be safe, structurally sound, verminproof, and shall not have jagged or sharp projections. Playground equipment shall be anchored to suitable foundations to prevent toppling or dislodgement. Cushioning materials such as mats, wood chips, or sand shall be used under climbing equipment, slides, and swings as required by the Public Playground Safety Handbook.

468.2.4 Transmission line right-of-way. Buildings, play areas, and common use areas shall not be located within a high-voltage power transmission line right-of-way.

1st Comment Period History

7732-A2

Proponent Don Whitehead **Submitted** 2/4/2019 **Attachments** Yes

Rationale

This modification will clarify the site requirements by locating these requirements with the other site requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to Small Business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the drainage and other site requirements affecting health and safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer drainage and site requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

~~**453.10.5.4** Playgrounds shall be evenly graded and sloped to provide surface drainage.~~

~~**453.10.9 Transmission line right-of-way.** Buildings, play areas, and common use areas shall not be located within a high-voltage power transmission line right-of-way.~~

468.2.2 Playgrounds and equipment. Playgrounds ~~and~~ shall be evenly graded and sloped to provide positive surface drainage. Playground equipment shall be safe, structurally sound, verminproof, and shall not have jagged or sharp projections. Playground equipment shall be anchored to suitable foundations to prevent toppling or dislodgement. Cushioning materials such as mats, wood chips, or sand shall be used under climbing equipment, slides, and swings as required by the Public Playground Safety Handbook.

468.2.4 Transmission line right-of-way. Buildings, play areas, and common use areas shall not be located within a high-voltage power transmission line right-of-way.

~~**453.10.5.4** Playgrounds shall be evenly graded and sloped to provide surface drainage.~~

468.2.2 Playgrounds and equipment. Playgrounds ~~and~~ shall be evenly graded and sloped to provide positive surface drainage. Playground equipment shall be safe, structurally sound, verminproof, and shall not have jagged or sharp projections. Playground equipment shall be anchored to suitable foundations to prevent toppling or dislodgement. Cushioning materials such as mats, wood chips, or sand shall be used under climbing equipment, slides, and swings as required by the Public Playground Safety Handbook.

SP7807

Date Submitted	12/9/2018	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Add requirement for closer of all sliding doors to isolation rooms.

Rationale

All doors to isolation rooms must automatically close including sliding doors.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Text of Mod 7807 including A3

449.3.1 Critical care units. Reference The Guidelines for other requirements.

449.3.1.1 Sliding doors used for access to critical care rooms may be either manual or power operated and if located on an exit access corridor shall be smoke resistive and equipped with latching hardware <u>or other mechanism that prevents the door from rebounding to a partially open position if the door is forcefully closed</u>.

<u>449.3.1.2 A sliding door used for access to an isolation room shall be equipped with an automatic closer and latching hardware</u>.

<u>449.3.4.10 A sliding door used for access to an airborne infection isolation room or a protective environment room shall be equipped with an automatic closer and latching hardware or other mechanism that prevents the door from rebounding to a partially open position if the door is forcefully closed</u>.

Alternate Language

1st Comment Period History

7807-A3

Proponent scott waltz **Submitted** 2/12/2019 **Attachments** Yes

Rationale

The proposed change relocate the new requirement from section 449.3.1 (Critical care units) to 449.3.4 (Architectural details, surfaces, and furnishings). Isolation rooms are not exclusive to critical care units. Locating the requirement in section 449.3.1 may lead users to believe that provision only applies when these rooms are located in critical care unit. The change also revises the room name from isolation room to airborne infection isolation room and adds protective environment room to be consistent with the nomenclature of the spaces in the reference standard (the Guidelines). The change also introduces new language that is consistent with the Life Safety Code and the intent of the requirement to insure that the door closes properly and stays closed by using alternate mechanisms.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not.

Does not degrade the effectiveness of the code

It does not.

1st Comment Period History

SP7807-G1

Proponent James gregory **Submitted** 2/14/2019 **Attachments** No

Comment:

I support the alternate language.

449.3.1 Critical care units. Reference The Guidelines for other requirements.

449.3.1.1 Sliding doors used for access to critical care rooms may be either manual or power operated and if located on an exit access corridor shall be smoke resistive and equipped with latching hardware or other mechanism that prevents the door from rebounding to a partially open position if the door is forcefully closed.

449.3.4.10 A sliding door used for access to an airborne infection isolation room or a protective environment room shall be equipped with an automatic closer and latching hardware or other mechanism that prevents the door from rebounding to a partially open position if the door is forcefully closed.

449.3.1 Critical care units. Reference The Guidelines for other requirements.
449.3.1.1 Sliding doors used for access to critical care rooms may be either manual or power operated and if
located on an exit access corridor shall be smoke resistive and equipped with latching hardware.
449.3.1.2 A sliding door used for access to an isolation room shall be equipped with an automatic closer and latching hardware.

SP7954

Date Submitted	12/12/2018	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Adds specificity to the location of fire alarm notification devices.

Rationale

Adds language to specify where audible devices shall be permitted. Removes redundant language that is specified by other codes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Text of Mod 7954 including A1

450.3.16.2 In all resident care rooms, spaces and areas, including sleeping, treatment, diagnostic, and therapeutic, the private operating mode as permitted and described in NFPA 72, National Fire Alarm and Signaling Code, shall be required. Only the attendants and other personnel required to evacuate occupants from a zone, area, room, floor, or building shall be required to be notified. Audible and visual notification devices shall only be permitted to be located at the care providers' stations, the soiled workroom, soiled holding room, clean workroom, staff lounge, medication preparation room, , ~~and~~ nurse or supervisor's office, and other staff rooms or areas as determined by the governing body of the facility.

~~450.3.16.3 The disconnecting device or circuit breaker for the fire alarm control unit shall be clearly identified and secured from unauthorized operation.~~

1st Comment Period History

7954-A1

Proponent James gregory **Submitted** 2/14/2019 **Attachments** Yes

Rationale

Permits more areas where F/A appliances may be located but only at the direction of the governing body, not the AHJ.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact on property owners relative to cost.

Impact to industry relative to the cost of compliance with code

There is no impact to industry relative to the cost of compliance.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Allows the governing body to determine other areas that are not named in the modification.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by allowing more options of compliance.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Makes the code stronger by offering more spaces to locate fire alarm devices.

Audible and visual notification devices shall only be permitted to be located at the care providers' stations, the soiled workroom, soiled holding room, clean workroom, staff lounge, medication preparation room, ~~and~~ nurse or supervisor's office, and other staff rooms or areas as determined by the governing body of the facility.

<!-- /* Font Definitions */ @font-face {font-family:"MS ??";} @font-face {font-family:"Cambria Math"; panose-1:2 4 5 3 5 4 6 3 2 4;} @font-face {font-family:Cambria; panose-1:2 4 5 3 5 4 6 3 2 4;} /* Style Definitions */ p.MsoNormal, li.MsoNormal, div.MsoNormal { mso-style-parent:""; margin:0in; margin-bottom:.0001pt; font-size:12.0pt; font-family:Cambria; mso-fareast-font-family:"MS ??"; mso-bidi-font-family:"Times New Roman";} .MsoChpDefault { font-family:Cambria; mso-fareast-font-family:"MS ??"; mso-bidi-font-family:"Times New Roman";} @page WordSection1 {size:8.5in 11.0in; margin:1.0in 1.25in 1.0in 1.25in;} div.WordSection1 {page:WordSection1;} -->

450.3.16.2 In all resident care rooms, spaces and areas, including sleeping, treatment, diagnostic, and therapeutic, the private operating mode as permitted and described in NFPA 72, National Fire Alarm and Signaling Code, shall be required. Only the attendants and other personnel required to evacuate occupants from a zone, area, room, floor, or building shall be required to be notified. Audible and visual notification devices shall only be permitted to be located at the care providers' stations, the soiled workroom, soiled holding room, clean workroom, staff lounge, medication preparation room, and nurse or supervisor's office.

~~450.3.16.3 The disconnecting device or circuit breaker for the fire alarm control unit shall be clearly identified and secured from unauthorized operation.~~

SP8223

Date Submitted	12/14/2018	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Revises some redundant electrical requirements.

Rationale

Deletes some redundant language used in other adopted codes and standards. Coordinates the Class with the new requirements for nursing homes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Text of Mod 8223 including A1

450.3.18 Essential electrical system.

450.3.18.1 A Type 1 essential electrical system shall be provided in all new nursing homes as described in NFPA 99, Health Care Facilities Code. The emergency power for this system shall meet the requirements of a Level 1, Type 10, Class ~~4872~~ 54 generator as described in NFPA 110, Standard for Emergency and Standby Power Systems.

450.3.18.2 In new facility construction, the normal main service equipment shall be separated from the emergency distribution equipment by locating it in a separate room. Transfer switches shall be considered emergency distribution equipment for this purpose.

450.3.18.3 There shall be a generator remote alarm annunciator in accordance with the requirements of NFPA 110 located at a designated on-site 24-hour staffed location.

~~450.3.18.4 There shall be illumination of the means of egress in accordance with NFPA 101 and designed for automatic dusk-to-dawn operation. Such illumination shall continue to the public way or to a safe area(s) located at a minimum of 30 feet (9.144 m) from the building and large enough to accommodate the required occupant load of the exit discharge.~~

450.3.18.~~5~~ 4A minimum of one elevator per bank serving any ~~patient~~resident use floor shall be connected to the equipment branch of the essential electric system and arranged for manual or automatic operation during loss of normal power.

450.3.18.~~6~~5 If a day tank is provided, it shall be equipped with a dedicated low-level fuel alarm and a manual pump. The alarm shall be located at the generator remote alarm annunciator as described in Section

450.3.18.3

~~450.3.18.7 The generator remote manual stop (sometimes called the “generator emergency stop”) shall be tamper resistant. It shall be located outside of the housing of the generator, adjacent to the opening of the generator enclosure or to the door to the generator room, and viewable from the generator.~~

1st Comment Period History

8223-A1

Proponent James gregory **Submitted** 2/18/2019 **Attachments** Yes

Rationale

Modifies the Class to be more aligned with the FAC 59A-4.1265.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact to local entity relative to enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

There is no impact on building and property owners relative to cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no impact on industry relative to the cost of compliance.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves the code to be aligned with the FAC.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens the code by being more aligned with existing FAC.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not discriminate against materials, products, methods, or systems.

Does not degrade the effectiveness of the code

It improves the effectiveness of the code by aligning with the FAC.

NFPA 99, Health Care Facilities Code. The emergency power for this system shall meet the requirements of a Level 1, Type 10, Class ~~48~~72 54 generator as described in NFPA 110, Standard for Emergency and Standby Power Systems.

450.3.18 Essential electrical system.

450.3.18.1 A Type 1 essential electrical system shall be provided in all new nursing homes as described in

NFPA 99, Health Care Facilities Code. The emergency power for this system shall meet the requirements of a Level 1, Type 10, Class ~~48~~72 generator as described in NFPA 110, Standard for Emergency and Standby Power Systems.

450.3.18.2 In new facility construction, the normal main service equipment shall be separated from the

emergency distribution equipment by locating it in a separate room. Transfer switches shall be considered

emergency distribution equipment for this purpose.

450.3.18.3 There shall be a generator remote alarm annunciator in accordance with the requirements of

NFPA 110 located at a designated on-site 24-hour staffed location.

~~450.3.18.4 There shall be illumination of the means of egress in accordance with NFPA 101 and designed for automatic dusk-to-dawn operation. Such illumination shall continue to the public way or~~

~~to a safe area(s) located at a minimum of 30 feet (9.144 m) from the building and large enough to accommodate the required occupant load of the exit discharge.~~

-

450.3.18.~~5~~ 4A minimum of one elevator per bank serving any ~~patient~~resident use floor shall be connected to the equipment branch of the essential electric system and arranged for manual or automatic operation during loss of normal power.

450.3.18.~~6~~5 If a day tank is provided, it shall be equipped with a dedicated low-level fuel alarm and a

manual pump. The alarm shall be located at the generator remote alarm annunciator as described in Section

450.3.18.3

~~450.3.18.7 The generator remote manual stop (sometimes called the "generator emergency stop") shall be~~

~~tamper resistant. It shall be located outside of the housing of the generator, adjacent to the opening of the generator enclosure or to the door to the generator room, and viewable from the generator.~~

SP8094

Date Submitted	12/14/2018	**Section**	1612.4	**Proponent**	Kari Hebrank
Chapter	16	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification specifies the location, anchoring and safety requirements to resist flood forces and prevent flotation for pool, spa and water feature equipment.

Rationale

This ensures pool, spa and water feature equipment is installed safely in floodplain areas consistent with their design specifications.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

There could potentially be cost-savings by ensuring pool equipment is located and anchored to ensure safety and design functionality, thus preventing malfunction.

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This provision ensures pools and equipment can be built and installed safely in floodplains.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This provision will provide equivalent protection through the use of branch circuits that have ground-fault circuit interrupter protection. Further, with the equipment being located near the ground, there is less chance of falling injuries to homeowners and contractors.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This revision does not discriminate against materials, products, methods or systems of demonstrated capabilities.

Does not degrade the effectiveness of the code

This provision does not degrade the effectiveness of the code.

Text of Mod 8094-A1

1612.4.2 Modification of ASCE 24 9.6 Pools.

In-ground and above ground pools shall be designed to withstand all flood-related loads and load combinations. Mechanical equipment for pools such as pumps, heating systems, and filtering systems, and their associated electrical systems shall comply with Chapter 7.

Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1 provided it is elevated to the extent practical, is anchored to prevent flotation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection.

Alternate Language

1st Comment Period History

8094-A1

Proponent Gregory Wilson **Submitted** 2/13/2019 **Attachments** Yes

Rationale

The proposed amendment is not consistent with published FEMA guidance. This proposed change to further modify the amendment to ASCE 24, Section 9.6 makes it consistent with National Flood Insurance Program Guidance which advises pool equipment should be fully elevated where possible, but if elevation would result in problems with pump function and performance, equipment is to be elevated as high as possible while allowing safe functioning. Reference FEMA P-348 Protecting Building Utilities From Flood Damage. There are other places in the code where judgement to determine practicality is required.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Some may have costs for partial elevation.

Impact to industry relative to the cost of compliance with code

None

Impact to Small Business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Allows safe functioning while reducing exposure to flooding.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, consistent with NFIP guidance

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Modification does not discriminate against materials, products or methods of systems of construction

Does not degrade the effectiveness of the code

Modification does not degrade effectiveness of the code.

1st Comment Period History

SP8094-G1

Proponent Kari Hebrank **Submitted** 2/13/2019 **Attachments** No

Comment:

The Florida Swimming Pool Association (FSPA) SUPPORTS this code proposal which addresses pool equipment in floodplain areas.

Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1 provided it is elevated to the extent practical, is anchored to prevent flotation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection.

1612.4.2 Modification of ASCE 24 9.6 Pools.

In-ground and aboveground pools shall be designed to withstand all flood-related loads and load combinations. Mechanical equipment for pools such as pumps, heating systems, and filtering systems, and their associated electrical systems shall comply with Chapter 7.

<u>Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1 provided it is anchored to prevent flotation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection.</u>

SP7680

8

Date Submitted	12/4/2018	**Section**	322.1.6	**Proponent**	Kari Hebrank
Chapter	3	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification specifies the location, anchoring and safety requirements to resist flood forces and prevent flotation for equipment for pools, spas and water features located within a floodplain.

Rationale

This revision provides relief for homeowners located within floodplains so that they may safely install a pool. Currently, pool builders are being asked to elevate pool equipment to heights in excess of their design specifications. To illustrate, pumps will lose prime at 3' or above water level. Every time the pump shuts down, the wet end of the pump and elevated piping will likely drain to the pool water level. When a pump loses prime it must manually be restarted. If this happens and the operator / homeowner is not aware, the pump will fail, causing overheating, melting of the plumbing, and burning out the motor and seals. In addition, pool water could sit stagnant for a period of time. In Florida's extreme heat temperatures, if a pool is not circulating it could result in the development of an algae bloom and harmful bacteria requiring more chemical and labor expense to restore the water quality, in addition to replacing the pump. Also, if equipment is located at an elevation which is unsafe, homeowners may be at risk for injury.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

There could potentially be costs-savings by ensuring pool equipment is located and anchored to ensure safety and design functionality, thus preventing equipment malfunction.

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This revision will help ensure that safe pools continue to be built within floodplains.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The revision will provide equivalent protection through the use of branch circuits that have ground-fault circuit interrupter protection. Further, with the equipment being located near the ground, there is less chance of falling injuries to homeowners and contractors.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This revision does not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This revision does not degrade the effectiveness of the code.

Text of Mod 7680-A1

R322.1.6Protection of mechanical, plumbing and electrical systems.

Electrical systems, *equipment* and components; heating, ventilating, air conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall be located at or above the elevation required in Section R322.2 or R322.3. If replaced as part of a substantial improvement, electrical systems, *equipment* and components; heating, ventilating, air conditioning and plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall meet the requirements of this section. Systems, fixtures, and *equipment* and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it is elevated to the extent practical and is anchored to prevent floatation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

Alternate Language

1st Comment Period History

7680-A1

Proponent Gregory Wilson **Submitted** 2/13/2019 **Attachments** Yes

Rationale

The proposed amendment is not consistent with published FEMA guidance. This proposed change to further modify the R322.1.6 exception makes it consistent with National Flood Insurance Program Guidance which advises pool equipment should be fully elevated where possible, but if elevation would result in problems with pump function and performance, equipment is to be elevated as high as possible while allowing safe functioning. Reference FEMA P-348 Protecting Building Utilities From Flood Damage. There are other places in the code where judgement to determine practicality is required.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Some may have costs for partial elevation.

Impact to industry relative to the cost of compliance with code

None

Impact to Small Business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Allows safe functioning while reducing exposure to flooding.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, consistent with NFIP guidance

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Modification does not discriminate against materials, products or methods of systems of construction

Does not degrade the effectiveness of the code

Modification does not degrade effectiveness of the code.

1st Comment Period History

SP7680-G1

Proponent Kari Hebrank **Submitted** 2/13/2019 **Attachments** No

Comment:

The Florida Swimming Pool Association SUPPORTS this code modification which specifies the location, anchoring and safety requirements to resist flood forces and prevent flotation for equipment for pools, spas and water features located within a floodplain. Furthermore, it will ensure pool equipment is installed to ensure maximum efficiency.

Exception: Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it <u>is elevated to the extent practical and</u> is anchored to prevent floatation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

R322.1.6Protection of mechanical, plumbing and electrical systems.

Electrical systems, *equipment* and components; heating, ventilating, air conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall be located at or above the elevation required in Section R322.2 or R322.3. If replaced as part of a substantial improvement, electrical systems, *equipment* and components; heating, ventilating, air conditioning and plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall meet the requirements of this section. Systems, fixtures, and *equipment* and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Locating electrical systems, *equipment* and components; heating, ventilating, air conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. <u>Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it is anchored to prevent floatation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection.</u> Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Submitted: 47**

Total Mods for report: 63

Sub Code: Building

SP7462

9

Date Submitted	12/8/2018	**Section**	202	**Proponent**	Rebecca Quinn obo FL Dept Emerg Mg
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

7461 (existing building volume)

Summary of Modification

In FBC Building, in "Existing Structure" remove sentence about flood hazard areas and add "Existing Building" consistent with FBC Existing Building.

Rationale

This code proposal was submitted for the I-Codes (ADM13-16). The purpose of this code change is to have consistent definitions of "existing building" and "existing structure" in the building and existing building volumes of the Florida Building Code. The terms are used interchangeably in the codes. The proposal not only adds “existing building” to the building volume, it modifies all definitions to remove the flood-specific sentence.

For the I-Codes, FEMA concurred with removal of the sentence pertaining to application of provisions for flood hazard areas. The determination as to whether improvements or repairs for existing buildings and structures in flood hazard areas constitute substantial improvement or repair of substantial damage is made for all existing buildings. As flood hazard data are changing over time, sometimes with higher base flood elevations or changed flood zone designations, compliance that is triggered by substantial improvement or substantial damage includes bringing building into compliance with the revised flood hazard data. In addition, there’s a presumption that buildings built after the community’s first flood ordinance are fully compliant, which may not be the case if unpermitted improvements or additions were made that alter whether the building remains compliant.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Definition clarification makes easier to enforce because only one definition is used for all existing buildings in flood hazard areas.

Impact to building and property owners relative to cost of compliance with code

Definition clarification does not change in costs when compliance with flood provisions is triggered.

Impact to industry relative to the cost of compliance with code

Definition clarification does not change in costs when compliance with flood provisions is triggered.

Impact to small business relative to the cost of compliance with code

Definition clarification does not change in costs when compliance with flood provisions is triggered.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Definition clarification does not change the purpose of the flood provisions to protect health, safety and general welfare.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Definition clarification does not change the compliance requirements with respect to products, methods or systems used for flood resistant constructions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Definition clarification does not change the compliance requirements with respect to products, methods or systems used for flood resistant constructions.

Does not degrade the effectiveness of the code

Definition clarification does not alter the effectiveness of the code.

EXISTING BUILDING. A building erected prior to the date of adoption of the appropriate code, or one for which a legal building *permit* has been issued.

EXISTING STRUCTURE. A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building *permit* has been issued. ~~For application of provisions in flood hazard areas, an existing structure is any building or structure for which the start of construction commenced before the effective date of the community's first flood plain management code, ordinance or standard.~~

SP7212

Date Submitted	11/7/2018	**Section**	457.1.4.1.5	**Proponent**	Bryan Holland
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

7209, 7210, and 7211

Summary of Modification

This proposed modification revises the requirements for surge protection for added clarity and effective enforcement.

Rationale

This proposed modification simply revises the rule to add clarity and to remove an incorrect reference to the NEC.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will have no impact on the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance to industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification clarifies the rules related to surge protection which directly relates to the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves the code by adding clarity to the rule.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

457.1.4.1.5 Surge protection.

Surge protection in compliance with ~~the~~NFPA 70, National Electric Code~~, Article 280, as incorporated by reference in Chapter 27 of the Florida Building Code, Building,~~ shall be installed to protect the ~~each~~ service ~~entrance~~ equipment and have integral visual indication of surge protector failure. Additional surge protection shall be provided for all low-voltage and power connections to all electronic equipment and conductors entering or exiting the building and other life safety systems equipment such as fire alarm, telephone, and nurse call. Protection shall be in accordance with appropriate IEEE standards for the type of equipment being protected.

SP7220

Date Submitted	11/8/2018	**Section**	453.17.8	**Proponent**	Bryan Holland
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This proposed modification slightly revises the wording of the section to correspond with terms used in the NEC related to GFCI protection.

Rationale

This proposed modification revises the language used in the section to correspond to terms used in the NEC related to GFCI protection. The change also recognizes that GFCI protection can be provided by other than GFCI-type receptacles, such as GFCI-type circuit breakers supplying the branch circuits to the locations identified in the rule.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will have no impact on the local entity.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will have no impact on the building or property owner of SREF structures.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance to industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Rules for GFCI protection are directly connected to the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves the code by aligning the FBC-B language with that used in the NEC related to GFCI protection.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification actually removes a product discrimination by clarifying that all NEC suitable types of the GFCI protection can be utilized to meet the requirements of the section.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

453.17.8 ~~Ground fault interrupter (GFI) receptacles~~. Ground-Fault Circuit-Interrupter Protection for Personnel (GFCI).

GFCI protection of receptacles shall be ~~installed as required by~~ provided in accordance with NFPA 70, National Electrical Code~~of Chapter 27~~ and in the following locations:

1. All elementary special needs, prekindergarten, and kindergarten classroom receptacles.

2. All building entry vestibule receptacles.

3. All mechanical, boiler and electrical room receptacles.

SP7633

Date Submitted	12/2/2018	**Section**	451	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Adds descriptive language to coordinate with the Guidelines as referenced.

Rationale

This is required to coordinate the new language in the Guidelines that is referenced by 451.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

451.3.3 Recovery area. Reference The Guidelines for other requirements.

451.3.3.1 Only the Phase I post-anesthesia recovery positions, as described in The Guidelines, will be listed as recovery positions for purposes of licensure.

SP7634

Date Submitted 12/2/2018
Chapter 4
Section 451
Affects HVHZ No
Proponent James gregory
Attachments No
TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No**

Alternate Language **No**

Related Modifications

Summary of Modification

Deletes language that is no longer needed.

Rationale

The NFPA 110 edition to be referenced by this code now contains this requirement.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

~~451.3.13.10 The generator remote manual stop (sometimes called the "generator emergency stop") shall be switchable and tamper resistant. It shall be located outside of and away from the housing of the generator, and if the generator is located inside an enclosure or room, it shall be located adjacent to the opening of the generator enclosure or to the door of the generator room and shall be viewable from the generator location.~~

SP7635

Date Submitted	12/4/2018	**Section**	451	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No**

Alternate Language **No**

Related Modifications

Summary of Modification

Required for all ASCs

Rationale

There is only one general surgical license offered to an ASC in Florida. Therefore, all ASCs must meet the highest level of outpatient surgery that can be performed in an ASC setting.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

May have some fiscal impact to industry for those surgery centers who have specialties that are not licensed or recognized by the Agency.

Impact to small business relative to the cost of compliance with code

May have some fiscal impact to small business for those surgery centers who have specialties that are not licensed or recognized by the Agency.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

451.3.15 Medical gas. ~~If t~~There shall be is a piped medical gas installation in the licensed operating room of the ASC, ~~it~~ that shall comply with the requirements of NFPA 99 Health Care Facilities Code for a Category 1 piped gas and vaccum system.

SP7636

Date Submitted	12/2/2018	**Section**	451	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Revises reference to coordinate with the 2018 edition of the Guidelines.

Rationale

This revision is to coordinate the 2018 edition of the FGI Guidelines and the new book for outpatient surgery centers.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

451.2.2 The Guidelines for Design and Construction of ~~Hospitals and~~ Outpatient Facilities (The Guidelines), including Part I General, and Part 2 Outpatient Facility Types, Chapter~~3~~2.7 Specific Requirements For Outpatient ~~Surgical~~Surgery Facilities as reference in Chapter 35 of this code.

SP7641

Date Submitted 12/3/2018
Chapter 4
Section 449
Affects HVHZ No
Proponent James gregory
Attachments No
TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No
Alternate Language No

Related Modifications

Summary of Modification

Deletes redundant requirement.

Rationale

Deletes a requirement that is now in NFPA 110.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

~~449.3.14.8 The generator remote manual stop (sometimes called the "generator emergency stop") shall beswitchable and tamper resistant. It shall be located outside the housing of the generator, adjacent to the opening of the generator enclosure or to the door to the generator room, and viewable from the generator location.~~

SP7643

Date Submitted	12/4/2018	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Adds some requirements for fire and smoke shutters in hospitals.

Rationale

The use of fire shutters in hospitals has been a problem for many years. Generally, they are used to close openings that are associated with counters where items are left or stored. This makes them ineffective because they do not close tightly. In addition, because they must be tied to the fire alarm system, they close on each fire alarm and because of this, the users dismantle them rendering them useless for protection. However, when used at spaces that are permitted to be open to the corridor by section 407, they can be used for security purposes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

449.3.4.10 The use of fire shutters to meet the requirements of opening protection required by othersections of this codes shall not be permitted.

449.3.4.11 Shutters in openings of smoke partitions to rooms and areas that are permitted to be open to other areas in accordance with section 407 shall be permitted without automatic closing of the shutter.

SP7644

Date Submitted 12/4/2018
Chapter 4
Section 449
Affects HVHZ No
Proponent James gregory
Attachments No
TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Revises details of hospital design and construction.

Rationale

Adds language to coordinate with the federal rule. Clarifies ceiling heights and locations. Deletes redundant language that is found in the Life Safety Code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

449.3.4.1 Each patient sleeping room, except for special nursing care units or rooms, newborn nurseries, and neonatal intensive care units or rooms, shall have a window(s) with a view, visible from the patient's bed, to the exterior of the building or to an atrium that is visually open to the exterior of the building. The clear opening of the patient room window's width and height shall have a minimum of 20 feet (6.10 m) unobstructed vista to any permanent structure or equipment, and a minimum of 15 feet (4.57m) unobstructed vista to any vehicular parking area or to the property line measured horizontally from the plane of the window. The sill height of the window(s) shall be a maximum of 36 inches (.914m). Special nursing care units or rooms shall have a window(s) as required by this section and the Guidelines, except the sill height shall be a maximum of 60 inches (1.524 m).

449.3.4.2 Ceilings in patient care areas or rooms with ceiling-mounted surgical light fixtures, tracks, rails, or pipes and in the centralized kitchen~~s~~ shall be a minimum height of 9 feet (2.7 m).

~~449.3.4.3 A pair of doors opening to a room or closet that is located on an exit access corridor shall be equipped with automatic positive latching for both the active and inactive door leaf and shall be equipped with rabbets, bevels, or an astragal at the meeting edges of the doors. The inactive door leaf shall be equipped with either an automatic or semiautomatic flush bolt to provide positive latching.~~ Where a pair of double ~~the~~ doors, opening to a room or closet, are located on the exit access corridor and are not required to be equipped with closers, a door coordinator is not required.

SP7708

Date Submitted	12/6/2018	**Section**	453.5.5.1	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This proposal will clarify the definition of an exterior courtyard.

Rationale

The current definition is confusing. So part of the definition has been removed to minimize the confusion.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the requirements for firesafety in a courtyard.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with a clearer definition.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code

453.5.5.1 "Exterior courtyard" is a courtyard which is not roofed, has a minimum width of 40 feet (1219 mm), and

~~a.~~ has an opening a minimum width of 40 feet (1219 mm), with no obstructions or fencing, on at least one end~~, or~~

~~b. has fences between the buildings for security purposes, and the required exiting capacity of the courtyard is provided for by means of doors or gates from the courtyard~~.

An exterior courtyard may be considered exterior space and used for exiting of adjacent spaces. For an exterior courtyard with an opening between 40 feet (1219 mm) and 60 feet wide (18 288 mm), the building walls and wall openings must meet the requirements of *Florida Building Code, Building* Tables 601 and 602 and the maximum travel distance to the courtyard opening/exit shall not exceed 150 feet (45 720 mm) from any point within the courtyard. If the minimum courtyard width exceeds 60 feet (18 288 mm), the travel distance to a courtyard opening/exit may exceed 150 feet (945 720 mm).

SP7712

Date Submitted	12/6/2018	**Section**	453.5.5.2	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will allow more flexibility with an enclosed courtyard.

Rationale

Some enclosed courtyards are more than 300 feet wide and reaching an exit within 150 would be impossible.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will allow more flexibility in the requirements for firesafety in an enclosed courtyard.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will improve the code with a more flexible definition.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.5.5.2 "Enclosed courtyard" is a courtyard which is not roofed by more than 50 percent of the courtyard area and which is substantially surrounded by a building(s) on two sides or more, has a minimum width of 40 feet (1219 mm) and each opening to the exterior is less than 40 feet (1219 mm) in width. The courtyard area shall be calculated for maximum occupancy as an assembly space and the number and size of remotely located exits shall be calculated for the maximum possible load. The maximum possible load is the greater of the calculated capacity of the courtyard or the load imposed by the surrounding spaces. An enclosed courtyard may be used as a component of exit access provided that the walls and wall openings meet the requirements of Florida Building Code, Building Tables 601 and 602 and the maximum travel to the exit discharge does not exceed 150 feet (45 720 mm) from any point within the enclosed courtyard. If the minimum courtyard width exceeds 60 feet (18 288 mm), the travel distance to a courtyard opening/exit may exceed 150 feet (945 720 mm). An enclosed courtyard cannot serve as the exterior for exiting or for emergency rescue openings.

SP7717

Date Submitted	12/6/2018	**Section**	453.7.3	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

To match the Florida Accessibility Code.

Rationale

To match the maximum height specified in section 308.2.1, Florida Accessibility Code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the safe height for fire extinguishers and fire blankets.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with a clearer height requirement.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.7.3 Location of fire extinguishers and blankets. Fire extinguishers may be located inside student-occupied spaces provided they are placed adjacent to the primary exit door, and the room door remains unlocked when the facility is occupied, and a permanently affixed sign, with a red background and white letters, reading "FIRE EXTINGUISHER INSIDE" is placed on the outside adjacent to the door. Fire extinguisher cabinets shall not be locked. Fire blankets shall be located in each laboratory and each shop where a fire hazard may exist. Fire extinguishers and fire blankets shall be readily accessible and suitable for the hazard present and shall not be obstructed or obscured from view. Extinguishers and blankets shall be on hangers or brackets, shelves, or cabinets so that the top of the extinguisher or blanket is not more than ~~54~~ 48 inches (~~1318~~ 1220 mm) above finish floor (AFF) and complies with state and federal accessibility requirements. All extinguishers shall be installed and maintained in accordance with NFPA. Extinguishers shall remain fully charged and operable at all times and have a current tag to indicate compliance.

SP7721

Date Submitted	12/6/2018	**Section**	453.8.8	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

To conform to the State Requirements for Educational Facilities approved by the Florida Legislature.

Rationale

To conform to section 3.2(2), State Requirements for Educational Facilities, 2014 Edition, Rule 6A-2.0010, Florida Administrative Code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the requirements for safe school design.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with conformance to Florida rule.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.8.8 Safe school design. School boards ~~should~~ shall design educational facilities and sites including pre-K through 12, vocational and Florida colleges to enhance security and reduce vandalism through the use of "safe school design" principles. Safe school design strategies are available from the Florida Department of Education, Office of Educational Facilities in a publication titled Florida Safe School Design Guidelines and include but are not limited to the following:

SP7728

Date Submitted	12/6/2018	**Section**	453.10.2.4	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

To match other portions of the Florida Building Code.

Rationale

To match sections 1015.2 and 1029.16.3, Florida Building Code, Building.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the required safe guard locations.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer required guard locations.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.10.2.4 Vertical drops. Walls, railings, or other physical barriers which are at least a minimum 12 inches (305 mm) in height, shall define and protect any vertical drop between joining or abutting surfaces of more than 6 inches (152 mm) but less than 18 inches (457 mm) in height. Any vertical drop of 18 inches (457 mm) or more shall be protected by a wall or guardrail a minimum of 42 inches (1067 mm) in height.

Exceptions:

1. Guards are not required for the locations described in the exception to Section 1015.2.

2. In assembly seating where guards in accordance with Section 1029.16.3 are permitted and provided.

SP7733

Date Submitted	12/12/2018	**Section**	453.15.4	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will move this site section to the same location as other mechanical ventilation requirements.

Rationale

This modification will clarify the mechanical ventilation requirements by locating this requirement with the other mechanical ventilation requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the site requirements affecting health and safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer mechanical ventilation requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

~~453.15.4~~ 468.3.6.7 **Toilet room ventilation.** Toilet rooms shall be continuously ventilated during building occupancy.

-

Exception: Individual toilet rooms shall be ventilated continuously during building occupancy or ventilation shall turn on with the light switch and run for at least 10 minutes after the light has been turned off.

SP7804

Date Submitted	12/9/2018	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Corrects and Updates Referenced Codes.

Rationale

Updates the reference to the correct name of the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

449.2.2 The Guidelines for Design and Construction of Hospitals ~~and Outpatient Facilities~~ (*The Guidelines*), as referenced in Chapter 35 of this code.

SP7953

Date Submitted	12/12/2018	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Revises some electrical requirements for nursing homes

Rationale

Because most resident rooms are now Basic Care Rooms, per NFPA 99, nonmetalic, sheathed cable could be used in these rooms. This was never the intent. At least one duplex receptacle needs to be in the resident room to operate the electric bed in case of power failure to the building. Revises the need for equipotential grounding.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

450.3.14 Electrical requirements. See The Guidelines for additional requirements.

450.3.14.1 All material, including equipment, conductors, controls, and signaling devices, shall be installed

to provide a complete electrical system with the necessary characteristics and capacity to supply the electrical facility requirements as shown in the specifications and as indicated on the plans. All materials and equipment shall be listed as complying with applicable standards of Underwriter's Laboratories, Inc., or other nationally recognized testing facilities. Field labeling of equipment and materials will be permitted only when provided by a nationally recognized testing laboratory (NRTL) that has been certified by the Occupational Safety and Health Administration (OSHA) for that referenced standard.

450.3.14.2 Nonmetallic sheathed cable or similar systems are not permitted for power and lighting wiring in any facility.

450.3.14.~~2~~3 For purposes of electrical requirements, a resident room, a resident therapy area or an examination room that is not equipped with a piped medical gas or vacuum system shall be reviewed as a basic care room or space as defined in NFPA 99 Health Care Facilities Code. A resident room, a resident therapy area or an examination room that is equipped with a piped medical gas or vacuum system shall be reviewed as a general care room or space as defined in NFPA 99 Health Care Facilities Code, and Chapter 27, Electrical Systems, of this code.

450.3.14.4 There shall be at least one duplex receptacle located at the head of the resident bed connected to the critical branch of the essential electrical system.

450.3.14.~~3~~5 Panels may be located in spaces subject to storage and shall have the clear working space in accordance with Chapter 27, permanently marked "ELECTRICAL—NOT FOR STORAGE" with a line outlining the required clear working space on the floor and wall.

450.3.14.~~4~~6 Panel boards shall not be located in an exit access corridor or in an unenclosed space or area that is open to an exit access corridor. Panel boards may be located inside of a room or closet that opens into an exit access corridor only when the room or closet is separated from the exit access corridor by a partition and door that comply with this code.

450.3.14.~~5~~7There shall be documentation for equipotential grounding in ~~all~~ areas defined as patient care areas., b~~uilding service ground electrode systems, lightning protection ground terminals and special systems such as fire alarm, nurse call, paging, generator, emergency power and breaker~~ coordination.

SP7955

Date Submitted	12/12/2018	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Adds some requirements for Fire Shutters.

Rationale

The use of fire shutters in nursing homes has been a problem for many years. Generally, they are used to close openings that are associated with counters where items are left or stored. This makes them ineffective because they do not close tightly. In addition, because they must be tied to the fire alarm system, they close on each fire alarm and because of this, the users dismantle them rendering them useless for protection. However, when used at spaces that are permitted to be open to the corridor by section 407, they can be used for security purposes and closed manually.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

450.3.5.13 The use of fire shutters to meet the requirements of opening protection required by othersections of this codes shall not be permitted.

450.3.5.14 Shutters in openings of smoke partitions to rooms and areas that are permitted to be open to other areas in accordance with section 407 shall be permitted without automatic closing of the shutter.

SP7979

Date Submitted	12/12/2018	**Section**	453.16.3	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will move this plumbing section to the same location as other plumbing requirements.

Rationale

This modification will clarify the plumbing requirements by locating this requirement with the other plumbing requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the plumbing requirements affecting health and safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer plumbing requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

~~**453.16.3**~~ **468.3.5.11** **Urinals.** Trough urinals shall not be installed in any location.

SP7983

Date Submitted	12/12/2018	**Section**	453.16.6	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will move this plumbing section to the same location as other plumbing requirements.

Rationale

This modification will clarify the plumbing requirements by locating this requirement with the other plumbing requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the plumbing requirements affecting health and safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer plumbing requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

~~**453.16.6**~~ **468.3.5.12** **Hot water.** When hot water is supplied to ~~showers,~~ handwash sinks or lavatories in toilet rooms, a mixing valve shall be installed to control the temperature, at the fixture, which shall not exceed 110°F (43°C) nor be less than 95°F (35°C).

SP8017

Date Submitted	12/12/2018	**Section**	453.18.1.6	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will replace an undefined term with a defined term.

Rationale

This modification will clarify the courtyard occupant load requirement.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the courtyard occupant load requirements affecting health and safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer courtyard occupant load requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.18.1.6 ~~Interior~~ Enclosed courtyards. The ~~interior~~ enclosed courtyard area at 15 gross square feet (1.4 m^2) per person. Raised, dedicated landscape areas may be deducted.

SP8022

Date Submitted	12/12/2018	**Section**	453.19.7	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will replace a limited use term with a universal term.

Rationale

This modification will clarify the required locations for fire alarm appliances in voice evacuation systems.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the fire alarm notification appliance location requirements affecting safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code with clearer fire alarm notification appliance location requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.19.7 Fire alarm. Fire alarm pull stations shall be located within 200 feet (60 960 mm) of any shade or green house. Fire alarm ~~horns~~ notification appliances mounted on a permanent building must be audible inside the shade/green house.

SP8029

Date Submitted	12/12/2018	**Section**	453.25.1.1	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will remove a protection area limitation and add a realistic protection period.

Rationale

This modification will clarify this section, which appeared to limit the protection to a maximum of 8 hours, by adding a realistic minimum protection period of 24 hours (ICC 500 referenced in section 423 also provides a minimum protection period of 24 hours).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Less than 1% increase in cost of the EHPA for increased potable water, sewage and emergency generator fuel storage tank capacities.

Impact to industry relative to the cost of compliance with code

Less than 1% increase in cost of the EHPA for increased potable water, sewage and emergency generator fuel storage tank capacities.

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will provide a reasonable minimum protection of the health, safety and welfare of the public in the EHPA.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by replacing an unrealistic time period protection limitation with a realistic time period protection minimum.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.25.1.1 Enhanced hurricane protection areas (EHPA). The EHPA areas shall provide emergency shelter and protection for people for a minimum period of ~~up to 8~~ 24 hours during a hurricane.

SP8037

Date Submitted	12/12/2018	**Section**	453.25.3.1	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will clarify this section describing excluded spaces.

Rationale

This modification will clarify the EHPA capacity calculation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the requirements of the health, safety and welfare of the public in an EHPA.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by clarifying the requirements of the capacity calculation of an EHPA.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.25.3.1 Excluded spaces. Spaces such as mechanical and electrical rooms, storage rooms, open corridors, kitchens, science rooms and labs, vocational shop areas and labs, computer rooms and labs, attic and crawl spaces shall ~~not be used as EHPAs~~ be excluded from EHPA capacity calculations.

SP8039

Date Submitted	12/12/2018	**Section**	453.25.3.2	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No

Alternate Language No

Related Modifications

Summary of Modification

This modification will add the Special Needs EHPA occupant load requirement.

Rationale

This modification will clarify the EHPA capacity calculation and add the DEM occupant load factor for a Special Needs EHPA.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the requirements of the health, safety and welfare of the public in an EHPA.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by clarifying the requirements of the capacity calculation of an EHPA.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.25.3.2 Capacity. Fifty percent of the net square feet of a designated educational facility shall be constructed as EHPAs. The net square feet shall be determined by subtracting from the gross square feet those spaces, such as mechanical and electrical rooms, storage rooms, open corridors, kitchens, science rooms and labs, vocational shop areas and labs, computer rooms, attic and crawl spaces that shall ~~not be used as EHPAs~~ be excluded from EHPA capacity calculations. The board, with concurrence of the applicable local emergency management agency or DEM, may adjust this requirement if it is determined to be in its best interest. The capacity of an EHPA shall be calculated at 20 square feet (1.86 m2) per occupant (adults and children five years or older). The capacity of a Special Needs EHPA shall be calculated at 60 square feet (5.57 m2) per occupant (adults and children five years or older).

SP8058

Date Submitted	12/13/2018	**Section**	453.25.4.1	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** | **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification removes the year of the referenced document.

Rationale

This modification removes the year of the referenced document, which is specified in Chapter 35.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the correct reference document for the health, safety and welfare of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by clarifying the correct reference document.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.25.4.1 Enclosure classifications. Enclosure classifications for EHPAs shall be determined in accordance with ASCE ~~7-10~~ 7, Section 26.2.

SP8065

Date Submitted	12/13/2018	**Section**	453.25.5.2	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation	Approved as Submitted
Commission Action	Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will correct some grammatical errors.

Rationale

This modification will clarify the standby system requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the standby system requirements relating to the safety of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by clarifying the standby system requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.25.5.2 Optional standby systems. Additional nonlife safety systems, as defined by Chapter 27 and NFPA 70 Article 702 (Optional Standby systems), may be supplied power, if available, by the standby emergency power system. These systems shall be connected to the standby emergency power system via an electrical subpanel to the standby electrical power system's main electrical panel. This will allow selective or total load shedding of power if required. The fire alarm, emergency lighting and illuminated exit signs throughout the entire campus shall receive first priority to power provided by the standby emergency power system per Chapter 27 and NFPA 70 Article 700. The systems listed are not all encompassing but are in order of priority.

SP8068

Date Submitted	12/13/2018	**Section**	453.25.6.3	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification removes this section.

Rationale

This modification will remove this section which has difficult requirements to meet and not necessary since the annual inspection requirements in sections 453.25.6.1, 453.25.6.2 and 453.25.6.4 appear to be sufficient.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This modification will reduce the cost of enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

This modification will reduce the cost of compliance with code for school districts and Florida colleges.

Impact to industry relative to the cost of compliance with code

This modification will reduce the industry cost of compliance with code.

Impact to small business relative to the cost of compliance with code

This modification will reduce the small business cost of compliance with code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification does not affect the health, safety and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by removing an unnecessary section.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

~~**453.25.6.3** EHPAs shall be inspected and recertified for compliance with the structural requirements of this section every five years by a Florida-registered professional engineer skilled in structural design. If any structural system, as specified in this section, is damaged or replaced, the recertification shall be obtained prior to the beginning of the next hurricane season.~~

SP8071

Date Submitted	12/13/2018	**Section**	453.27.5.2	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will conform the code to Florida Statutes.

Rationale

This modification will clarify the requirements of this section by conforming this section to section 1013.20, F.S.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the safety requirements for installation of covered walks.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by conforming this section to Florida Statutes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.27.5.2 Covered walks and technology. New relocatables and "modular schools" acquired by a board which are intended for long term use, shall be connected from exit door to the core facilities by accessible covered walkways, and shall contain wiring and computer technologies which connect to the facility's technology, communications and fire alarms infrastructure.

Exceptions:

1. Covered walks and public address systems are not required for Florida college facilities.

2. Temporary relocatables constructed after the date of this standard shall meet all construction requirements of this code, except that covered walks may be installed. The term "temporary relocatable" means relocatables which are used for less than ~~3~~ 4 years to provide temporary housing while permanent replacement classrooms and related facilities are under construction, renovation or remodeling. The term "temporary relocatable" does not apply to relocatables which have been located on a school site for more than ~~2~~ 3 years and used for classrooms or for student occupancy, where there is no identifiable permanent facility which is under construction, being remodeled, or renovated to house the students.

SP8078

Date Submitted	12/13/2018	**Section**	453.27.7	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will add, to this section, specific requirements found elsewhere in these public educational facilities requirements.

Rationale

This modification will clarify the requirements of this section by adding the referenced specific requirements found in section 453.11.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will clarify the requirements of FRTW wood affecting the health of the students.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen and improve the code by clarifying the requirements of FRTW wood.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate against materials, products, methods or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

453.27.7 Fire-retardant-treated wood (FRTW). Only FRTW which does not contain ammonium phosphates, sulfates, or halides may be used in the roof structure of Type II construction ancillary facilities, as authorized by other sections of the Florida Building Code. FRTW shall comply with the specific requirements found elsewhere in these public educational facilities requirements. Contractors shall provide evidence of compliance to inspectors. Inspection access panels shall be provided to facilitate initial and annual inspections for general condition assessment of FRTW and connectors.

SP8198

Date Submitted	12/14/2018	**Section**	450.4.2.6.2	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Proposed revision aligns the Florida Building Code with 59A-4.1265, F.A.C. Emergency Environmental Control for Nursing Homes.

Rationale

Following the tragic loss of life at a nursing home due to heat related illness in the aftermath of Hurricane Irma, the Agency for Health Care Administration developed a rule requiring facilities to provide an alternate power source for equipment necessary to maintain safe indoor air temperatures for not less 96 hours following the loss of normal power. This rule exceeds the current requirements for a standby power system for a nursing home. This proposed modification is part of a series of proposals intended to align the Florida Building Code with the Rule and eliminate conflicting requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Impact to industry relative to the cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Impact to small business relative to the cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

No.

450.4.2.6.2 As determined by the governing body of the facility, occupied resident areas shall be supplied with temperature and humidity control during and immediately following ~~a disaster~~ loss of normal utilities. At a minimum, these areas shall be maintained at a dry-bulb temperature at or below 81 °F (27.2 °C). Vulnerable components of new mechanical equipment necessary to maintain safe indoor air temperature shall be protected from horizontal impact in accordance with Section 450.4.2.5.4 and shall be connected to the facilities essential electrical system described in Section 450.3.18.1 or connected to the optional standby generator described in 450.4.2.9.6.

59A-4.1265 Emergency Environmental Control for Nursing Homes.

(1) DETAILED NURSING HOME EMERGENCY POWER PLAN. Each nursing home shall prepare a detailed plan ("plan"), to serve as a supplement to its Comprehensive Emergency Management Plan, to address emergency power in the event of the loss of primary electrical power in that nursing home, which includes the following information:

(a) The acquisition of a sufficient alternate power source such as a generator(s), maintained at the nursing home, to ensure that current licensees of nursing homes will be equipped to ensure the protection of resident health, safety, welfare, and comfort for a minimum of ninety-six (96) hours in the event of the loss of primary electrical power. Safe indoor air temperatures in resident occupied areas shall be determined by the licensee to meet the clinical needs of residents, but shall not exceed eighty-one (81) degrees Fahrenheit.

1. The required temperature must be maintained in an area or areas determined by the nursing home of sufficient size to maintain all residents safely at all times and is appropriate for the care needs and life safety requirements. For planning purposes, no less than thirty (30) net square feet per resident must be provided. This may include areas that are less than the entire nursing home if the nursing home's comprehensive emergency management plan includes relocating residents to portions of the building where the health, safety, welfare, and comfort of the residents will be maintained as required by this rule. The plan shall include information regarding the area(s) within the nursing home where the required temperature will be maintained.

2. The alternate power source for the equipment necessary to maintain the safe indoor air temperature required by this rule may be provided by the essential electrical system required by the Florida Building Code for Nursing Home design and construction or onsite optional standby system as defined by NFPA 70 National Electrical Code supplying normal power to the nursing home maintained onsite at all times when the building is occupied. If an optional standby system is used, it must be connected and maintained in accordance with the manufacturer's recommendations. The alternate power source and fuel supply shall be located in an area(s) in accordance with local zoning and the Florida Building Code.

3. Each nursing home is unique in size; the types of care provided; the physical and mental capabilities and needs of residents; the type, frequency, and amount of services and care offered; and staffing characteristics. Accordingly, this rule does not limit the types of systems or equipment that may be used to maintain the safe indoor air temperature required by this rule for a minimum of ninety-six (96) hours in the event of the loss of primary electrical power. The plan shall include information regarding the systems and equipment that will be used by the nursing home required to operate the systems and equipment.

a. A nursing home in an evacuation zone pursuant to Chapter 252, F.S., must maintain an alternative power source and fuel as required by this subsection at all times when the facility is occupied but is permitted to utilize a mobile generator(s) to enable portability if evacuation is necessary.

b. Facilities located on a single campus with other facilities licensed by the Agency under common ownership, may share fuel, alternative power resources, and resident space available on the campus if such resources are sufficient to support the requirements of each facility's residents, as specified in this rule. Details regarding how resources will be shared and any necessary movement of residents must be clearly described in the emergency power plan.

c. A multistory facility, whose comprehensive emergency management plan is to move residents to a higher floor during a flood or surge event, must place its alternative power source and all necessary additional equipment so it can safely operate in a location protected from flooding or storm surge damage.

(b) The acquisition of sufficient fuel, and safe maintenance of that fuel onsite at the facility, to ensure that in the event of the loss of primary electrical power there is sufficient fuel available for the alternate power source required in paragraph (1)(a), to power life safety systems, critical systems, and equipment necessary to maintain safe indoor air temperatures as described in this rule for ninety-six (96) hours after the loss of electrical power during a declared state of emergency. The plan shall include information regarding fuel source and fuel storage.

1. A nursing home located in an area in a declared state of emergency area pursuant to Section 252.36, F.S., that may impact primary power delivery must secure ninety-six (96) hours of fuel. The nursing home may utilize portable fuel storage containers for the remaining fuel necessary for ninety-six (96) hours during the period of a declared state of emergency.

2. A nursing home must store a minimum of seventy-two (72) hours of fuel onsite.

3. Piped natural gas is an allowable fuel source and meets the onsite fuel requirement under this rule.

4. If local ordinances or other regulations that limit the amount of onsite fuel storage for the nursing home's location and the nursing home does not have access to piped natural gas, then the nursing home must develop a plan that includes maximum onsite fuel storage allowable by the ordinance or regulation and a reliable method to obtain the maximum additional fuel at least 24 hours

prior to depletion of onsite fuel.

(c) The acquisition of services necessary to install, maintain, and test the equipment and its functions to ensure the safe and sufficient operation of the alternate power source installed in the nursing home.

(2) SUBMISSION OF THE PLAN.

(a) Each nursing home licensed prior to the effective date of this rule shall submit its plan to the local emergency management agency for review and approval within thirty (30) days of the effective date of the rule. Nursing Home plans previously received and approved under Emergency Rule 59AER17-1, F.A.C., will require resubmission only if changes are made.

(b) Each new nursing home shall submit the plan required under this rule prior to obtaining a license.

(c) Each existing nursing home that undergoes additions, modifications, alterations, refurbishment, reconstruction or renovations that require modification of the systems or equipment affecting the nursing home's compliance with this rule shall amend its plan and submit it to the local emergency management agency for review and approval.

(3) PLAN REVIEW. Architectural and engineering plans are subject to review by the Agency's Office of Plans and Construction. The local emergency management agency shall review the emergency power plan for compliance with the subsection and may rely on the technical review of the Office of Plans and Construction. Once the review is complete, the local emergency management agency shall:

(a) Report deficiencies in the plan to the nursing home for resolution. The nursing home must resubmit the plan within ten (10) business days.

(b) Report approval or denial of the plan to the Agency and the nursing home.

(4) APPROVED PLANS.

(a) Each nursing home must maintain a copy of its plan in a manner that makes the plan readily available at the licensee's physical address for review by the authority having jurisdiction. If the plan is maintained in an electronic format, nursing home staff must be readily available to access and produce the plan. For purposes of this section, "readily available" means the ability to immediately produce the plan, either in electronic or paper format, upon request.

(b) Within two (2) business days of the approval of the plan from the local emergency management agency, the nursing home shall submit in writing proof of the approval to the Agency for Health Care Administration.

(c) The nursing home shall submit a consumer friendly summary of the emergency power plan to the Agency. The Agency shall post the summary and notice of the approval and implementation of the nursing home emergency power plans on its website within ten (10) business days of the plan's approval by the local emergency management agency and update within ten (10) business days of implementation.

(5) IMPLEMENTATION OF THE PLAN.

(a) Each nursing home licensed prior to the effective date of this rule shall, no later than June 1, 2018 have implemented the plan required under this rule.

(b) The Agency shall grant an extension up to January 1, 2019 to providers in compliance with paragraph (c), below, and who can show delays caused by necessary construction, delivery of ordered equipment, zoning or other regulatory approval processes. Nursing homes granted an extension must keep the Agency apprised of progress on a monthly basis to ensure there are no unnecessary delays.

(c) During the extension period, a nursing home must make arrangements pending full implementation of its plan that the residents are housed in an area that meets the safe indoor air temperature requirements of paragraph (1)(a), for a minimum of ninety-six (96) hours.

1. A nursing home not located in an evacuation zone must either have an alternative power source onsite or have a contract in place for delivery of an alternative power source and fuel when requested. Within twenty-four (24) hours of the issuance of a state of emergency for an event that may impact primary power delivery for the area of the nursing home, it must have the alternative power source and no less than ninety-six (96) hours of fuel stored onsite.

2. A nursing home located in an evacuation zone pursuant to Chapter 252, F.S., must either:

a. Fully and safely evacuate its residents prior to the arrival of the event, or

b. Have an alternative power source and no less than ninety-six (96) hours of fuel stored onsite, within twenty-four (24) hours of the issuance of a state of emergency for the area of the nursing home,

(d) Each new nursing home shall implement the plan prior to obtaining a license.

(e) Each nursing home that undergoes any additions, modifications, alterations, refurbishment, reconstruction or renovations

that require modification of the systems or equipment affecting the nursing home's compliance with this rule shall implement its amended plan subsequent with the completion of construction.

(f) The Agency may request cooperation from the State Fire Marshal to conduct inspections to ensure implementation of the plan in compliance with this rule.

(6) POLICIES AND PROCEDURES.

(a) Each nursing home shall develop and implement written policies and procedures to ensure that each nursing home can effectively and immediately activate, operate and maintain the alternate power source and any fuel required for the operation of the alternate power source. The procedures shall be resident-focused to ensure that residents do not experience complications from heat exposure, and shall include a contingency plan to transport residents to a safe facility if the current nursing home's plan to keep the residents in a safe and comfortable location within the nursing home at or below the indoor air temperature required by this rule becomes compromised.

(b) Each nursing home shall maintain its written policies and procedures in a manner that makes them readily available at the licensee's physical address for review by the authority having jurisdiction. If the policies and procedures are maintained in an electronic format, nursing home staff must be readily available to access the policies and procedures and produce the requested information.

(c) The written policies and procedures must be readily available for inspection by each resident; each resident's legal representative, designee, surrogate, guardian, attorney in fact, or case manager; each resident's estate; and all parties authorized in writing or by law.

(7) REVOCATION OF LICENSE, FINES OR SANCTIONS. For a violation of any part of this rule, the Agency may seek any remedy authorized by Chapter 400, Part II, or Chapter 408, Part II, F.S., including but not limited to, license revocation, license suspension, and the imposition of administrative fines.

(8) COMPREHENSIVE EMERGENCY MANAGEMENT PLAN.

(a) Nursing homes whose comprehensive emergency management plan is to evacuate must comply with this rule.

(b) Once the plan has been approved, the nursing home shall submit the plan as an addendum with any future submissions for approval of its Comprehensive Emergency Management Plan.

(9) NOTIFICATION.

(a) Within three (3) business days, each nursing home must notify in writing, unless permission for electronic communication has been granted, each resident and the resident's legal representative:

1. Upon submission of the plan to the local emergency management agency that the plan has been submitted for review and approval;

2. Upon final implementation of the plan by the nursing home following review by the State Fire Marshal or the Agency's Office of Plans and Construction.

(b) The nursing home shall keep a copy of each written or electronic notification sent by the nursing home to the resident and resident's representative on file.

Rulemaking Authority 400.23 FS. Law Implemented 400.23 FS. History–New 3-26-18.

SP8210

Date Submitted	12/14/2018	**Section**	450.3.18.1	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Modification # 8198

Summary of Modification

Proposed revision aligns the Florida Building Code with 59A-4.1265, F.A.C. Emergency Environmental Control for Nursing Homes.

Rationale

Following the tragic loss of life at a nursing home due to heat related illness in the aftermath of Hurricane Irma, the Agency for Health Care Administration developed a rule requiring facilities to provide an alternate power source for equipment necessary to maintain safe indoor air temperatures for not less 96 hours following the loss of normal power. This rule exceeds the current requirements for a standby power system for a nursing home. This proposed modification is part of a series of proposals intended to align the Florida Building Code with the Rule and eliminate conflicting requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Impact to industry relative to the cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Impact to small business relative to the cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

No.

450.3.18.1 A Type 1 essential electrical system shall be provided in all new nursing homes as described in NFPA 99, *Health Care Facilities Code*. The emergency power for this system shall meet the requirements of a Level 1, Type 10, Class ~~48~~ 54 generator as described in NFPA 110, Standard for Emergency and Standby Power Systems.

59A-4.1265 Emergency Environmental Control for Nursing Homes.

(1) DETAILED NURSING HOME EMERGENCY POWER PLAN. Each nursing home shall prepare a detailed plan ("plan"), to serve as a supplement to its Comprehensive Emergency Management Plan, to address emergency power in the event of the loss of primary electrical power in that nursing home, which includes the following information:

(a) The acquisition of a sufficient alternate power source such as a generator(s), maintained at the nursing home, to ensure that current licensees of nursing homes will be equipped to ensure the protection of resident health, safety, welfare, and comfort for a minimum of ninety-six (96) hours in the event of the loss of primary electrical power. Safe indoor air temperatures in resident occupied areas shall be determined by the licensee to meet the clinical needs of residents, but shall not exceed eighty-one (81) degrees Fahrenheit.

1. The required temperature must be maintained in an area or areas determined by the nursing home of sufficient size to maintain all residents safely at all times and is appropriate for the care needs and life safety requirements. For planning purposes, no less than thirty (30) net square feet per resident must be provided. This may include areas that are less than the entire nursing home if the nursing home's comprehensive emergency management plan includes relocating residents to portions of the building where the health, safety, welfare, and comfort of the residents will be maintained as required by this rule. The plan shall include information regarding the area(s) within the nursing home where the required temperature will be maintained.

2. The alternate power source for the equipment necessary to maintain the safe indoor air temperature required by this rule may be provided by the essential electrical system required by the Florida Building Code for Nursing Home design and construction or onsite optional standby system as defined by NFPA 70 National Electrical Code supplying normal power to the nursing home maintained onsite at all times when the building is occupied. If an optional standby system is used, it must be connected and maintained in accordance with the manufacturer's recommendations. The alternate power source and fuel supply shall be located in an area(s) in accordance with local zoning and the Florida Building Code.

3. Each nursing home is unique in size; the types of care provided; the physical and mental capabilities and needs of residents; the type, frequency, and amount of services and care offered; and staffing characteristics. Accordingly, this rule does not limit the types of systems or equipment that may be used to maintain the safe indoor air temperature required by this rule for a minimum of ninety-six (96) hours in the event of the loss of primary electrical power. The plan shall include information regarding the systems and equipment that will be used by the nursing home required to operate the systems and equipment.

a. A nursing home in an evacuation zone pursuant to Chapter 252, F.S., must maintain an alternative power source and fuel as required by this subsection at all times when the facility is occupied but is permitted to utilize a mobile generator(s) to enable portability if evacuation is necessary.

b. Facilities located on a single campus with other facilities licensed by the Agency under common ownership, may share fuel, alternative power resources, and resident space available on the campus if such resources are sufficient to support the requirements of each facility's residents, as specified in this rule. Details regarding how resources will be shared and any necessary movement of residents must be clearly described in the emergency power plan.

c. A multistory facility, whose comprehensive emergency management plan is to move residents to a higher floor during a flood or surge event, must place its alternative power source and all necessary additional equipment so it can safely operate in a location protected from flooding or storm surge damage.

(b) The acquisition of sufficient fuel, and safe maintenance of that fuel onsite at the facility, to ensure that in the event of the loss of primary electrical power there is sufficient fuel available for the alternate power source required in paragraph (1)(a), to power life safety systems, critical systems, and equipment necessary to maintain safe indoor air temperatures as described in this rule for ninety-six (96) hours after the loss of electrical power during a declared state of emergency. The plan shall include information regarding fuel source and fuel storage.

1. A nursing home located in an area in a declared state of emergency area pursuant to Section 252.36, F.S., that may impact primary power delivery must secure ninety-six (96) hours of fuel. The nursing home may utilize portable fuel storage containers for the remaining fuel necessary for ninety-six (96) hours during the period of a declared state of emergency.

2. A nursing home must store a minimum of seventy-two (72) hours of fuel onsite.

3. Piped natural gas is an allowable fuel source and meets the onsite fuel requirement under this rule.

4. If local ordinances or other regulations that limit the amount of onsite fuel storage for the nursing home's location and the nursing home does not have access to piped natural gas, then the nursing home must develop a plan that includes maximum onsite fuel storage allowable by the ordinance or regulation and a reliable method to obtain the maximum additional fuel at least 24 hours

prior to depletion of onsite fuel.

(c) The acquisition of services necessary to install, maintain, and test the equipment and its functions to ensure the safe and sufficient operation of the alternate power source installed in the nursing home.

(2) SUBMISSION OF THE PLAN.

(a) Each nursing home licensed prior to the effective date of this rule shall submit its plan to the local emergency management agency for review and approval within thirty (30) days of the effective date of the rule. Nursing Home plans previously received and approved under Emergency Rule 59AER17-1, F.A.C., will require resubmission only if changes are made.

(b) Each new nursing home shall submit the plan required under this rule prior to obtaining a license.

(c) Each existing nursing home that undergoes additions, modifications, alterations, refurbishment, reconstruction or renovations that require modification of the systems or equipment affecting the nursing home's compliance with this rule shall amend its plan and submit it to the local emergency management agency for review and approval.

(3) PLAN REVIEW. Architectural and engineering plans are subject to review by the Agency's Office of Plans and Construction. The local emergency management agency shall review the emergency power plan for compliance with the subsection and may rely on the technical review of the Office of Plans and Construction. Once the review is complete, the local emergency management agency shall:

(a) Report deficiencies in the plan to the nursing home for resolution. The nursing home must resubmit the plan within ten (10) business days.

(b) Report approval or denial of the plan to the Agency and the nursing home.

(4) APPROVED PLANS.

(a) Each nursing home must maintain a copy of its plan in a manner that makes the plan readily available at the licensee's physical address for review by the authority having jurisdiction. If the plan is maintained in an electronic format, nursing home staff must be readily available to access and produce the plan. For purposes of this section, "readily available" means the ability to immediately produce the plan, either in electronic or paper format, upon request.

(b) Within two (2) business days of the approval of the plan from the local emergency management agency, the nursing home shall submit in writing proof of the approval to the Agency for Health Care Administration.

(c) The nursing home shall submit a consumer friendly summary of the emergency power plan to the Agency. The Agency shall post the summary and notice of the approval and implementation of the nursing home emergency power plans on its website within ten (10) business days of the plan's approval by the local emergency management agency and update within ten (10) business days of implementation.

(5) IMPLEMENTATION OF THE PLAN.

(a) Each nursing home licensed prior to the effective date of this rule shall, no later than June 1, 2018 have implemented the plan required under this rule.

(b) The Agency shall grant an extension up to January 1, 2019 to providers in compliance with paragraph (c), below, and who can show delays caused by necessary construction, delivery of ordered equipment, zoning or other regulatory approval processes. Nursing homes granted an extension must keep the Agency apprised of progress on a monthly basis to ensure there are no unnecessary delays.

(c) During the extension period, a nursing home must make arrangements pending full implementation of its plan that the residents are housed in an area that meets the safe indoor air temperature requirements of paragraph (1)(a), for a minimum of ninety-six (96) hours.

1. A nursing home not located in an evacuation zone must either have an alternative power source onsite or have a contract in place for delivery of an alternative power source and fuel when requested. Within twenty-four (24) hours of the issuance of a state of emergency for an event that may impact primary power delivery for the area of the nursing home, it must have the alternative power source and no less than ninety-six (96) hours of fuel stored onsite.

2. A nursing home located in an evacuation zone pursuant to Chapter 252, F.S., must either:

a. Fully and safely evacuate its residents prior to the arrival of the event, or

b. Have an alternative power source and no less than ninety-six (96) hours of fuel stored onsite, within twenty-four (24) hours of the issuance of a state of emergency for the area of the nursing home,

(d) Each new nursing home shall implement the plan prior to obtaining a license.

(e) Each nursing home that undergoes any additions, modifications, alterations, refurbishment, reconstruction or renovations

that require modification of the systems or equipment affecting the nursing home's compliance with this rule shall implement its amended plan subsequent with the completion of construction.

(f) The Agency may request cooperation from the State Fire Marshal to conduct inspections to ensure implementation of the plan in compliance with this rule.

(6) POLICIES AND PROCEDURES.

(a) Each nursing home shall develop and implement written policies and procedures to ensure that each nursing home can effectively and immediately activate, operate and maintain the alternate power source and any fuel required for the operation of the alternate power source. The procedures shall be resident-focused to ensure that residents do not experience complications from heat exposure, and shall include a contingency plan to transport residents to a safe facility if the current nursing home's plan to keep the residents in a safe and comfortable location within the nursing home at or below the indoor air temperature required by this rule becomes compromised.

(b) Each nursing home shall maintain its written policies and procedures in a manner that makes them readily available at the licensee's physical address for review by the authority having jurisdiction. If the policies and procedures are maintained in an electronic format, nursing home staff must be readily available to access the policies and procedures and produce the requested information.

(c) The written policies and procedures must be readily available for inspection by each resident; each resident's legal representative, designee, surrogate, guardian, attorney in fact, or case manager; each resident's estate; and all parties authorized in writing or by law.

(7) REVOCATION OF LICENSE, FINES OR SANCTIONS. For a violation of any part of this rule, the Agency may seek any remedy authorized by Chapter 400, Part II, or Chapter 408, Part II, F.S., including but not limited to, license revocation, license suspension, and the imposition of administrative fines.

(8) COMPREHENSIVE EMERGENCY MANAGEMENT PLAN.

(a) Nursing homes whose comprehensive emergency management plan is to evacuate must comply with this rule.

(b) Once the plan has been approved, the nursing home shall submit the plan as an addendum with any future submissions for approval of its Comprehensive Emergency Management Plan.

(9) NOTIFICATION.

(a) Within three (3) business days, each nursing home must notify in writing, unless permission for electronic communication has been granted, each resident and the resident's legal representative:

1. Upon submission of the plan to the local emergency management agency that the plan has been submitted for review and approval;

2. Upon final implementation of the plan by the nursing home following review by the State Fire Marshal or the Agency's Office of Plans and Construction.

(b) The nursing home shall keep a copy of each written or electronic notification sent by the nursing home to the resident and resident's representative on file.

Rulemaking Authority 400.23 FS. Law Implemented 400.23 FS. History–New 3-26-18.

SP8216

Date Submitted	12/14/2018	**Section**	450.4.2.9.2	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Modification # 8198

Summary of Modification

Proposed revision aligns the Florida Building Code with 59A-4.1265, F.A.C. Emergency Environmental Control for Nursing Homes.

Rationale

Following the tragic loss of life at a nursing home due to heat related illness in the aftermath of Hurricane Irma, the Agency for Health Care Administration developed a rule requiring facilities to provide an alternate power source for equipment necessary to maintain safe indoor air temperatures for not less 96 hours following the loss of normal power. This rule exceeds the current requirements for a standby power system for a nursing home. This proposed modification is part of a series of proposals intended to align the Florida Building Code with the Rule and eliminate conflicting requirements. This revises the fuel requirements to align with the rule and clarifies the method for calculating the required fuel storage.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Impact to industry relative to the cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Impact to small business relative to the cost of compliance with code

The proposal aligns the code with requirements in an existing rule and will not result in any additional costs.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

No.

450.4.2.9.2 The emergency power supply (EPS) shall be fueled by ~~a~~ fuel ~~supply~~ stored on-site. The fuel supply shall be sized to fuel the generator for 100-percent load for ~~64~~ 72 hours or for ~~72~~ 96 hours of actual demand load of the occupied ~~patient~~ resident area(s) and ~~patient~~ resident support area(s) and ~~patient~~ resident support utilities during and immediately following a disaster, whichever is greater.Where used to meet the requirements of Section 450.4.2.6.2, the fuel calculation must include the cooling demand

59A-4.1265 Emergency Environmental Control for Nursing Homes.

(1) DETAILED NURSING HOME EMERGENCY POWER PLAN. Each nursing home shall prepare a detailed plan ("plan"), to serve as a supplement to its Comprehensive Emergency Management Plan, to address emergency power in the event of the loss of primary electrical power in that nursing home, which includes the following information:

(a) The acquisition of a sufficient alternate power source such as a generator(s), maintained at the nursing home, to ensure that current licensees of nursing homes will be equipped to ensure the protection of resident health, safety, welfare, and comfort for a minimum of ninety-six (96) hours in the event of the loss of primary electrical power. Safe indoor air temperatures in resident occupied areas shall be determined by the licensee to meet the clinical needs of residents, but shall not exceed eighty-one (81) degrees Fahrenheit.

1. The required temperature must be maintained in an area or areas determined by the nursing home of sufficient size to maintain all residents safely at all times and is appropriate for the care needs and life safety requirements. For planning purposes, no less than thirty (30) net square feet per resident must be provided. This may include areas that are less than the entire nursing home if the nursing home's comprehensive emergency management plan includes relocating residents to portions of the building where the health, safety, welfare, and comfort of the residents will be maintained as required by this rule. The plan shall include information regarding the area(s) within the nursing home where the required temperature will be maintained.

2. The alternate power source for the equipment necessary to maintain the safe indoor air temperature required by this rule may be provided by the essential electrical system required by the Florida Building Code for Nursing Home design and construction or onsite optional standby system as defined by NFPA 70 National Electrical Code supplying normal power to the nursing home maintained onsite at all times when the building is occupied. If an optional standby system is used, it must be connected and maintained in accordance with the manufacturer's recommendations. The alternate power source and fuel supply shall be located in an area(s) in accordance with local zoning and the Florida Building Code.

3. Each nursing home is unique in size; the types of care provided; the physical and mental capabilities and needs of residents; the type, frequency, and amount of services and care offered; and staffing characteristics. Accordingly, this rule does not limit the types of systems or equipment that may be used to maintain the safe indoor air temperature required by this rule for a minimum of ninety-six (96) hours in the event of the loss of primary electrical power. The plan shall include information regarding the systems and equipment that will be used by the nursing home required to operate the systems and equipment.

a. A nursing home in an evacuation zone pursuant to Chapter 252, F.S., must maintain an alternative power source and fuel as required by this subsection at all times when the facility is occupied but is permitted to utilize a mobile generator(s) to enable portability if evacuation is necessary.

b. Facilities located on a single campus with other facilities licensed by the Agency under common ownership, may share fuel, alternative power resources, and resident space available on the campus if such resources are sufficient to support the requirements of each facility's residents, as specified in this rule. Details regarding how resources will be shared and any necessary movement of residents must be clearly described in the emergency power plan.

c. A multistory facility, whose comprehensive emergency management plan is to move residents to a higher floor during a flood or surge event, must place its alternative power source and all necessary additional equipment so it can safely operate in a location protected from flooding or storm surge damage.

(b) The acquisition of sufficient fuel, and safe maintenance of that fuel onsite at the facility, to ensure that in the event of the loss of primary electrical power there is sufficient fuel available for the alternate power source required in paragraph (1)(a), to power life safety systems, critical systems, and equipment necessary to maintain safe indoor air temperatures as described in this rule for ninety-six (96) hours after the loss of electrical power during a declared state of emergency. The plan shall include information regarding fuel source and fuel storage.

1. A nursing home located in an area in a declared state of emergency area pursuant to Section 252.36, F.S., that may impact primary power delivery must secure ninety-six (96) hours of fuel. The nursing home may utilize portable fuel storage containers for the remaining fuel necessary for ninety-six (96) hours during the period of a declared state of emergency.

2. A nursing home must store a minimum of seventy-two (72) hours of fuel onsite.

3. Piped natural gas is an allowable fuel source and meets the onsite fuel requirement under this rule.

4. If local ordinances or other regulations that limit the amount of onsite fuel storage for the nursing home's location and the nursing home does not have access to piped natural gas, then the nursing home must develop a plan that includes maximum onsite fuel storage allowable by the ordinance or regulation and a reliable method to obtain the maximum additional fuel at least 24 hours

prior to depletion of onsite fuel.

(c) The acquisition of services necessary to install, maintain, and test the equipment and its functions to ensure the safe and sufficient operation of the alternate power source installed in the nursing home.

(2) SUBMISSION OF THE PLAN.

(a) Each nursing home licensed prior to the effective date of this rule shall submit its plan to the local emergency management agency for review and approval within thirty (30) days of the effective date of the rule. Nursing Home plans previously received and approved under Emergency Rule 59AER17-1, F.A.C., will require resubmission only if changes are made.

(b) Each new nursing home shall submit the plan required under this rule prior to obtaining a license.

(c) Each existing nursing home that undergoes additions, modifications, alterations, refurbishment, reconstruction or renovations that require modification of the systems or equipment affecting the nursing home's compliance with this rule shall amend its plan and submit it to the local emergency management agency for review and approval.

(3) PLAN REVIEW. Architectural and engineering plans are subject to review by the Agency's Office of Plans and Construction. The local emergency management agency shall review the emergency power plan for compliance with the subsection and may rely on the technical review of the Office of Plans and Construction. Once the review is complete, the local emergency management agency shall:

(a) Report deficiencies in the plan to the nursing home for resolution. The nursing home must resubmit the plan within ten (10) business days.

(b) Report approval or denial of the plan to the Agency and the nursing home.

(4) APPROVED PLANS.

(a) Each nursing home must maintain a copy of its plan in a manner that makes the plan readily available at the licensee's physical address for review by the authority having jurisdiction. If the plan is maintained in an electronic format, nursing home staff must be readily available to access and produce the plan. For purposes of this section, "readily available" means the ability to immediately produce the plan, either in electronic or paper format, upon request.

(b) Within two (2) business days of the approval of the plan from the local emergency management agency, the nursing home shall submit in writing proof of the approval to the Agency for Health Care Administration.

(c) The nursing home shall submit a consumer friendly summary of the emergency power plan to the Agency. The Agency shall post the summary and notice of the approval and implementation of the nursing home emergency power plans on its website within ten (10) business days of the plan's approval by the local emergency management agency and update within ten (10) business days of implementation.

(5) IMPLEMENTATION OF THE PLAN.

(a) Each nursing home licensed prior to the effective date of this rule shall, no later than June 1, 2018 have implemented the plan required under this rule.

(b) The Agency shall grant an extension up to January 1, 2019 to providers in compliance with paragraph (c), below, and who can show delays caused by necessary construction, delivery of ordered equipment, zoning or other regulatory approval processes. Nursing homes granted an extension must keep the Agency apprised of progress on a monthly basis to ensure there are no unnecessary delays.

(c) During the extension period, a nursing home must make arrangements pending full implementation of its plan that the residents are housed in an area that meets the safe indoor air temperature requirements of paragraph (1)(a), for a minimum of ninety-six (96) hours.

1. A nursing home not located in an evacuation zone must either have an alternative power source onsite or have a contract in place for delivery of an alternative power source and fuel when requested. Within twenty-four (24) hours of the issuance of a state of emergency for an event that may impact primary power delivery for the area of the nursing home, it must have the alternative power source and no less than ninety-six (96) hours of fuel stored onsite.

2. A nursing home located in an evacuation zone pursuant to Chapter 252, F.S., must either:

a. Fully and safely evacuate its residents prior to the arrival of the event, or

b. Have an alternative power source and no less than ninety-six (96) hours of fuel stored onsite, within twenty-four (24) hours of the issuance of a state of emergency for the area of the nursing home,

(d) Each new nursing home shall implement the plan prior to obtaining a license.

(e) Each nursing home that undergoes any additions, modifications, alterations, refurbishment, reconstruction or renovations

that require modification of the systems or equipment affecting the nursing home's compliance with this rule shall implement its amended plan subsequent with the completion of construction.

(f) The Agency may request cooperation from the State Fire Marshal to conduct inspections to ensure implementation of the plan in compliance with this rule.

(6) POLICIES AND PROCEDURES.

(a) Each nursing home shall develop and implement written policies and procedures to ensure that each nursing home can effectively and immediately activate, operate and maintain the alternate power source and any fuel required for the operation of the alternate power source. The procedures shall be resident-focused to ensure that residents do not experience complications from heat exposure, and shall include a contingency plan to transport residents to a safe facility if the current nursing home's plan to keep the residents in a safe and comfortable location within the nursing home at or below the indoor air temperature required by this rule becomes compromised.

(b) Each nursing home shall maintain its written policies and procedures in a manner that makes them readily available at the licensee's physical address for review by the authority having jurisdiction. If the policies and procedures are maintained in an electronic format, nursing home staff must be readily available to access the policies and procedures and produce the requested information.

(c) The written policies and procedures must be readily available for inspection by each resident; each resident's legal representative, designee, surrogate, guardian, attorney in fact, or case manager; each resident's estate; and all parties authorized in writing or by law.

(7) REVOCATION OF LICENSE, FINES OR SANCTIONS. For a violation of any part of this rule, the Agency may seek any remedy authorized by Chapter 400, Part II, or Chapter 408, Part II, F.S., including but not limited to, license revocation, license suspension, and the imposition of administrative fines.

(8) COMPREHENSIVE EMERGENCY MANAGEMENT PLAN.

(a) Nursing homes whose comprehensive emergency management plan is to evacuate must comply with this rule.

(b) Once the plan has been approved, the nursing home shall submit the plan as an addendum with any future submissions for approval of its Comprehensive Emergency Management Plan.

(9) NOTIFICATION.

(a) Within three (3) business days, each nursing home must notify in writing, unless permission for electronic communication has been granted, each resident and the resident's legal representative:

1. Upon submission of the plan to the local emergency management agency that the plan has been submitted for review and approval;

2. Upon final implementation of the plan by the nursing home following review by the State Fire Marshal or the Agency's Office of Plans and Construction.

(b) The nursing home shall keep a copy of each written or electronic notification sent by the nursing home to the resident and resident's representative on file.

Rulemaking Authority 400.23 FS. Law Implemented 400.23 FS. History–New 3-26-18.

SP8244

Date Submitted	12/14/2018	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Revises the nurse call requirements.

Rationale

Revises nurse all requirements by removing some redundant language and not selecting other codes to be followed including the FGI Guidelines but not NFPA 99 which is an incomplete and contradictory code for nurse call.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

450.3.17 Nurse call systems. Reference The Guidelines for other requirements.Nurse call systems as described in NFPA 99 shall not apply.

450.3.17.1 Wired- or wireless-type nurse call systems shall be permitted if they have been tested and approved by a national recognized testing laboratory (NRTL) to meet the requirements of UL 1069, 7th edition, published October 12, 2007, as referenced in Chapter 35 of this code. All wireless systems shall have been tested and approved by a nationally recognized testing laboratory (NRTL) to meet the requirements of Section 49, Wireless Systems of UL 1069, 7th edition as referenced in Chapter 35 of this code. All nurse call systems whether wired or wireless shall have electronically supervised visual and audible annunciation in accordance with the supervision criteria of UL 1069, 7th edition for nurse call systems and tested and approved by a nationally recognized testing laboratory (NRTL) to meet those requirements.

450.3.17.~~1~~2 A nurse call system shall be provided that will register a call from a call button from each resident bed to the related staff work area(s) by activating a visual signal at the resident room door or wireless pager and activating a visual and audible signal in the clean utility, soiled utility, nourishment station, medication prep or mobile nurse station receiver and the master station of the resident. If a mobile nurse station receiver is utilized to receive the resident call, it will be worn by all staff who are assigned to the resident unit and shall identify the specific resident and or room from which the call was placed.

450.3.17.3 Audible signals may be temporarily silenced, provided subsequent calls automatically reactivate the audible signal. In rooms containing two or more calling stations, indicating lights shall be provided for each calling station. In multi corridor nursing units, corridor zone lights shall be installed at corridor intersections in the vicinity of staff work areas.

450.3.17.~~2~~4An emergency calling station of the pull cord-type shall be provided and shall be conveniently

located for resident use at each exam room (if provided), resident toilet, bath or shower room but not

inside of the shower unless the nurse call device is listed for wet locations. The call signal shall be the highest priority and shall be cancelled only at the emergency calling station. The emergency calling station shall activate distinctive audible and visual signals immediately at the resident room door or wireless pager, and activate a visual and audible signal in the clean utility, soiled utility, nourishment station, medication prep or mobile nurse station receiver and the master station of the resident unit. If a mobile nurse station receiver is utilized to receive the resident call, it will be worn by all staff who are assigned to the resident unit and shall identify the specific resident and or room from which the call was placed.

~~450.3.17.3 The nurse call master station shall be located inside the resident unit at a staff administrative~~

~~area and shall not block any incoming resident calls. The master station control settings shall not prevent the activation of the incoming audible and visual signals. In wireless systems, all orphaned calls to mobile nurse station receivers will register at the nurse call master station.~~

450.3.17.4~~4~~5Activation of an emergency call shall not cancel a normal call from the same room.

~~450.3.17.5 A corridor dome light shall be located directly outside of any resident care area that is equipped with a wired nurse call system.~~

SP8246

Date Submitted	12/14/2018	**Section**	449.3.10	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Modification clarifies an existing requirement.

Rationale

Provides clarification that electric motor-driven fire pumps are to be connected to EPSS unless it infeasible to provide connection to the existing EPSS equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Impact to small business relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provides clarification of an existing the code requirement.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not degrade the effectiveness of the code

It does not.

449.3.10 Where a fire pump is required by another section of this code, a new electric motor-driven fire pump~~,~~ ~~except for a replacement fire pump, that is electric motor-driven~~ shall be connected to the Emergency Power Supply System (EPSS) of the hospital. Where connection to existing EPSS equipment is technically infeasible, replacement fire pumps shall be exempt from this requirement. A fire pump~~(s)~~ that is not electric motor-driven shall meet the requirements of NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, alternative power.

SP8254

Date Submitted	12/14/2018	**Section**	449.3.11.10	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Modification clarifies an existing requirement based on updates to referenced standards.

Rationale

Updates to language to reflect terminology used in updated reference standards.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provides clarification of an existing the code requirement.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not degrade the effectiveness of the code

It does not.

449.3.11.10 The circuitry of all receptacles required by The Guidelines and NFPA 99 in critical care areas, in all emergency treatment rooms or areas, and other areas including ~~angiographic laboratories, cardiac catheterization laboratories~~ Class II and Class III imagining rooms, coronary care units, human physiology laboratories, ~~intensive~~ critical care units and phase I postoperative recovery rooms, shall be provided as follows:

SP7466

Date Submitted	11/27/2018	**Section**	3010	**Proponent**	Comingore Michelle
Chapter	30	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Clarifies the ASME rules amended and conforms to the current ASME codes.

Rationale

This proposal clarifies which specific ASME codes and sections are being amended and conforms the amendments to the current ASME codes. Section 3010.1.3 amends both ASME A17.1 and ASME A17.3, but only lists ASME A17.1 as being amended in the opening sentence. The amendment to paragraph a. places the additional language in the specific rule relating to assigning elevator identifications.

The amendment to paragraph b. adds the language to the specific ASME rule. Left unchanged the code will replace the entire section of 2.7.3.1 and eliminate important safety requirements. This part of the proposal also deletes unnecessary and vague language relating to means of access to machine room and overhead machinery spaces that is covered by the ASME rule. ASME A17.1 provides detailed requirements for means of access to these rooms and spaces and specifies who shall have access to them. This proposal also clarifies that the key to machine rooms, control rooms, machinery spaces and control spaces must be available for State of Florida Certified Elevator Inspectors, rather than limiting this key to just machine rooms and overhead machinery spaces. This will help ensure that the elevator inspectors have access to all areas necessary to perform inspections.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No anticipated impact to local entities relative to enforcement of code.

Impact to building and property owners relative to cost of compliance with code

No anticipated impact to building and property owners relative to cost of compliance with code.

Impact to industry relative to the cost of compliance with code

No anticipated impact to industry relative to the cost of compliance with code.

Impact to small business relative to the cost of compliance with code

No anticipated impact to small business relative to the cost of compliance with code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal improves the health, safety and welfare of the general public by clarifying elevator safety requirement amendments and removing vague language that potentially conflicts with ASME code requirements.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal improves the code by conforming to the referenced ASME standards and removing vague language that potentially conflicts with the ASME code requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

3010.1.3

The following ASME A17.1 and ASME A17.3 rules are~~rule is~~ hereby amended to read as follows:

a.Rule 2.29.1.1 of ASME A17.1 is amended~~amend~~ to add the following to the rule: “Each car in a multicar group shall be sequentially identified from left to right, as viewed from the elevator lobby.”

b.Rule 2.7.3.1.1 of ~~the~~ ASME A17.1, ~~which~~ is amended to add the following to the rule~~read as follows~~: “~~Rule 2.7.3.1 General Requirements. A permanent, safe and convenient means of access to elevator machine rooms and overhead machinery spaces shall be provided for authorized persons.~~ The key to the machine rooms, control rooms, machinery spaces and control ~~overhead machinery~~ spaces shall be kept on the premises at all times and be readily available for use by State of Florida C~~c~~ertified Elevator Inspectors.”

c.Rule 3.11.3 of ASME A17.3 is amended to read as follows:

Note: Updates to the Safety Code for Existing Elevators and Escalators ASME A17.1 and ASME A17.3 which require Phase II Firefighters’ Service shall apply except where Section 399.02(9) Florida Statutes states Phase II Firefighters’ Service on elevators may not be enforced until the elevator is replaced or requires major modification, whichever occurs first, on elevators in condominiums or multifamily residential buildings, including those that are part of a continuing care facility licensed under Chapter 651, or similar retirement community with apartments, having a certificate of occupancy by the local building authority that was issued before July 1, 2008. This exception does not prevent an elevator owner from requesting a variance from the applicable codes. This subsection does not prohibit the division from granting variances pursuant to Section 120.542, Florida Statutes.

SP7468

Date Submitted	11/27/2018	**Section**	3001.2	**Proponent**	Comingore Michelle
Chapter	30	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No **Alternate Language** No

Related Modifications

Building, Chapter 35 - ASME Codes. This proposal adds a new referenced standard that would need added to Chapter 35.

Summary of Modification

Adds table identifying the equipment to the referenced standards, add ASME A17.6 to referenced standards, and updates variance authority.

Rationale

The referenced standards do not apply to all elevators and conveying systems and their components. Each standard is for a certain type of elevator or conveying system. This proposal clearly identifies the standard that applies to each type of elevator or conveying system covered by Chapter 30.

ASME A17.6 includes requirements for material properties, design, testing, inspection, and replacement criteria for elevator suspension, compensation, and governor systems. Inspection and replacement criteria were moved from ASME A17.1, Safety Code for Elevators and Escalators, to ASME A17.6 in 2010. ASME A17.1 now references to ASME A17.6 for the minimum requirements for elevator suspension, compensation, and governor systems. Since the inspection and replacement criteria standards were previously included with ASME A17.1, adopting ASME A17.6 will ensure that these elevator suspension, compensation, and governor system code standards remain in place in the State of Florida.

This proposal also removes allowance for the Division of Hotels and Restaurants to issue exceptions to the Elevator Safety Code. The Division has authority to issue variances and waivers, not exceptions. This proposal also adds reference to Chapter 399, Florida Statutes, which specifically allows variances for undue hardship and prohibits the Division from issuing variances that will adversely affect public safety.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No anticipated impact to local entities relative to enforcement of code.

Impact to building and property owners relative to cost of compliance with code

No anticipated impact to building and property owners relative to cost of compliance with code.

Impact to industry relative to the cost of compliance with code

No anticipated impact to industry relative to the cost of compliance with code. The industry already follows ASME A17.6 since it is referenced in ASME A17.1.

Impact to small business relative to the cost of compliance with code

No anticipated impact to small business relative to the cost of compliance with code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal will benefit the health, safety, and welfare of the general public by clarifying application of the codes and providing minimum requirements for elevator suspension, compensation, and governor systems.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal improves the code and provides better equivalent or better products, methods, or systems of construction by clarifying application of the codes and providing minimum requirements for elevator suspension, compensation, and governor systems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

1st Comment Period History

SP7468-G1

Proponent Bill Snyder **Submitted** 1/3/2019 **Attachments** No

Comment:

I support the changes proposed for the codes. It better aligns Florida codes with industry manufacturing of equipment to enhance safety of elevator equipment.

3001.2 Referenced standards.

Except as otherwise provided for in this code, the design, construction, installation, *alteration*, repair and maintenance of elevators and conveying systems and their components shall conform to the applicable standard specified in Table 3001.2 ~~ASME A17.1/CSA B44, ASME A17.7/CSA B44.7, ASME A17.3 and ASME A18.1, ASME A90.1, ASME B20.1, ANSI MH29.1, ALI ALCTV,~~ and ASCE 24 for construction in *flood hazard areas* established in Section 1612.3. The Division of Hotels and Restaurants may grant ~~exceptions,~~ variances and waivers to the *Elevator Safety Code* as authorized by the *Safety Code for Elevators and Escalators* (ASME A17.1, Section 1.2) and Florida Statutes (Chapter 120 and Chapter 399.)

TABLE 3001.2

STANDARDS FOR ELEVATORS AND CONVEYING SYSTEMS AND COMPONENTS

TYPE	STANDARD
Elevators, escalators, dumbwaiters, moving walks, material lifts	ASME A17.1/CSA B44, ASME A17.6, ASME A17.7/CSA B44.7
Existing elevators and escalators	ASME A17.3
Platform lifts, stairway chairlifts, wheelchair lifts	ASME A18.1
Belt manlifts	ASME A90.1
Conveyors and related equipment	ASME B20.1
Industrial scissors lifts	ANSI MH29.1
Automotive lifts	ALI ALCTV

SP7621

Date Submitted	12/4/2018	**Section**	3115	**Proponent**	Steve Martin
Chapter	31	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Public use restrooms on publicly owned lands in flood hazard areas shall comply with the requirements of ASCE 24, except for elevation requirements, and shall comply with criteria set forth in the amendment.

Rationale

Under the current requirements of the NFIP and IFBC, restrooms for public use that are located in flood hazard areas must meet the same requirements as residential and commercial buildings. This proposal is intended to meet the intent of all NFIP requirements, except elevation requirements, to minimize flood damage, while acknowledging the special needs and access required or appropriate for public use restrooms. See support file for a complete rationale and photographs.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No change in costs associated with enforcement.

Impact to building and property owners relative to cost of compliance with code

The proposal will lower initial costs and lower routine and long-term facility maintenance by public entities that provide public use restrooms on publicly owned lands. Construction costs will be less than the cost to elevate and provide and maintain elevators and extensive ramp systems.

Impact to industry relative to the cost of compliance with code

The code change proposal will decrease the cost of construction.

Impact to small business relative to the cost of compliance with code

No impact; the proposal applies only to public use restrooms on publicly owned lands.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Accessible public use restrooms on publicly owned lands have a direct substantial connect to health, safety, and welfare of the public that visits public parks and beaches.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by providing a better method to provide public use restrooms on publicly owned land, while preserving the objective of flood resistant construction.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No specific materials, products, methods or systems are specified.

Does not degrade the effectiveness of the code

Communities that permit public use restrooms on publicly owned lands in accordance with the proposal may have to justify such action to FEMA.

1st Comment Period History

SP7621-G1

Proponent Gregory Wilson **Submitted** 2/13/2019 **Attachments** Yes

Comment:

See attached letter from the FEMA Floodplain Management Division Director

3101.1 Scope. The provisions of this chapter shall govern special building construction including membrane structures, temporary structures, *pedestrian walkways* and tunnels, automatic *vehicular gates*, *awnings* and *canopies*, *marquees*, signs, ~~and~~ towers and antennas, and public use restroom buildings on publicly owned lands in flood hazard areas.

3115 PUBLIC USE RESTROOM BUILDINGS IN FLOOD HAZARD AREAS

3115.1 General. - For the purpose of this section, public restroom buildings are located on publicly owned lands in flood hazard areas and intended for public use. Public restroom buildings and portions of other buildings that contain public restrooms, are limited to toilet rooms, bathrooms, showers and changing rooms. Public restroom buildings and portions of buildings that contain public restrooms shall comply with the requirements of this section. Public use restrooms that are not elevated or dry flood proofed in accordance with Section 1612 shall comply with Section 3115.2. Portions of buildings that include uses other than public use toilet rooms, bathrooms, showers and changing rooms shall comply with Section 1612.

3115.2 Flood resistance. Public use restrooms on publicly owned lands in flood hazard areas shall comply with the requirements of ASCE 24, except for elevation requirements, and shall comply with all of the following criteria:

-

1. The building foot print is not more than 1,500 square feet.
2. Located, designed and constructed to resist the effects of flood hazards and flood loads to minimize flood damage from a combination of wind and water loads associated with the base flood.
3. Anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy during conditions of the base flood.
4. Constructed of flood damage-resistant materials.
5. Where enclosed by walls, the walls have flood openings.
6. Mechanical and electrical systems are located above the base flood elevation.
7. Plumbing fixtures and plumbing connections are located above the base flood elevation.
8. An emergency plan, approved by the jurisdiction, is submitted to the building official where the building design documents specify implementation of protection measures prior to the onset of flooding conditions.

-

Exceptions:
1. Minimum necessary electric equipment required to address health, life safety and electric code requirements is permitted below the base flood elevation in accordance with ASCE 24 provisions for electric elements installed below the minimum elevations.
2. Plumbing fixtures and connections are permitted below the base flood elevation provided the fixtures and connections are designed and installed to minimize or eliminate infiltration of flood waters into the sanitary sewage system and discharges from sanitary sewage systems into flood waters.

U.S. Department of Homeland Security
500 C Street, SW
Washington, DC 20472

FEMA

23 OCT 2018

International Code Council
International Codes Governmental Member Voting Representatives
2018 Public Comment Hearings, Group A
Richmond, Virginia

International Codes Governmental Member Voting Representatives:

FEMA Floodplain Management Division appreciates the opportunity to comment on the proposed code change being offered by the Florida Department of Emergency Management (FDEM) and Building Officials Association of Florida (BOAF) related to public restroom construction in beach areas.

Over 22,300 communities currently participate in the National Flood Insurance Program (NFIP). This number represents over 90 percent of all US communities that have land use authority and identified flood hazards. By law, FEMA can only provide flood insurance via the NFIP to those States or communities that adopt and vigorously enforce floodplain management regulations that meet or exceed minimum NFIP requirements. These minimum requirements are detailed in the Code of Federal Regulations in Title 44, Emergency Management and Assistance, and are primarily within Part 60, Subpart A - Requirements for Flood Plain Management Regulations. The requirements focus on buildings and other development that is occurring in identified Special Flood Hazard Areas (SFHAs) also commonly referred to as the base or regulatory floodplain. A primary tenant of these regulations is to require that all new construction (and substantial improvements) of non-residential structures either be elevated above the elevation associated with the base or regulatory floodplain (BFE or base flood elevation) or be dry floodproofed to this elevation and capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. Dry floodproofing is not, however, permissible in coastal flood hazard areas labeled as V zones, nor is it advisable in areas subject to any type of wave action.

The Public Restroom Proposal submitted by FDEM and BOAF is not consistent with floodplain management regulations that communities must adopt and enforce to remain in good standing with the NFIP. The proposal includes provisions to allow the lowest floor of restrooms to be constructed below the BFE. This is in direct conflict with the minimum floodplain management requirements of the NFIP. While the proposal does include additional provisions to address potential flood damage, including the use of flood-resistant materials and the placement of mechanical and electrical systems and plumbing fixtures above the BFE, it is still in direct conflict with current NFIP floodplain management requirements.

Should the International Building Code be changed to incorporate this proposal, it would no longer be consistent with minimum NFIP floodplain management regulations. This change would signify the first time in 15 years that an inconsistency would exist between the International Codes and the NFIP representing a significant departure in our shared goals of community resilience. Furthermore, should states and communities adopt this provision, their floodplain management regulations would no longer meet minimum NFIP floodplain management requirements. If states and communities implement this provision, they will be permitting NFIP violations to occur and it would be incumbent on NFIP State Coordinators and FEMA Staff to identify these violations and hold communities accountable for them. When violations in NFIP-participating communities are identified by the State or FEMA and not addressed by the community, enforcement actions—including community probation and ultimately suspension—are taken against the community.

Communities put on probation are expected to resolve identified noncompliance actions or face suspension. Probation has no effect on the continued availability of flood insurance, but a $50 surcharge is added to premiums for new and renewed policies for each year the community is on probation. Suspension is the removal of a community from the program.

The NFIP is a voluntary program. However, it's worth noting that the NFIP can only provide flood insurance coverage in participating states and communities. Furthermore, when a community is sanctioned (i.e., it has identified flood hazard areas but does not participate in the NFIP), Federal officers and agencies are prohibited from approving any financial assistance for acquisition or construction purposes in an area of special flood hazard in the community. This restriction applies to Federal disaster assistance under the Stafford Act if the assistance is in connection with a flood.

FEMA Floodplain Management recognizes that the State of Florida is interested in identifying alternate means of public restroom construction in Special Flood Hazard Areas. We are willing to continue to explore how to address this interest and are currently working with our Office of Chief Counsel, Office of Environmental and Historic Preservation and Building Science Branch colleagues to identify a potential resolution that could be implemented while still abiding by the laws and regulations that govern our programs.

As you consider whether to approve this code change proposal, we respectfully request that you consider the impact it would have on the States and communities that would adopt and enforce this provision in the future should it become part of the International Building Code.

1. If the State or FEMA identifies community violations, there is a notable burden in terms of time, effort, coordination and stress that is placed on community officials to remedy those violations in order for the community to remain in good standing with the NFIP.

2. There would be significant ramifications in terms of NFIP flood insurance policy availability for communities that either knowingly or unknowingly permit violations, particularly if they are unable to remedy them. Additionally, there is a $50 surcharge placed on all NFIP policy holders within a community when that community is placed on probation.

3. Federal disaster assistance is limited in floodprone areas for those communities that are sanctioned from the NFIP. Many communities rely heavily on federal disaster assistance in the wake of flood disasters to recover and become fully functional again.

FEMA Floodplain Management Division appreciates the opportunity to be heard by the voting representatives and we thank you for your time.

Sincerely,

Rachel Sears
Floodplain Management Division Director
Federal Insurance and Mitigation Administration
Resilience

RATIONALE Support File

Proposal No.: 7621

Proponent: Steve Martin, Florida Division of Emergency Management

Most Florida communities and some state agencies have public open space and parks along rivers and shorelines. Many communities experience economic value from tourism and public access to areas that feature water resources. Under the current requirements of the NFIP and FBC, restrooms for public use that are located in flood hazard areas must meet the same requirements as commercial buildings. In flood hazard areas other than coastal high hazard areas and Coastal A Zones (i.e., in flood zones identified on Federal Emergency Management Agency Flood Insurance Rate Maps with the letter "A"), restroom buildings must either be elevated or dry floodproofed to or above the elevations required by the FBC/ASCE 24. In coastal high hazard areas (flood Zone V) and Coastal A Zones, restroom buildings must be elevated to or above the elevations required by the FBC/ASCE 24.

In Florida, this has resulted in construction of public use restrooms as high as 6 to 18 feet above grade. This poses many challenges, not the least of which is access. Figures 1, 2, 3 and 4 (below) illustrate elevated restrooms with long ramps. While ramps can be built to meet ADA requirements, to reach some heights required in some flood hazard areas the ramps may be as long as 300 feet. In coastal high hazard areas, such ramps likely conflict with the NFIP requirements that elevated buildings be “free of obstruction,” and the presence of such ramps would likely interfere with the ability of walls around enclosures to break away under flood conditions. Those same provisions are required by FBC Section 1612, Flood Loads, which references ASCE 24, Flood Resistant Design and Construction.

Long ramps defeat accessibility when the distance of travel still renders restroom facilities inaccessible to many persons with disabilities or limited mobility. Although the FBC (and FEMA) permits elevators to extend below the base flood elevation, installing elevators to provide access to elevated public use restrooms is expensive and creates many maintenance issues, and a high rate of failure to function, especially in beach areas where blowing sand and windborne salt aerosols create corrosive conditions.

This proposal creates a new section in FBC Chapter 31, Special Construction to limit the scope to public use restrooms that include public use toilet rooms, bathrooms, showers and changing rooms and spaces. Portions of such buildings that include other uses would have to fully comply with the elevation and other flood resistant requirements of FBC Section 1612, Flood Loads, which references ASCE 24, Flood Resistant Design and Construction.

In recognition that most public use restrooms are built on public land using public funds, the proposal is to limit the potential financial losses associated with flooded public facilities in two ways: by limiting the footprint to not more than 1,500 square feet and by specifying design requirements that minimize or eliminate physical damage when flooding occurs. Enabling public use restrooms to be designed to withstand the hydrodynamic and hydrostatic loads below the base flood elevation is an appropriate alternative to the extremely high cost for design, construction and maintenance of highly elevated public restrooms and their required access ramps or elevators.

Although the proposed design requirements are intended to preclude significant damage during flood conditions up to and including conditions of the design flood (e.g., the base or 100-year flood), more severe floods can and do occur. Figure 5 (below) illustrates one modest design option that demonstrates the feasibility of the proposal. It shows a small masonry restroom on a beach after Hurricane Irma pushed onshore. The drawings for the building show below-grade piling support and it appears the masonry units were filled. Despite approximately 6-8 feet of flooding (including waves), there is no evidence of structural damage and the non-structural damage appears readily repairable. The Florida Division of Emergency Management staff participated in FEMA's post-Irma field work and, along with the other team members, observed some below-BFE small public restrooms designed to resist flood loads that sustained superficial damage (finishes and fixtures) and were readily repairable.

FDEM and BOAF submitted this proposal for the 2021 International Building Code (G149-18) and modified it to respond to comments by the ICC committee. The proposal is now in the last stage of online voting by government members of ICC. At a June 2018 meeting between the FDEM and senior management officials with the FEMA Flood Insurance and Mitigation Administration, FEMA indicated the agency would work to achieve consistency across agency programs to develop guidance or procedures based on the proposed amendment. No opposition to the proposal was expressed during that meeting.

The proposal includes requirements for flood resistance similar to those found in ASCE 24-14 for Flood Design Class 1 (which is essentially equivalent to Structure/Risk Category I). Those requirements effectively are the same as the NFIP requirements in 44 Code of Federal Regulations Section 60.3(a)(3)(ii), (iii), and (iv). FEMA deems the flood provisions of the FBC, with reference to ASCE 24, to meet or exceed the requirements of the National Flood Insurance Program (NFIP).

The intent is to allow public use restrooms to be at-grade or above-grade but below the base flood (partially elevated), provided they meet the design requirements listed in 3115.2. FDEM acknowledges that FEMA guidance states that restroom buildings and comfort stations in coastal high hazard areas must be elevated and meet the same design and construction requirements as other buildings.

Despite the indications from the June 2018 meeting between FDEM and FEMA, FEMA is now on record opposing this proposal for the IBC because it does not meet the minimum requirements of the NFIP. In 2015 the FDEM withdrew a similar proposal for the 2018 IBC based on a FEMA commitment to establish a task force to examine and recommend guidance for options to minimize future damage while meeting construction requirements. The task force was expected to develop a workable solution that balances flood resistance, accessibility, costs, and aesthetics to meet the sanitary needs of the public. While the task force initiated work, FEMA did not follow through and the expected guidance was not prepared.

This proposal is intended to meet the intent of all NFIP requirements, except elevation requirements, to minimize flood damage, while acknowledging the special needs and access required or appropriate for public use restrooms. The Florida Floodplain Management Association prepared a white paper on this subject: Policy and Design Options for Public Restrooms in Special Flood Hazard Areas (2014), www.FLfloods.org/ffmawhitepaper.

Figure 1. Florida, flood Zone V. Ramp wraps around entire building. Has composting toilets, battery and solar electric system, emergency plan requires pumping out tank and filling with clean water.

Figure 2. Coastal Mississippi, flood Zone V. This facility cost $1.1 million.

Figure 3. Florida, Gulf Coast, flood Zone V. Ramp built after original elevator determined to be unsustainable due to significant maintenance problems.

Figure 4. Southwest Florida, flood Zone V. Extensive ramp wraps around three sides.

Figure 5. Florida, after Hurricane Irma, flood Zone V. No evidence of structural damage after estimated 5 ft stillwater plus waves. From upper left: facing beach, side, interior, rear.

SP7465

Date Submitted	11/27/2018	**Section**	35	**Proponent**	Comingore Michelle
Chapter	35	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Updates the safety standard for platform lifts and stairway chairlifts to the 2017 edition.

Rationale

This proposal updates the safety standard for platform lifts and stairway chairlifts to ASME A18.1-2017. Key changes to this edition of the Standard include additional safety features, increased minimum rated load from 500 to 550 pounds for vertical platform lifts, emergency signals for vertical platform lifts, and a new section detailing general maintenance documentation requirements. Additionally, the A18.1-2017 Standard includes relocatable lifts which are starting to be used here in Florida. Adopting this edition of this standard will provide specific safety code requirements for relocatable lifts.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will potentially increase costs to local entities relative to enforcement of the code by adopting standards for relocatable lifts. Portable lifts are excluded from the Division of Hotels and Restaurants authority. This exclusion may place a new enforcement responsibility upon local entities.

Impact to building and property owners relative to cost of compliance with code

Will potentially increase the cost of installing platform lifts and stairway chairlifts by requiring additional safety features and higher capacity. However, manufacturers design equipment to the newest code, making equipment meeting A18.1-2017 the standard equipment available.

Impact to industry relative to the cost of compliance with code

Will potentially increase maintenance costs by requiring the industry to provide maintenance documentation. However, manufacturer’s design equipment to the newest code, making equipment meeting A18.1-2017 the standard equipment available.

Impact to small business relative to the cost of compliance with code

Will potentially increase the cost of installing platform lifts and stairway chairlifts by requiring additional safety features and higher capacity. However, manufacturer’s design equipment to the newest code, making equipment meeting A18.1-2017 the standard.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal will benefit the health, safety, and welfare of the general public by increasing safety requirements and rated load for platform lifts and stairway chairlifts.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal strengthens the code and provides better products by increasing safety features and capacity loads for platform lifts and stairway chairlifts.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

1st Comment Period History

SP7465-G1

Proponent Bill Snyder **Submitted** 1/3/2019 **Attachments** No

Comment:

Adoption of current codes provides for higher levels of safety of this type of equipment. Manufacturers of this type of equipment already produce the equipment to the most current safety standard. The most current code does not cause any increased cost for the end user but enhances the level of safety of this equipment. Adoption of most current codes ensures the end user has the highest safety level available.

ASME A18.1-2017 ~~2014~~ Safety Standard for Platform Lifts and Stairway Chairlifts …..3001.1, 3001.2, 3012.1

SP7469

Date Submitted	11/27/2018	**Section** 35		**Proponent**	Comingore Michelle
Chapter	35	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Building, Section 3001.2, Mod 7468. This proposal references a new standard.

Summary of Modification

Adopts ASME A17.6 as the safety standard for elevator suspension, compensation, and governor systems.

Rationale

This proposal adopts the safety standard for elevator suspension, compensation, and governor systems in ASME A17.6-2010. ASME A17.6 includes requirements for material properties, design, testing, inspection, and replacement criteria for elevator suspension, compensation, and governor systems. Inspection and replacement criteria were moved from ASME A17.1, Safety Code for Elevators and Escalators, to ASME A17.6 in 2010. ASME A17.1 now references to ASME A17.6 for the minimum requirements for elevator suspension, compensation, and governor systems. Since the inspection and replacement criteria standards were previously included with ASME A17.1, adopting ASME A17.6 will ensure that these elevator suspension, compensation, and governor system code standards remain in place in the State of Florida.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No anticipated impact to local entities relative to enforcement of code.

Impact to building and property owners relative to cost of compliance with code

No anticipated impact to building and property owners relative to cost of compliance with code. Parts of this standard were previously adopted as part of ASME A17.1 and are the industry standard safety guideline. The industry already follows ASME A17.6 since it is referenced in ASME A17.1.

Impact to industry relative to the cost of compliance with code

No anticipated impact to industry relative to the cost of compliance with code. Parts of this standard were previously adopted as part of ASME A17.1 and are the industry standard safety guideline. The industry already follows ASME A17.6 since it is referenced in ASME A17.1.

Impact to small business relative to the cost of compliance with code

No anticipated impact to small business relative to the cost of compliance with code. Parts of this standard were previously adopted as part of ASME A17.1 and are the industry standard safety guideline. The industry already follows ASME A17.6 since it is referenced in ASME A17.1.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal will benefit the health, safety, and welfare of the general public by providing minimum requirements for elevator suspension, compensation, and governor systems. Parts of this standard were previously adopted as part of ASME A17.1 and are the industry standard safety guideline.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal strengthens the code and provides better products by providing minimum requirements for elevator suspension, compensation, and governor systems. Parts of this standard were previously adopted as part of ASME A17.1 and are the industry standard safety guideline.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

1st Comment Period History

SP7469-G1

Proponent Bill Snyder **Submitted** 1/3/2019 **Attachments** No

Comment:

I support the changes proposed for the code. It better aligns Florida codes with industry manufacturing of equipment to enhance safety of elevator equipment. Additionally, the level of safety of this equipment is ensured with the adoption of the most current codes.

ASME A17.6-2010 Standard for Elevator Suspension, Compensation, and Governor Systems Safety …................... 3001.2

SP7628

Date Submitted 12/2/2018
Chapter 35
Section 35
Affects HVHZ No
Proponent James gregory
Attachments No
TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No**

Alternate Language **No**

Related Modifications

Summary of Modification

Modifies and Revises the reference to later edition of the FGI Guidelines and corrects address of FGI Guidelines..

Rationale

Updates to the latest edition of the FGI Guidelines so that Florida hospitals, nursing homes, large assisted living facilities, and ambulatory surgical centers will be designed and constructed to the national standard. Corrects the address of the FGI Guidelines and revises and corrects the references made in the code to the FGI Guidelines.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact to enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

There is no impact on the cost of compliance. May actually reduce cost.

Impact to industry relative to the cost of compliance with code

There is no impact on the cost of compliance with the code.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance with this revision.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This revision improves the health, safety, and welfare of the general public by referencing the latest technology of health care.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This revision strengthens and improves the code by updating the reference to the latest standard.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This revision and reference does not discriminate against materials, products, methods or systems of construction.

Does not degrade the effectiveness of the code

This revision does not in any way degrade the effectiveness of the code.

FGI The Facility Guidelines Institute
~~350 N. Saint Paul Street, Suite 100~~ 9750 Fall Ridge Trail
~~Dallas, Texas 75201~~ St. Louis, MO 63127

Standard reference number	Title	Referenced in code section number

GHCF—14~~8~~ Guidelines for Design and Construction of Hospitals ~~and Outpatient Facilities~~ . . . . ~~449.2.1.2~~, 449.2.2,
449.3.2, 449.3.3, 449.3.4, ~~449.3.4.1~~, 449.3.5, ~~449.3.5.1~~, ~~449.3.5.2~~,
449.3.6, ~~449.3.6.1~~, 449.3.7, ~~449.3.8.8, 449.3.8.9~~, 449.3.9, ~~449.3.10~~, 449.3.11,
449.3.13, ~~449.3.15, 449.3.17~~, ~~451.2.1.2, 451.2.2, 451.3.2, 451.3.2.1, 451.3.2.2,~~
~~451.3.3, 451.3.3.2.2, 451.3.3.3, 451.3.4, 451.3.5, 451.3.10~~, 469.2.1.2

GHCF—18 Guidelines for Design and Construction of Outpatient Facilities
451.2.2, 451.3.3, 451.3.3.1, 451.3.4, 451.3.5, 451.3.6, 451.3.8, 451.3.10, 451.3.13,469.2.1.2

GHCF – 14~~8~~ Guidelines for Design and Construction of Residential Health, Care, and Support Facilities . . . . .450.2.2, 450.3.2, ~~450.2.5~~ 450.3.3.1, 450.3.3.2, 450.3.3.3, 450.3.3.4, 450.3.3.5, 450.3.3.6, 450.3.4, 450.3.4.3, 450.3.4.4, 450.3.5, 450.3.6, 450.3.7, 450.3.8, 450.3.9, 450.3.11, 450.3.14, 450.3.15

SP7461

Date Submitted	12/8/2018	**Section**	202	**Proponent**	Rebecca Quinn obo FL Dept Emerg Mg
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

7462 (building volume)

Summary of Modification

In FBC Existing Building, match proposed definition for "Existing Structure" in FBC Building, rather than be specific to flood.

Rationale

This code proposal was submitted for the I-Codes (ADM13-16). The purpose of this code change is to have consistent definitions of "existing building" and "existing structure" in the building and existing building volumes of the Florida Building Code. The terms are used interchangeably in the codes. The proposal modifies the definition to remove the flood-specific sentence.

The 6th Ed. FBC, existing building volume, added the definition for “existing structure.” For the I-Codes, FEMA concurred with addition of the basic definition, without a sentence pertaining to application of provisions for flood hazard areas. The determination as to whether improvements or repairs for existing buildings and structures in flood hazard areas constitute substantial improvement or repair of substantial damage is made for all existing buildings. As flood hazard data are changing over time, sometimes with higher base flood elevations or changed flood zone designations, compliance that is triggered by substantial improvement or substantial damage includes bringing building into compliance with the revised flood hazard data. In addition, there’s a presumption that buildings built after the community’s first flood ordinance are fully compliant, which may not be the case if unpermitted improvements or additions were made that alter whether the building remains compliant.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Definition clarification makes easier to enforce because only one definition is used for all existing buildings in flood hazard areas.

Impact to building and property owners relative to cost of compliance with code

Definition clarification does not change in costs when compliance with flood provisions is triggered.

Impact to industry relative to the cost of compliance with code

Definition clarification does not change in costs when compliance with flood provisions is triggered.

Impact to small business relative to the cost of compliance with code

Definition clarification does not change in costs when compliance with flood provisions is triggered.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Definition clarification does not change the purpose of the flood provisions to protect health, safety and general welfare.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Definition clarification does not change the compliance requirements with respect to products, methods or systems used for flood resistant constructions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Definition clarification does not change the compliance requirements with respect to products, methods or systems used for flood resistant constructions.

Does not degrade the effectiveness of the code

Definition clarification does not alter the effectiveness of the code.

EXISTING STRUCTURES ~~(for flood hazard areas)~~. ~~See Section 1612.2 of the *Florida Building Code, Building.*~~ A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building *permit* has been issued.

SP8165

53

Date Submitted 12/15/2018	**Section** 1003.3	**Proponent** Eberhard Roeder
Chapter 10	**Affects HVHZ** No	**Attachments** No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No **Alternate Language** No

Related Modifications

P230-15

Summary of Modification

The modification keeps the distinction between grease interceptors as part of onsite sewage treatment and disposal systems vs. for central sewer systems (Florida Statutes 381.0065(2)(k)) and incorporates some changes of the 2018 IPC. The onsite sewage requirement moved to 1003.3.9 instead of 1003.5.

Rationale

The proposed modification incorporates some new language of the 2018 IPC and maintains the current distinction between grease interceptors as part of onsite sewage treatment and disposal systems in accordance with Florida Statutes (Section 381.0065(2)(k)), and grease interceptors for central sewer systems. Grease interceptors are included in the definition of “onsite sewage treatment and disposal system” per 381.0065(2)(k) Fl. Statutes. The modification also maintains the option (phrased as exception) to use grease interceptors approved for onsite systems under Chapter 64E-6 of the Florida Administrative Code with central sewer systems. This allows continued use of interceptors approved for onsite sewage systems and manufactured frequently by Florida tank manufacturers. The sudden prohibition of such grease interceptors could disrupt the onsite industry.
The onsite sewage grease interceptor requirement with its reference to Chapter 64e-6, of the Florida Administrative Code, has been moved into section 1003.3.9 instead of 1003.5 to fit in logically into the structure of the 1003.3 grease interceptor section.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Proposal simplifies enforcement by keeping requirements for components of onsite sewage treatment and disposal systems, including a grease interceptor, in one place, Chapter 64E-6. No impact on local entities that enforce the Florida Building Code-Plumbing, the existing requirements remain the same.

Impact to building and property owners relative to cost of compliance with code

No impact on building and property owners, the existing requirements remain the same.

Impact to industry relative to the cost of compliance with code

Reduces costs, as it allows continued use of currently approved and manufactured onsite sewage grease interceptors instead of requiring re-review and re-approval. Several manufacturers have sought approval under the standards of Chapter 64E-6 in order to enter the market.

Impact to small business relative to the cost of compliance with code

The modification results in no impact, as the existing requirements remain the same.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Properly operating grease interceptors protect sewer systems and onsite sewage and disposal systems and their functioning, which in turn protects health, safety and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed modification makes the code clearer by referencing a set of requirements that will apply to grease interceptors as part of onsite sewage treatment and disposal systems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed modification does not discriminate in this manner. It prevents a prohibition of a system of construction that has been used largely satisfactorily in Florida for about two decades.

Does not degrade the effectiveness of the code

By making the building code and the onsite sewage treatment code more consistent with each other the code system overall will become more effective.

1003.3Grease ~~traps and grease~~ interceptors ~~for publicly-owned or investor-owned sewage systems~~.

Grease interceptors for publicly owned or investor-owned sewage systems shall comply with the requirements of Sections 1003.3.1 through 1003.3.~~5~~8. Grease interceptors for onsite sewage treatment and disposal systems shall comply with the requirements of 1003.3.2 and 1003.3.9

1003.3.1Grease interceptors and automatic grease removal devices required.

A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a grease interceptor, one or more grease interceptors shall be permitted to be installed on or above the floor and upstream of an existing grease interceptor.

1003.3.2Food waste disposers.

Where food waste disposers connect to grease interceptors, a solids interceptor shall separate the discharge before connecting to the grease interceptor. Solids interceptors and grease interceptors shall be sized and rated for the discharge of the food waste disposers. Emulsifiers, chemicals, enzymes and bacteria shall not discharge into the food waste disposer.

1003.3.3 Additives to grease interceptors.

Dispensing systems that dispense interceptor performance additives to grease interceptors shall not be installed except where such systems dispense microbes for the enhancement of aerobic bioremediation of grease and other organic material, or for inhibiting growth of pathogenic organisms by anaerobic methods. Such microbial dispensing systems shall be installed only where the grease interceptor manufacturer's instructions allow such systems and the systems conform to ASME A112.14.6. Systems that discharge emulsifiers, chemicals or enzymes to grease interceptors shall be prohibited.

1003.3.~~3~~4 Grease interceptors and automatic grease removal devices not required.

A grease interceptor or an automatic grease removal device shall not be required for individual dwelling units or any private living quarters.

1003.3.~~4~~5 Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices.

Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be sized in accordance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101. Hydromechanical grease interceptors; fats, oils, and greases disposal systems; and automatic grease removal devices shall be designed and tested in accordance with ASME A112.14.3, ASME A112.14.4, CSA B481.1, PDI G101 or PDI G102. Hydromechanical grease interceptors; fats, oils, and greases disposal systems; and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. Where manufacturer's instructions are not provided, hydromechanical grease interceptors; fats, oils, and greases disposal systems; and automatic grease removal devices shall be installed in compliance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101.

Exception: Grease interceptors that are sized, constructed and approved in accordance with Rule 64E-6, *Florida Administrative Code* and that are located outside the building shall not be required to meet the requirements of this section.

1003.3.45.1Grease interceptor capacity.

Grease interceptors shall have the grease retention capacity indicated in Table 1003.3.4.1 for the flow-through rates indicated.

TABLE 1003.3.45.1

CAPACITY OF GREASE INTERCEPTORS[a]

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28

15	30
18	36
20	40
25	50
35	70
50	100
75	150
100	200

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

1. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

1003.3.45.2Rate of flow controls.

Grease interceptors shall be equipped with devices to control the rate of water flow so that the water flow does not exceed the rated flow. The flow-control device shall be vented and terminate not less than 6 inches (152 mm) above the flood rim level or be installed in accordance with the manufacturer's instructions.

1003.3.56Automatic grease removal devices.

Where automatic grease removal devices are installed, such devices shall be located downstream of each fixture or multiple fixtures in accordance with the manufacturer's instructions. The automatic grease removal device shall be sized to pretreat the measured or calculated flows for all connected fixtures or equipment. Ready *access* shall be provided for inspection and maintenance.

1003.3.67 Gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems.

The required capacity of gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be determined by multiplying the peak drain flow into the interceptor in gallons per minute by a retention time of 30 minutes. Gravity grease interceptors shall be designed and tested in accordance with IAPMO/ANSI Z1001. Gravity grease interceptors with fats, oils, and greases disposal systems shall be designed and tested in accordance with ASME A112.14.6 and IAPMO/ANSI Z1001. Gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be installed in accordance with manufacturer's instructions. Where manufacturer's instructions are not provided, gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be installed in compliance with ASME A112.14.6 and IAPMO/ANSI Z1001.

1003.3.~~7~~8 Direct connection.

The discharge piping from a grease interceptor shall be directly connected to the sanitary drainage system.

1003.3.9 Grease interceptors for onsite sewage treatment and disposal systems.

Grease interceptors are not required for a residence. However, one or more grease interceptors are required where grease waste is produced in quantities that could otherwise cause line stoppage or hinder sewage disposal. Where a grease interceptor is required or used, only kitchen wastewater shall first pass through the interceptor and then be discharged into the first compartment of a septic tank or other approved system. Grease interceptors shall be water tight. Each interceptor shall be engineered to withstand the load, such as from vehicular traffic, to be placed on the interceptor. Grease interceptors shall be sized, constructed and approved in accordance with Rule 64E-6, *Florida Administrative Code*.

1003.4 Oil separators required.

At repair garages where floor or trench drains are provided, car washing facilities, factories where oily and flammable liquid wastes are produced and hydraulic elevator pits, oil separators shall be installed into which oil-bearing, grease-bearing or flammable wastes shall be discharged before emptying into the building drainage system or other point of disposal.

Exception: An oil separator is not required in hydraulic elevator pits where an approved alarm system is installed. Such alarm systems shall not terminate the operation of pumps utilized to maintain emergency operation of the elevator by fire fighters.

1003.4.1Separation of liquids.

A mixture of treated or untreated light and heavy liquids with various specific gravities shall be separated in an *approved* receptacle.

1003.4.2Oil separator design.

Oil separators shall be listed and labeled, or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.

1003.4.2.1General design requirements.

Oil separators shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening of the separator shall have not less than an 18-inch (457 mm) water seal.

1003.4.2.2Garages and service stations.

Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, oil separators shall have a capacity of not less than 6 cubic feet (0.168 m^3) for the first 100 square feet (9.3 m^2) of area to be drained, plus 1 cubic foot (0.028 m^3) for each additional 100 square feet (9.3 m^2) of area to be drained into the separator. Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.

~~1003.5Grease interceptors for onsite sewage treatment and disposal systems.~~

~~Grease interceptors are not required for a residence. However, one or more grease interceptors are required where grease waste is produced in quantities that could otherwise cause line stoppage or hinder sewage disposal. Where a grease interceptor is required or used, only kitchen wastewater shall first pass through the interceptor and then be discharged into the first compartment of a septic tank or other approved system. Grease interceptors shall be water tight. Each interceptor shall be engineered to withstand the load, such as from vehicular traffic, to be placed on the interceptor. Grease interceptors shall be sized, constructed and approved in accordance with Rule 64E-6, *Florida Administrative Code*.~~

Renumber subsequent sections to 1003.5 etc

SP8384

Date Submitted	12/15/2018	**Section**	1402	**Proponent**	Eberhard Roeder
Chapter	14	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

The proposed modification deletes the content of this Chapter from the Florida Building Code-Plumbing consistent with Florida Statutes, which require graywater disposal systems to follow onsite sewage treatment and disposal system standards of Chapter 64-6, of the Florida Administrative Code.

Rationale

The proposed deletion of Chapter 14 is consistent with the adaptations for the 2010 Florida Building Code-Plumbing Appendix C (Graywater Recycling Systems) and the 2014 Florida Building Code-Plumbing Chapter 13 (Graywater Recycling Systems). This issue was missed in the initial adaptation for the 2017 Florida Building Code-Plumbing Chapter 14 (Subsurface Landscape Irrigation Systems).

The Department of Health is the regulatory authority for permitting onsite sewage treatment and disposal systems, including gray water systems (381.0065(2)(k); 381.0065(3)(k), Fl. Statutes). Chapter 64E-6, of the Florida Administrative Code, provides specifications for them. Gray water and laundry water disposal systems are addressed in the onsite sewage treatment and disposal code.

Florida has existing requirements for graywater disposal systems, Graywater can be treated separately in graywater onsite sewage treatment and disposal systems subject to requirements described in Chapter 64E-6 of the Florida Administrative Code. Graywater onsite sewage treatment and disposal systems can also be permitted where the blackwater is treated by a central sewerage system (Florida Statute 381.0065(3)(k)).

Chapter 14 of the 2018 IPC prescribes methods for drainfield sizing and installation that would be inconsistent with and partially duplicate the requirements of Chapter 64-6.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Proposal simplifies enforcement by clarifying that there is only a single jurisdiction over onsite sewage treatment and disposal systems. Graywater and laundry wastewater system tanks are included in the definition of “onsite sewage treatment and disposal system” per 381.0065(2)(k) Fl. Statutes.

Impact to building and property owners relative to cost of compliance with code

Simplifies compliance with code by avoiding conflicts with Department of Health regulations. No impact on building and property owners, the existing requirements remain the same.

Impact to industry relative to the cost of compliance with code

Simplifies compliance with code by avoiding conflicts with Department of Health regulations. No impact, the existing requirements remain the same.

Impact to small business relative to the cost of compliance with code

Simplifies compliance with code by avoiding conflicts with Department of Health regulations. No impact, the existing requirements remain the same.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Graywater contains pathogens, and sanitary treatment and disposal of this sewage is necessary for the protection of health and safety. Application of Florida’s onsite sewage regulations provides protection. e.g., Florida, but not the base code, requires an unsaturated zone to remove pathogens.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed modification makes the code clearer deleting a chapter that would conflict with another state regulation, namely 64E-6, Florida Administrative Code, which provides at least equivalent methods.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed modification does not discriminate in this manner.

Does not degrade the effectiveness of the code

By making the building code and the onsite sewage treatment code more consistent with each other the code system overall will become more effective.

1st Comment Period History

8384-A1

Proponent Cheryl Harris **Submitted** 2/18/2019 **Attachments** Yes

Rationale

The Florida Irrigation Society is in agreement with the Florida Department of Health's modification to completely eliminate the content of Chapter 14 as it was published in the 2017 Florida Building Code Plumbing. This change would eliminate a potential conflict between Florida Building Code and the Florida Administrative Code that is already in effect governing irrigation systems. However, we suggest the modification be changed to remove the existing wording of Chapter 14, retitle Chapter 14 and the scope in Section 1401 to cover irrigation systems EXCEPT for systems connected to on-site sewage treatment and disposal systems and add wording for design and installation of all other irrigation systems.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No change for enforcement of Florida Administrative Code governing on site wastewater or sewage treatment water reuse systems for subsurface irrigation.

Impact to building and property owners relative to cost of compliance with code

No change for enforcement of Florida Administrative Code governing on site wastewater or sewage treatment water reuse systems for subsurface irrigation.

Impact to industry relative to the cost of compliance with code

No change for enforcement of Florida Administrative Code governing on site wastewater or sewage treatment water reuse systems for subsurface irrigation.

Impact to Small Business relative to the cost of compliance with code

Simplifies compliance with code by avoiding conflicts with Department of Health regulations. No impact, the existing requirements remain the same.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade effectiveness.

BCIS Home | Log Out | User Registration | Hot Topics | Submit Surcharge | Stats & Facts | Publications | Contact Us | BCIS Site Map | Links | Search |

The linked image cannot be displayed. The file may have been moved, renamed, or deleted. Verify that the link points to the c

Proposed Code Modifications
USER: Cheryl Harris

Proposed Code Modifications Menu > Modification Search > Modification List > **Modification Detail**

Modification #	SP8384
Name	Eberhard Roeder
Address	FL Dept. of Health/DCHP 4052 Bald Cypress Way Bin A-08
City	Tallahassee
State	FL
Zip Code	32399-1713
Email	eberhard.roeder@flhealth.gov
Primary Phone	(850) 901-6512
Alternate Phone	
Fax	
Modification Status	Verified
View Request History	
TAC	Special Occupancy
TAC Recommendation	Pending Review
Commission Action	Pending Review
Archived	No

Code Version	2020
Code Change Cycle	2020 Triennial Original Modification 11/02/2
Sub Code	Plumbing
Chapter & Topic	Chapter 14 - Subsurface Landscape Irrigation
Section	1402
Related Modifications	
Affects High Velocity Hurricane Zone (HVHZ)	No
Summary of Modification	

To provide alternate wording for Chapter 14 that both eliminates the wording for subsurface irrigation systems connecte

---

Text of Modification

Delete text in its entirety

CHAPTER 14

~~SUBSURFACE~~ LANDSCAPE IRRIGATION SYSTEMS ~~(reserved)~~
~~1401~~
~~GENERAL~~

1401.1Scope.

The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ turf and lanc ~~reuse~~ systems.

Exception: All Turf and Landscape irrigation systems serving as drainfields for onsite sewage treatment and disposal sys Onsite Sewage Treatment and Disposal Systems.

~~1401.2Materials.~~

~~Above-ground drain, waste and vent piping for subsurface landscape irrigation systems shall conform to one building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.~~

~~1401.3Tests.~~

~~Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with S~~

~~1401.4Inspections.~~

~~Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Bui*~~

~~1401.5Disinfection.~~

~~Disinfection shall not be required for on-site nonpotable water reuse for subsurface landscape irrigation syste~~

~~1401.6Coloring.~~

~~On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~1402~~
~~SYSTEM DESIGN AND SIZING~~

~~1402.1Sizing.~~

~~The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-discharge shall be calculated by the following equation:~~

The linked image cannot be displaye...

~~**where:**~~

~~***A* = Number of occupants:**~~

~~**Residential—Number of occupants shall be determined by the actual number of occupants, but not le bedroom.**~~

~~**Commercial—Number of occupants shall be determined by the *Florida Building Code, Building*.**~~

~~***B* = Estimated flow demands for each occupant:**~~

~~**Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 g**~~

~~**Commercial—Based on type of fixture or water use records minus the discharge of fixtures other thar**~~

~~***C* = Estimated gray water discharge based on the total number of occupants.**~~

~~1402.2Percolation tests.~~

~~The permeability of the soil in the proposed absorption system shall be determined by percolation tests or per~~

~~1402.2.1Percolation tests and procedures.~~

~~At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly tests shall be made where necessary, depending on system design.~~

~~1402.2.1.1Percolation test hole.~~

~~The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 i scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from sand.~~

~~1402.2.1.2Test procedure, sandy soils.~~

~~The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measuren Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in ac~~

~~1402.2.1.3Test procedure, other soils.~~

~~The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintain or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereaft Immediately after the soil swelling period, the measurements for determining the percolation rate shall be ma shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference p unless two successive water level drops do not vary by more than $^{1}/_{16}$ inch (1.59 mm). At least three water lev a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly emp periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time period shall be used in calculating the percolation rate.~~

~~1402.2.1.4Mechanical test equipment.~~

~~Mechanical percolation test equipment shall be of an *approved* type.~~

~~1402.2.2Permeability evaluation.~~

~~Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted s for evaluating the soil.~~

~~1402.3Subsurface landscape irrigation site location.~~

~~The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of an site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The s various elements as indicated in Table 1402.3. Private sewage disposal systems in compacted areas, such from any soil absorption site on the same or neighboring lots.~~

~~TABLE 1402.3~~

~~LOCATION OF SUBSURFACE IRRIGATION SYSTEM~~

~~**ELEMENT**~~	~~**Storage tank (feet)**~~
~~Buildings~~	~~5~~

~~Lot line adjoining private property~~	~~5~~
~~Water wells~~	~~50~~
~~Streams and lakes~~	~~50~~
~~Seepage pits~~	~~5~~
~~Septic tanks~~	~~0~~
~~Water service~~	~~5~~
~~Public water main~~	~~10~~

~~For SI: 1 foot = 304.8 mm.~~

~~1403~~
~~INSTALLATION~~

~~1403.1Installation.~~

~~Absorption systems shall be installed in accordance with Sections 1403.1.1 through 1403.1.5 to provide lands~~

~~1403.1.1Absorption area.~~

~~The total absorption area required shall be computed from the estimated daily gray water discharge and the d~~
~~area equals the estimated gray water discharge divided by the design-loading rate from Table 1403.1.1.~~

~~TABLE 1403.1.1~~

~~DESIGN LOADING RATE~~

~~PERCOLATION RATE(minutes per inch)~~	~~DES~~
~~0 to less than 10~~	
~~10 to less than 30~~	
~~30 to less than 45~~	
~~45 to 60~~	

~~For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².~~

~~1403.1.2Seepage trench excavations.~~

~~Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (152~~
~~apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench ar~~
~~greater than 100 feet (30 480 mm) in *developed length*.~~

~~1403.1.3Seepage bed excavations.~~

~~Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distributio~~
~~of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (15~~
~~and not less than 1 foot (305 mm) from the sidewall or headwall.~~

~~1403.1.4 Excavation and construction.~~

~~The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated w~~
~~All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall~~
~~Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form w~~
~~shall then be scarified and loose material removed.~~

~~1403.1.5Aggregate and backfill.~~

~~Not less than 6 inches in depth of aggregate, ranging in size from ½ to 2½ inches (12.7 mm to 64 mm), shall~~
~~evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggre~~
~~uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 in~~

~~1403.2Distribution piping.~~

~~Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 140~~
~~the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greate~~

~~TABLE 1403.2~~

~~DISTRIBUTION PIPE~~

~~MATERIAL~~

~~Polyethylene (PE) plastic pipe~~

~~Polyvinyl chloride (PVC) plastic pipe~~

~~Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular c~~

~~For SI: 1 inch=25.4 mm.~~

~~1403.2.1Joints.~~

~~Joints in distribution pipe shall be made in accordance with Section 705 of this code.~~

CHAPTER14
LANDSCAPE IRRIGATION SY
SECTION 1401
~~GENERAL~~

1401.1Scope.
The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ turf and lanc ~~reuse~~ systems.
Exception: Landscape irrigation systems connected to onsite sewage treatment and disposal systems shall be regulate and Disposal Systems.

~~SECTION 1402~~
~~Subsurface Landscape Irrigation Systems Connected to No~~

-
~~**1402.1 Scope.**~~
~~The provisions of Section 1402 shall govern the materials, design, construction and installation of subsurface landscape irrig~~

~~**1402.2 1402.2Materials.**~~
~~Above-ground drain, waste and vent piping for subsurface landscape irrigation systems connected to NonPotabale On-site landscape irrigation, underground building drainage and vent pipe shall conform to one of the standards listed in Table 7~~
~~**1401.3 1402.3Tests.**~~
~~Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.~~
~~**1401.4 1402.4Inspections.**~~

~~Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code*~~
~~**1401.5 1402.5Disinfection.**~~
~~Disinfection shall not be required for on-site nonpotable water reuse for subsurface landscape irrigation systems.~~
~~**1401.6 1402.6Coloring.**~~
~~On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~SECTION1402~~
~~SYSTEM DESIGN AND SI~~

~~**1402.1 1402.7Sizing.**~~
~~The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface i irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on equation:~~

~~**where:**~~
~~***A* = Number of occupants:**~~
~~**Residential—Number of occupants shall be determined by the actual number of occupants, but not less than two**~~
~~**Commercial—Number of occupants shall be determined by the *Florida Building Code, Building*.**~~
~~***B* = Estimated flow demands for each occupant:**~~
~~**Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per**~~
~~**Commercial—Based on type of fixture or water use records minus the discharge of fixtures other than those disc**~~
~~***C* = Estimated gray water discharge based on the total number of occupants.**~~
~~**1402.2 1402.8Percolation tests.**~~
~~The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability~~
~~**1402.2.1 1402.8.1Percolation tests and procedures.**~~
~~At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation t where necessary, depending on system design.~~
~~**1402.2.1.1 1402.8.1.1Percolation test hole.**~~
~~The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 in pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be~~
~~**1402.2.1.2 1402.8.1.2Test procedure, sandy soils.**~~
~~The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests i procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute i minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (1 be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be us in accordance with Section 1303.7.1.3.~~
~~**1402.2.1.3 1402.8.1.3Test procedure, other soils.**~~
~~The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained abov automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowe period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole s or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the lin away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.~~
~~**1402.2.1.4 1402.8.1.4Mechanical test equipment.**~~
~~Mechanical percolation test equipment shall be of an *approved* type.~~
~~**1402.2.2 1402.8.2Permeability evaluation.**~~
~~Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evalua evaluating the soil.~~
~~**1402.3 1402.9Subsurface landscape irrigation site location.**~~
~~The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be l~~

~~1402.3 1402.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. S~~
~~lots.~~

~~**TABLE 1402.3 1402.9**~~
~~**LOCATION OF SUBSURFACE IRRIGA**~~

~~**ELEMENT**~~	~~**Storage tank (feet)**~~
~~Buildings~~	~~5~~
~~Lot line adjoining private property~~	~~5~~
~~Water wells~~	~~50~~
~~Streams and lakes~~	~~50~~
~~Seepage pits~~	~~5~~
~~Septic tanks~~	~~0~~
~~Water service~~	~~5~~
~~Public water main~~	~~10~~

~~For SI: 1 foot = 304.8 mm.~~

~~SECTION1401 INSTALLATION~~

~~**1401.1 1402.10Installation.**~~
~~Absorption systems shall be installed in accordance with Sections 1401.1.1 1402.10.1 through 1401.1.5 1402.10.1.5 to p~~
~~**1401.1.1 1402.10.1Absorption area.**~~
~~The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loa~~
~~estimated gray water discharge divided by the design-loading rate from Table 1401.1.1 1402.10.1.~~

~~**TABLE 1401.1.1 1402.10.1**~~
~~**DESIGN LOADING RATI**~~

~~**PERCOLATION RATE(minutes per inch)**~~	~~**DES**~~
~~0 to less than 10~~	
~~10 to less than 30~~	
~~30 to less than 45~~	
~~45 to 60~~	

~~For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².~~

-

~~**1401.1.2 1402.10.1.2 Seepage trench excavations.**~~
~~Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in widtl~~
~~area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pi~~
~~*length.*~~

-

~~**1401.1.3 1402.10.1.3 Seepage bed excavations.**~~
~~Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. Th~~
~~Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 fe~~
~~the sidewall or headwall.~~
~~**1401.1.4 1402.10.1.4 Excavation and construction.**~~
~~The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the s~~
~~compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the dept~~
~~excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bott~~
~~removed.~~
~~**1401.1.5 1402.10.1.5 Aggregate and backfill.**~~
~~Not less than 6 inches in depth of aggregate, ranging in size from ½ to 2½ inches (12.7 mm to 64 mm), shall be laid into~~
~~not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with *appro*~~
~~paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above~~

-

-

-

~~**1401.2 1402.11Distribution piping.**~~

~~Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 1401.2 1402.1~~
~~surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 m~~

~~**TABLE 1401.2 1402.11**~~
~~**DISTRIBUTION PIPE**~~

~~**MATERIAL**~~
~~Polyethylene (PE) plastic pipe~~
~~Polyvinyl chloride (PVC) plastic pipe~~
~~Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core~~

~~For SI: 1 inch=25.4 mm.~~

~~**1401.2.1Joints.**~~

~~Joints in distribution pipe shall be made in accordance with Section 705 of this code.~~

-

-

1401.1.2 This section shall apply to all irrigation systems used on residential and commercial landscape area

-

1401.1.3 This section shall apply to all new irrigation systems and any new work to existing irrigation systems

-

Exception. This section shall not apply to irrigation systems for golf courses, nurseries, greenhouses, or agricultural production systems.

-

-

1401.1.4 Nothing contained in this section shall be deemed to require any irrigation system or part thereof, wh to meet the standards of this code.

-

1401.2 Permits.

-

1401.2.1 A permit shall be required for new installation of landscape irrigation systems and for repairs or moc on invoice value.

-

1401.2.2 No permit shall be required for general maintenance or repairs which do not change the structure material based on invoice value. -

-

1401.3 Preconstruction submittals.

-

1401.3.1 Plans or drawings.

-

1401.3.1.1 Single-family residence. Design drawings or shop drawings, where required, shall be provided t shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and include all improvem licensed landscape architect.

-

1401.3.1.2 Commercial, industrial, municipal and multiple-family. Professionally designed drawings pric drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all im specifications which list all aspects of equipment and assembly there of, water source, water meter and/or location, design operating pressure and flow rate per zone, precipitation rate per zone, locations of pipe, specifications shall be prepared in accordance with Section 107 of the Florida Building Code, Building.

-

1401.4 Definitions. The following definitions are exclusive to this section of the code.

ABS Pipe. Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limite
(see ASTM D 1788).

Air Release Valve. A valve which will automatically release to the atmosphere accumulated small pockets of
Air release valves are normally required at all summits of mainline and submain pipelines in an irrigation syst

Anti-Siphon Device. A safety device used to prevent back-flow of irrigation water to the water source by bac

Application Rate. The average rate at which water is applied by an irrigation system, sometimes also called

Application uniformity. Irrigation application uniformity (also known as distribution uniformity) describes hov

Arc. The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc wo

Atmospheric Vacuum Breaker (AVB). An anti-siphon backflow device which uses a floating seat to allow an

Automatic Control Valve. A valve in a sprinkler system which is activated by an automatic controller by way

Automatic System. An irrigation system which operates following a preset program entered into an automat

Backflow Prevention Device. An approved safety device used to prevent pollution or contamination of the i

Belled (Pipe). Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inse

Block (of sprinklers). A group of sprinklers controlled by one valve. Also called zones or subunits.

Block System. An irrigation system in which several groups of sprinklers are controlled by one valve for eacl

Bubbler Irrigation. The application of water to the soil surface or a container as a small stream or fountain.
less than 60 gph.

Check Valve. A valve which permits water to flow in one direction only.

Chemical Water Treatment. The addition of chemicals to water to make it acceptable for use in irrigation sy

Chemigation. The application of water soluble chemicals by mixing or injecting with the water applied throug

Contractor. Any person who engages in the fabrication and installation of any type of irrigation system on a

Control Lines. Hydraulic or electrical lines which carry signals to open and close the valves from the controll

Controller. The timing mechanism and its mounting box. The controller signals the automatic valves to open

Coverage. Refers to the way water is applied to an area.

Cycle. Refers to one complete run of a controller through all programmed controller stations.

Demand (or irrigation demand). Refers to the irrigation requirements of the irrigated area. Demand primaril

Design Area. The specific land area to which water is to be applied by an irrigation system.

Design Emission Uniformity. An estimate of the uniformity of water application with an irrigation system.

Design Pressure. The pressure at which the irrigation system or certain components are designed to operat
entrance to the system if there is no pump, and a zone design pressure is the average operating pressure of

Direct Burial Wire. Plastic-coated single-strand copper wire for use as control line for electric valves.

Discharge Rate. The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting devi
pumping system or from a reduced pressure assembly or relief valve.

Double Check Valve. An approved assembly of two single, independently-acting check valves with test ports

Drain Valve. A valve used to drain water from a line. The valve may be manually or automatically operated.

Drip Irrigation. The precise low-rate application of water to or beneath the soil surface near or directly into the
drops, in the range of 0.5 to 2.0 gph.

Effluent water. Also referred to as reclaimed is wastewater which has been treated per Florida Statute, §403

Emitters. Devices which are used to control the discharge of irrigation water from lateral pipes. This term is p

Fertigation. The application of soluble fertilizers with the water applied through an irrigation system.

Filtration System. The assembly of physical components used to remove suspended solids from irrigation w
screens, media filters, and centrifugal force units (vortex sand separators).

Flexible Swing Joint. A flexible connection between the lateral pipe and the sprinkler which allows the sprin

Flow Meters. Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typica

Gauge (Wire). Standard specification for wire size. The larger the gauge number, the smaller the wire diame

Head. A sprinkler head. Sometimes used interchangeably with and in conjunction with “Sprinkler.”

Infiltration Rate. The rate of water flow across the surface of the soil and into the soil profile. Units are usual

Irrigation. Application of water by artificial means, that is, means other than natural precipitation. Irrigation is
environmental control including crop cooling and freeze protection.

Irrigation Water Requirement or Irrigation Requirement. The quantity of water that is required for crop pro

Landscape. Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground
crops grown and harvested for monetary return.

Lateral. The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or heade

Line-Source Emitters. Lateral pipelines which are porous or contain closely-spaced perforations so that wate
widely-spaced points along the pipeline length.

Looped System. A piping system which allows more than one path for water to flow from the supply to the e

Low Volume Sprinklers. Sprinkler heads that emit less than .5 gallons per minute.

Mainline. A pipeline which carries water from the control station to submains or to manifolds or header pipeli

Manifold. The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. /

Manual System. A system in which control valves are manually operated rather than operated by automatic

Matched Precipitation. An equal distribution of water over a given area or zone.

Meter Box. A concrete or plastic box buried flush to grade which houses flow (water) meters or other compo

Microirrigation. The frequent application of small quantities of water directly on or below the soil surface, u along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, in irrigation.

Overlap. The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a

PE Pipe. Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black fo

Potable Water. Water which is suitable in quality for human consumption and meets the requirements of the

Pressure Relief Valve. A valve which will open and discharge to atmosphere when the pressure in a pipelin

Pressure Vacuum Breaker. A backflow prevention device which includes a spring-loaded check valve and a the water source.

Pumping Station. The pump or pumps that provide water to an irrigation system, together with all of the ne controls, safety devices, shelters and fences.

PVC Pipe. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure

Rain Shut off Device. A calibrated device that is designed to detect rainfall and override the irrigation cycle

Reduced Pressure Principle Backflow Preventer (RPZD) (also known as Reduced Pressure Zone Devi supplies from contamination.

Riser. A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

Runoff. The result of excess water applied either naturally (precipitation) or mechanically (irrigation) that exc

Sleeve. A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

Spacing. The distance between sprinklers or other emitters.

Spray Irrigation. The micro irrigation application of water to the soil or plant surface by low flow rate sprays

Sprinkler. The sprinkler head. Sometimes called “Head.”

Supply (Water Source). The origin of the water used in the irrigation system.

Swing Joint. A ridged connection between the lateral pipe and the sprinkler, utilizing multiple elbows and nip

-

Tubing. Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE

-

-

-

1401.4 DESIGN CRITERIA

-

-

1401.4.1 Design defined. Within the scope of this code, irrigation system design is defined as the science a

-

-

1401.4.2 Water supply.

-

-

1401.4.2.1 The water source shall be adequate from the stand-point of volume, flow rate, pressure, and qu demands, if any, both at the time the system is designed and for the expected life of the system.

-

-

1401.4.2.2 If the water source is effluent, it shall meet the advanced waste treatment standard as set fort controlling governmental agency.

-

-

1401.4.3 Application uniformity.

-

-

1401.4.3.1 Sprinkler irrigation systems shall be designed with the appropriate uniformity for the type of plants types of plants as one group without regard to their individual water requirements shall be avoided.

-

1401.4.3.2 Sprinkler head spacing, type and nozzle selection that achieves the highest application uniformity

-

1401.4.3.3 Application rates which avoid runoff and permit uniform water infiltration into the soil shall be util winds and sun exposure shall be considered when application rates are specified. Different types of sprinkler rotor heads, shall not be combined on the same zone or circuit.

-

1401.4 System zoning. The irrigation system shall be divided into zones based on consideration of the follo

-

-

1401.4.1 Available flow rate.

-

-

1401.4.2 Cultural use of the area.

-

-

1401.4.3 Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

-

-

1401.4.4 Type of sprinkler, i.e., sprinklers with matching precipitation rates.

-

-

1401.4.5 Soil characteristics and slope.

-

1401.4.6 Sun exposure.

1401.5 Sprinkler/emitter spacing and selection.

1401.5.1 Sprinkler/Emitter spacing shall be determined considering the irrigation requirements, hydraulic ch
sidewalks, buildings, and public access areas.

1401.5.2 All pop-up spray head bodies in turf areas shall be no less than 6" in height for St. Augustine, Zoys
Paspalum.

1401.5.3 Sprinklers shall be located in accordance with manufacturer's specifications in each irrigated zone a

1401.5.4 Single row head spacing shall only occur when an additional row will cause saturated soils at the to

1401.5.5 All heads shall not exceed 50% of manufacturer's specified diameters of coverage.

1401.5.6 Water conservation shall be taken into consideration by minimizing irrigation of non-vegetated area

1401.5.7 Microirrigation systems shall be designed using the Emission Uniformity concept. Microirrigation emi
of the root zone for shrubs and trees.

1401.5.8 Microirrigation or low volume heads shall be required in all areas to be irrigated that are less than 4

1401.5.9 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point wher
contamination from a main or lateral break.

1401.5.10 Each plant shall have an adequate number and size (gph) of microirrigation devices, properly plac

1401.6 Pipelines. Pipelines shall be sized to limit pressure variations so that the working pressure at all poin
Velocities shall not exceed 5 feet (1524 mm) per second.

1401.7 Wells.

1401.7.1 Well diameters, depths and location shall correspond to the irrigation system demand and in comp

1401.8 Pumps.

1401.8.1 Pump and motor combinations shall be capable of satisfying the total system demand without inva

1401.8.2 Pumps shall be positioned with respect to the water surface in order to ensure that the net positive

1401.8.3 The pumping system shall be protected against the effects of the interruption of water flow.

1401.9 Control valves.

1401.9.1 Control valve size shall be based on the flow rate through the valve. Friction loss through the valve 10 percent of the static mainline head.

1401.9.2 Control systems using hydraulic communication between controller and valve(s) shall comply with valve, both horizontally and vertically (elevation change).

1401.9.3 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifi the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control systems.

1401.9.4 Manually operated control valves shall be located so that they can be operated without wetting th

1401.9.5 In ground valves shall be located away from large tree and palm root zones.

1401.9.6 A manual shut off valve shall be required to be installed close to the point of connection but do minimize water loss when the system is shut off for repairs or emergencies.

1401.9.7 An automatic shut-off valve or master valve (normally closed) is required on all systems with a co weeping valves, or stuck on valves to just the time the system is operating automatically.

1401.10 Automatic irrigation controller. Automatic irrigation controllers shall conform to UL 1310 and hav irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sens by Florida Statutes, Section 373.62.

1401.11 Chemical injection.

1401.11.1 Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any oth recommendations.

1401.11.2 Injection systems shall be located downstream of the applicable backflow prevention devices Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

1401.11.3 If an irrigation water supply is also used for human consumption, an air gap separation or an ap compliance with ASSE 1013 and Section 1401.12.

1401.12 Backflow prevention methods. Backflow prevention assemblies at all cross connections with a applicable codes. In the event of conflicting regulations the assembly type shall be provided which gives the

1401.12.1 Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.

1401.12.1.1 For municipal water supplies, chemical injection equipment must be separated from the water s that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment shall co pressure.

1401.12.1.2 For other water supplies, Florida State law, EPA regulations, or other applicable local codes sh Breaker shall be required.

SECTION 1401.13 REFERENCED STANDARDS

The standards referenced below are exclusive to this section.

1401.13.1 American Society of Agricultural Engineers (ASAE) Standards:

ASAE S330.1: Procedure for sprinkler distribution testing for research purposes.

ASAE S376.1: Design, installation, and performance of underground thermoplastic irrigation pipelines.

ASAE S397.1: Electrical service and equipment for irrigation.

ASAE S435: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

ASAE S398.1: Procedure for sprinkler testing and performance reporting.

ASAE S339: Uniform classification for water hardness.

ASAE S394: Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural i

ASAE EP400.1: Designing and constructing irrigation wells.

ASAE EP405: Design, installation, and performance of trickle irrigation systems.

ASAE EP409: Safety devices for applying liquid chemicals through irrigation systems.

1401.13.2 ASTM International Standards:

ASTM D 2241: Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

ASTM D 2239: Specification for polyethylene (PE) plastic pipe (SDR-PR).

ASTM D 2466: Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (C

ASTM D 2855: Standard recommended practice for making solvent cemented joints with polyvinyl chloride pi

ASTM D 3139: Specification for joints for plastic pressure pipes using flexible elastomeric seals.

ASTM F 477: Specification for elastomeric seals (gaskets for joining plastic pipe).

1401.13.3 American Water Works Association (AWWA) standards:

AWWA C-900: PVC pipe standards and specifications

1401.13.4 American Society of Sanitary Engineers (ASSE) Standards:

ASSE 1001: Pipe applied atmospheric type vacuum breakers.

ASSE 1013: Reduced pressure principle backflow preventers.

ASSE 1015: Double check valve backflow preventers.

ASSE 1020: Vacuum breakers, anti-siphon, pressure type backflow preventers.

ASSE 1024: Dual check valve backflow preventers.

1401.13.5 Hydraulic Institute Standards, 14th Edition

1401.13.6 Standards and Specifications for Turf and Landscape Irrigation Systems Florida Irrigation

1401.13.7 Natural Resources Conservation Service (NRCS) Field Office Technical Guide, Section IV-A

NRCS Code 430-DD: Irrigation water conveyance, underground, plastic pipeline.

NRCS Code 430-EE: Irrigation water conveyance. Low pressure, underground, plastic pipeline.

NRCS Code 430-FF: Irrigation water conveyance, steel pipeline.

NRCS Code 441-1: Irrigation system, trickle.

NRCS Code 442: Irrigation system sprinkler.

NRCS Code 449: Irrigation water management.

-
NRCS Code 533: Pumping plant for water control.

-
NRCS Code 642: Well.

-
1401.13.8. Underwriters Laboratories (UL) 333 Pfingsten Road, Northbrook, IL 60062-296 Standards
UL 486C-1995 Splicing Wire Connectors

-
UL 969-2013 Standard for Marking and Labeling Systems

-
UL 1310-2011 Standard for Class 2 Power Units

-

-
Section 1401.14 MATERIALS
The materials referenced below are exclusive to this section.

-

-
1401.14.1 PVC pipe and fittings.

-

-
1401.14.1.1 PVC pipe shall comply with one of the following standards ASTM D 1785, ASTM D 2241, AW
required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by eith

-

-
1401.14.1.2 All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set

-

-
1401.14.1.3. Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D

-
1401.14.1.4. PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

-

-
1401.14.1.5. PVC flexible pipe shall be pressure rated as described in ASTM D 2740 with standard outside

-
1401.14.1.6. PVC cement shall meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

-

-
1401.14.2 Ductile iron pipe and fittings.

-

-
1401.14.2.1 Gasket fittings for iron pipe shall be of materials and type compatible with the piping material be

-

-
1401.14.3. Steel pipe and fittings.

-

-
1401.14.3.1. All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in a

-
1401.14.3.2 Threaded fittings for steel pipe shall be Schedule 40 Malleable Iron.

-

-
1401.14.4 Polyethylene pipe.

-
1401.14.4.1 Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in a

-
1401.14.4.2 Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

-

-
1401.14.4.3 Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

-

-
1401.14.5 Sprinklers, spray heads, and emitters.

-

-
1401.14.5.1 Units and nozzles shall be selected in accordance with the size of the area and the type of p without excessive overspray. Intentional direct spray onto walkways, buildings, roadways, and driveways is p

-

-
1401.14.5.2 Equipment shall be used that is protected from contamination and damage by use of seals, sc

-

-
1401.14.5.3 Riser-mounted sprinklers shall be supported to minimize movement of the riser resulting from tl

-

-
1401.14.5.4 Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection be prevent equipment damage.

-

-
1401.14,5.5 Check valves shall be installed on any sprinkler where low point drainage occurs.

-

-
1401.14.5.6 The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstructed for Bermuda, Centapede and Seashore Paspalum.

-

-
1401.14.5.7 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point contamination from a PVC main or lateral break.

-

-
1401.14.5.8 All microirrigation zones shall have adequate pressure regulation installed at the zone valve or devices meet the manufacturer's performance standards.

-

-
1401.14.5.9 Each plant shall have a adequate number and size(gph) of microirrigation devices, properly pla

-

-
1401.14.5.10 All tubing shall be secured to prevent movement in accordance with manufacturer's specificatic

-

-
1401.14.6 Valves.

-

-
1401.14.6.1 Valves shall have a maximum working pressure rating equal to or greater than the maximum pr waived for low mainline pressure systems [30 psi (207 kPa) or less].

-

-

1401.14.6.2 Only valves that are constructed of materials designed for use with the water and soil conditions not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.

-

-

1401.14.7 Valve boxes.

-

-

1401.14.7.1 Valve boxes shall be constructed to withstand traffic loads common to the area in which they a without excavation.

-

-

1401.14.7.2. Each valve box shall be permanently labeled in accordance with UL 969 to identify its contents

-

-

1401.14.8 Low voltage wiring.

-

-

1401.14.8.1 All low voltage wire which is directly buried shall be labeled for direct burial wire. Wire not lab THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed w

-

-

1401.14.8.2 The size of the electrical control wire shall be in accordance with the valve manufacturer's speci the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be u

-

-

1401.14.8.3 Connections shall be made using devices conforming to UL 486 specifically designed for direct

-

-

1401.14.9 Irrigation controllers.

-

-

1401.14.9.1 All irrigation controllers shall conform to UL 1310 and the provisions of the National Electric C Solid state controls shall be equipped with surge suppressors on the primary and secondary wiring, except si

-

-

1401.14.9.2 The controller housing or enclosure shall protect the controller from the hazards of the environ

-

-

1401.14.9.3 The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance obstructions, and above the height of the sprinkler coverage. Soil moisture sensors and ET sensors shall Section 373.62.

-

1401.14.10 Pumps and wells.

-

-

1401.14.10.1 Irrigation pump electrical control systems shall conform to the NEC and local building codes.

-

-

1401.14.10.2 The pumping system shall be protected from the hazards of the environment in which it is inst

-

-
1401.14.10.3 Use electric motors with a nominal horsepower rating greater than the maximum horsepower of at least 1.15.

-

-
1401.14.10.4 Casings for drilled wells shall be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Or casings shall conform to ASTM A 589.

-

-
1401.14.11 Chemical injection equipment.

-

-
1401.14.11.1 Chemical injection equipment shall be constructed of materials capable of withstanding the pc for those chemicals for which it was intended as stated by the injection equipment manufacturer.

-

-
1401.14.12 Filters and strainers.

-

-
1401.14.12.1 Filtration equipment and strainers constructed of materials resistant to the potential corrosive passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufactu

-

-
Section 1401.15 INSTALLATION

-

-
1401.15.1 Pipe installation.

-

-
1401.15.1.1 Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicu a property. Depths of cover shall meet or exceed NRCS Code 430-DD, Water Conveyance, as follows:

-

-
1401.15.1.1.1 Vehicle traffic areas.

-
Pipe Size (inches)

-
Depth of Cover (inches)

-
½ – 2 ½

-
18 - 24

-
3 - 5

-
24 - 30

-
6 and larger

-
30 - 36

-

-

1401.15.1.1.2 All areas except vehicle traffic:

Pipe Size (inches)	Depth of Cover (inches)
½ – 1 ½	6
2 - 3	12
4 - 6	18
More than 6	24

1401.15.1.2 All pipe joints and connections shall be made according to manufacturer's specifications. All solv

1401.15.1.3
Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shall one irri
For required minimum clearance to onsite sewage treatment and disposal systems, refer to Rule 64E-6.005(2)(b) of th

1401.15.1.4 Thrust blocks shall be used on all gasketed PVC systems. They must be formed against a soli constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outs 376.1.

1401.15.1.5 The trench bottom shall be uniform, free of debris, and of sufficient width to properly place pi backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-i be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking

1401.15.1.6. Pipe sleeves shall be used to protect pipes or wires installed under pavement or roadways. Pip bundle shall be used under the paving or roadway and extending a minimum of 3 feet beyond the paved are shall be Sch 40. Proper backfill and compaction procedures shall be followed.

1401.15.2 Control valve installation.

1401.15.2.1 Valve installation shall allow enough clearance for proper operation and maintenance. Where v extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches cover in traffic areas. The valve box shall be installed to minimize the effect of soil intrusion within the valve bo valve is installed under each sprinkler, then the valve box may be omitted.

-

-

1401.15.2.2 Valve boxes shall be installed so that they do not rest on the pipe and the box cover does not c the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscap

-

-

1401.15.2.3. Quick coupling valves shall be installed on swing joints or flexible pipe with the top of the valve

-

-

1401.15.2.4 Any above-ground manually-operated valves on nonpotable water systems shall be adequately systems that utilize nonpotable water supplies shall not be permitted.

-

-

1401.15.3 Sprinkler installation.

-

-

1401.15.3.1. On flat landscaped areas, sprinklers shall be installed plumb. In areas where they are installed be adjusted to avoid unnecessary discharge on roads, pavements and structures.

-

-

1401.15.3.2. There shall be a minimum separation of 4 inches (102 mm) between sprinklers and pavemen and buildings and other vertical structures. Piping shall be thoroughly flushed before installation of sprinkle polyethylene (PE) nipples or flexible pipe. Polyethylene (PE) nipples shall not be used in maintenance e mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be stabilized.

-

-

-

1401.15.4 Pump installation.

-

-

1401.15.4.1 Pumps shall be installed in accordance with the manufacturer's specifications. Pumps shall be on the pipe and fittings. Pipe and fittings shall be supported to avoid placing undue strain on the pump. Steel

-

-

1401.15.4.2 Pumps shall be installed in a manner to avoid loss of prime. Suction line shall be installed to pre sizes shall be designed to avoid causing air pockets and cavitation.

-

-

1401.15.4.3 Pumps shall be located to facilitate service and ease of removal. Appropriate fittings shall be enclosure shall be provide of adequate size and strength, with proper ventilation, to protect the pump from th

-

-

1401.15.5 Low voltage wire installation.

-

-

1401.15.5.1 Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (305 mr provided at each connection to allow for thermal expansion/shrinkage. As a minimum, a 12-inch (305 mm) di shall have 24 inches (610 mm) minimum free wire.

1401.15.5.2 All above-ground wire runs and wire entries into buildings shall be installed in electrical conduit
common wires) shall be provided. Connections shall be made using devices conforming to UL 486C specifica

Exception: When wiring above ground manifolds from the valve to the ground immediately beneath it, no co

1401.15.6 Hydraulic control tubing installation

1401.15.6.1. For hydraulic control systems, a water supply shall be used that is filtered and free of deleterious
A backflow prevention device shall be installed where the hydraulic control system is connected to potable wa

1401.15.6.2 Tubing shall be installed in trenches and spaced so that it will not rub against pipe, fittings, o
diameter loop at all turns and connections A minimum depth of cover of 12 inches (305 mm) shall be provide

1401.15.6.3 Tubing shall be connected with couplings and collars according to Manufacturer's specificatio
expel entrapped air and tested for leaks prior to installation.

1401.15.6.4 Exposed tubing shall be installed in a protective conduit manufactured from Schedule 40 UV pro

1401.16 As-Built Drawings.

1401.16.1 An As-Built drawing shall be required of all irrigation systems installed on commercial and resident

1401.16.1.1 Location, type, pressure and maximum flow available of all water sources.

1401.16.1.2 Location, type and size of all components including sprinklers, microirrigation, main and later
start relays, backflow devices, pumps, wells, etc.

1401.16.1.3 The flow rate, application rate (inches per hour), and the operating pressure for the sprinklers a

1401.16.1.4 The name, address, phone, email, professional license or certification number of the installatio

1401.16.1.5 Date of installation.

Delete text in its entirety

CHAPTER 14

SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS (reserved)

~~1401~~
~~GENERAL~~

~~1401.1Scope.~~

~~The provisions of Chapter 14 shall govern the materials, design, construction and installation of subsurface landscape irrigation systems connected to nonpotable water from on-site water reuse systems.~~

~~1401.2Materials.~~

~~Above-ground drain, waste and vent piping for subsurface landscape irrigation systems shall conform to one of the standards listed in Table 702.1. Subsurface landscape irrigation, underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.~~

~~1401.3Tests.~~

~~Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.~~

~~1401.4Inspections.~~

~~Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code, Building*.~~

~~1401.5Disinfection.~~

~~Disinfection shall not be required for on-site nonpotable water reuse for subsurface landscape irrigation systems.~~

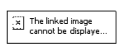
~~1401.6Coloring.~~

~~On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~1402~~
~~SYSTEM DESIGN AND SIZING~~

~~1402.1Sizing.~~

~~The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irrigation system. Where gray water collection piping is connected to subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on the type of fixtures connected. The gray water discharge shall be calculated by the following equation:~~



~~(Equation 14-1)~~

~~where:~~

~~*A* = Number of occupants:~~

~~Residential—Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.~~

~~**Commercial—Number of occupants shall be determined by the *Florida Building Code, Building*.**~~

~~***B* = Estimated flow demands for each occupant:**~~

~~**Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.**~~

~~**Commercial—Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.**~~

~~***C* = Estimated gray water discharge based on the total number of occupants.**~~

~~1402.2Percolation tests.~~

~~The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.~~

~~1402.2.1Percolation tests and procedures.~~

~~At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.~~

~~1402.2.1.1Percolation test hole.~~

~~The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.~~

~~1402.2.1.2Test procedure, sandy soils.~~

~~The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 1303.7.1.3.~~

~~1402.2.1.3Test procedure, other soils.~~

~~The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than $^{1}/_{16}$ inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.~~

~~1402.2.1.4Mechanical test equipment.~~

~~Mechanical percolation test equipment shall be of an *approved* type.~~

~~1402.2.2Permeability evaluation.~~

~~Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section 1402.2.1.1 for evaluating the soil.~~

~~1402.3Subsurface landscape irrigation site location.~~

~~The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table 1402.3. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.~~

~~TABLE 1402.3~~

~~LOCATION OF SUBSURFACE IRRIGATION SYSTEM~~

~~ELEMENT~~	~~MINIMUM HORIZONTAL DISTANCE~~	
	~~Storage tank (feet)~~	~~Irrigation disposal field (feet)~~
~~Buildings~~	~~5~~	~~2~~
~~Lot line adjoining private property~~	~~5~~	~~5~~
~~Water wells~~	~~50~~	~~100~~
~~Streams and lakes~~	~~50~~	~~50~~
~~Seepage pits~~	~~5~~	~~5~~
~~Septic tanks~~	~~0~~	~~5~~
~~Water service~~	~~5~~	~~5~~
~~Public water main~~	~~10~~	~~10~~

~~For SI: 1 foot = 304.8 mm.~~

~~1403~~
~~INSTALLATION~~

~~1403.1Installation.~~

~~Absorption systems shall be installed in accordance with Sections 1403.1.1 through 1403.1.5 to provide landscape irrigation without surfacing of water.~~

~~1403.1.1Absorption area.~~

~~The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table 1403.1.1.~~

~~TABLE 1403.1.1~~

~~DESIGN LOADING RATE~~

~~**PERCOLATION RATE(minutes per inch)**~~	~~**DESIGN LOADING FACTOR(gallons per square foot per day)**~~
~~0 to less than 10~~	~~1.2~~
~~10 to less than 30~~	~~0.8~~
~~30 to less than 45~~	~~0.72~~
~~45 to 60~~	~~0.4~~

~~For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².~~

~~1403.1.2Seepage trench excavations.~~

~~Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be not greater than 100 feet (30 480 mm) in *developed length*.~~

~~1403.1.3Seepage bed excavations.~~

~~Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.~~

~~1403.1.4 Excavation and construction.~~

~~The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.~~

~~1403.1.5Aggregate and backfill.~~

~~Not less than 6 inches in depth of aggregate, ranging in size from $^1/_2$ to $2^1/_2$ inches (12.7 mm to 64 mm), shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with *approved* synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above the covering.~~

~~1403.2Distribution piping.~~

~~Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 1403.2. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).~~

~~TABLE 1403.2~~

~~DISTRIBUTION PIPE~~

~~MATERIAL~~	~~STANDARD~~
~~Polyethylene (PE) plastic pipe~~	~~ASTM F405~~
~~Polyvinyl chloride (PVC) plastic pipe~~	~~ASTM D2729~~
~~Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core or composite wall~~	~~ASTM F1488~~

~~For SI: 1 inch=25.4 mm.~~

~~1403.2.1Joints.~~

~~Joints in distribution pipe shall be made in accordance with Section 705 of this code.~~

SP8052

55

Date Submitted	12/13/2018	**Section** 322		**Proponent**	Rebecca Quinn obo FL Dept Emerg Mg
Chapter	3	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Adjust section numbers of Commission approved flood provisions in R322.3 to put them in the correct order.

Rationale

Three proposals to the flood provisions in IRC Section R322.3 were approved by the Commission (RB160-16, RB161-16, and RB162-16). This proposal simply shows how to properly include those proposals into Sec. R322.3 with the correct section numbers, while adjusting the numbers of the existing subsections from the 5th edition (2017). The proposed order matches the order of provisions in 2018 IRC Sec. 322.3.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact due to adjusting section number.

Impact to building and property owners relative to cost of compliance with code

No impact due to adjusting section number.

Impact to industry relative to the cost of compliance with code

No impact due to adjusting section number.

Impact to small business relative to the cost of compliance with code

No impact due to adjusting section number.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

No change to flood protection of the code caused by adjusting section numbers.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

No change to flood protection of the code caused by adjusting section numbers.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No change to flood protection of the code caused by adjusting section numbers.

Does not degrade the effectiveness of the code

No change to flood protection of the code caused by adjusting section numbers.

~~R322.3.4~~ R322.3.5 **Walls below design flood elevation.** Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design, the *construction documents* shall include documentation prepared and sealed by a registered *design professional* that:
    - 4.1 The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the base flood.
    - 4.2 The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.
5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

~~R322.3.5~~ R322.3.6 **Enclosed areas below design flood elevation.** Enclosed areas below the design flood elevation shall be used solely for parking vehicles, building access or storage.

~~R322.3.5.1~~ R322.3.6.1 **Protection of building envelope.** An exterior door that meets the requirements of Section R609 shall be installed at the top of stairs that provide access to the building and that are enclosed with walls designed to break away in accordance with Section 322.3.5.

~~R322.3.6~~ R322.3.7 **Stairways and ramps.** Stairways and ramps that are located below the lowest floor elevations specified in Section R322.3.2 shall comply with one or more of the following:

1. Be designed and constructed with open or partially open risers and guards.
2. Stairways and ramps not part of the required means of egress shall be designed and constructed to break away during design flood conditions without causing damage to the building or structure, including foundation.
3. Be retractable, or able to be raised to or above the lowest floor elevation, provided that the ability to be retracted or raised prior to the onset of flooding is not contrary to the means of egress requirements of the code.
4. Be designed and constructed to resist flood loads and minimize transfer of flood loads to the building or structure, including foundation.

Areas below stairways and ramps shall not be enclosed with walls below the design flood elevation unless such walls are constructed in accordance with Section R322.3.5.

~~R322.3.6~~ R322.3.8 **Decks and porches.** Attached decks and porches shall meet the elevation requirements of Section R322.3.2 and shall either meet the foundation requirements of this section or shall be cantilevered from or knee braced to the building or structure. Self-supporting decks and porches that are below the elevation required in Section R322.3.2 shall not be enclosed by solid, rigid walls, including walls designed to break away. Self-supporting decks and porches shall be designed and constructed to remain in place during base flood conditions or shall be frangible and break away under base flood conditions.

~~R322.3.6~~ R322.3.9 Construction documents. The *construction documents* shall include documentation that is prepared and sealed by a registered *design professional* that the design and methods of construction to be used meet the applicable criteria of this section.

~~R322.3.7~~ R322.3.10 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.3.2. Where elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of Section R322.3.

Proposal #8052

Proponent: Rebecca Quinn, on behalf of the Florida Division of Emergency Management

NOTE: The base text shown below is the published 2018 IRC. ICC's tech editors do a little work, which accounts for the slight, non-substantive differences between this and the working documents based on the results of the code hearing cycle.

R322.3.4 Concrete slabs Concrete slabs used for parking, floors of enclosures, landings, decks, walkways, patios and similar uses that are located beneath structures, or slabs that are located such that if undermined or displaced during base flood conditions could cause structural damage to the building foundation, shall be designed and constructed in accordance with one of the following:

1. To be structurally independent of the foundation system of the structure, to not transfer flood loads to the main structure, and to be frangible and break away under flood conditions prior to base flood conditions. Slabs shall be a maximum of 4 inches (102 mm) thick, shall not have turned-down edges, shall not contain reinforcing, shall have isolation joints at pilings and columns, and shall have control or construction joints in both directions spaced not more than 4 feet (1219 mm) apart.
2. To be self-supporting, structural slabs capable of remaining intact and functional under base flood conditions, including erosion and local scour, and the main structure shall be capable of resisting any added flood loads and effects of local scour caused by the presence of the slabs.

Commented [RQ1]: RB160 proposed this as R322.3.4. Therefore, this section will not show in the proposal to adjust section numbering to match how they got combined in the 2018 IRC

~~**R322.3.4**~~ **R322.3.5 Walls below design flood elevation.** Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design, the *construction documents* shall include documentation prepared and sealed by a registered *design professional* that:

4.1 The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the base flood.
4.2 The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.

5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

~~R322.3.5~~ R322.3.6 **Enclosed areas below design flood elevation.** Enclosed areas below the design flood elevation shall be used solely for parking vehicles, building access or storage.

~~R322.3.5.1~~ R322.3.6.1 **Protection of building envelope.** An exterior door that meets the requirements of Section R609 shall be installed at the top of stairs that provide access to the building and that are enclosed with walls designed to break away in accordance with Section 322.3.5.

~~R322.3.6~~ R322.3.7 **Stairways and ramps.** Stairways and ramps that are located below the lowest floor elevations specified in Section R322.3.2 shall comply with one or more of the following:

1. Be designed and constructed with open or partially open risers and guards.
2. Stairways and ramps not part of the required means of egress shall be designed and constructed to break away during design flood conditions without causing damage to the building or structure, including foundation.
3. Be retractable, or able to be raised to or above the lowest floor elevation, provided that the ability to be retracted or raised prior to the onset of flooding is not contrary to the means of egress requirements of the code.
4. Be designed and constructed to resist flood loads and minimize transfer of flood loads to the building or structure, including foundation.

Areas below stairways and ramps shall not be enclosed with walls below the design flood elevation unless such walls are constructed in accordance with Section R322.3.5.

Commented [RQ2]: RB161 proposed this as R322.3.6, so now have to "amend" to assign the right section number

~~R322.3.6~~ R322.3.8 **Decks and porches.** Attached decks and porches shall meet the elevation requirements of Section R322.3.2 and shall either meet the foundation requirements of this section or shall be cantilevered from or knee braced to the building or structure. Self-supporting decks and porches that are below the elevation required in Section R322.3.2 shall not be enclosed by solid, rigid walls, including walls designed to break away. Self-supporting decks and porches shall be designed and constructed to

Commented [RQ3]: RB162 proposed this as R322.3.6, so now have to "amend" to assign the right section number remain in place during base flood conditions or shall be frangible and break away under base flood conditions.

~~R322.3.6~~ R322.3.9 **Construction documents.** The *construction documents* shall include documentation that is prepared and sealed by a registered *design professional* that the design and methods of construction to be used meet the applicable criteria of this section.

~~R322.3.7~~ R322.3.10 **Tanks.** Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.3.2. Where elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of Section R322.3.

Summary of Mod

Adjust section numbers of Commission approved flood provisions in R322.3 to put them in the correct order.

Rationale

Three proposals to the flood provisions in IRC Section R322.3 were approved by the Commission (RB160-16, RB161-16, and RB162-16). This proposal simply shows how to properly include those proposals into Sec. R322.3 with the correct section numbers, while adjusting the numbers of the existing subsections from the 5th edition (2017). The proposed order matches the order of provisions in 2018 IRC Sec. 322.3.

Fiscal Impact:

Impact to local entity relative to enforcement of code (553.73(9)(b),F.S.)*

No impact due to adjusting section number.

Impact to building and property owners relative to cost of compliance with code (553.73(9)(b),F.S.)*

No impact due to adjusting section number.

Impact to industry relative to the cost of compliance with code (553.73(9)(b),F.S.)*

No impact due to adjusting section number.

Impact to small business relative to the cost of compliance with code (553.73(9)(b),F.S.)*

No impact due to adjusting section number.

REQUIREMENTS
Has a reasonable and substantial connection with the health, safety, and welfare of the general public (553.73(9)(a)2,F.S.)
No change to flood protection of the code caused by adjusting section number.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction (553.73(9)(a)3,F.S.)
No change to flood protection of the code caused by adjusting section number.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities (553.73(9)(a)4,F.S.)
No change to flood protection of the code caused by adjusting section number.

Does not degrade the effectiveness of the code (553.73(9)(a)5,F.S.)
No change to flood protection of the code caused by adjusting section number

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **No Affirmative Recommendation: 5**

Total Mods for report: 63

Sub Code: Building

SP7128

Date Submitted	11/8/2018	**Section**	464.4.2.2	**Proponent**	Zaynab Salman
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments No **Alternate Language** No

Related Modifications

Amend no residents shall be in any inside area that exceeds 90°F to a maximum inside temperature of 85°F. Amend during daytime hours when outside temperature exceeds 90°F to 90°F or higher.

Summary of Modification

Criteria in code should reflect Rule 58A-5.036, FAC for consistency. Section 464.4.2.2 addresses temperature requirements when outside temperature is below or exceeds 90°F but fails to address an outside temperature of 90°F.

Rationale

On March 9, 2018, the Florida Legislature ratified Department of Elder Affairs Rule 58A-5.036, Florida Administrative Code requiring assisted living facilities equip their facilities with generators to ensure ambient air temperatures are maintained at or below 81°F to address loss of electrical power. Florida Building Code at a minimum should meet the minim temperature requirements during power outages for consistency. Additionally, current section 464.4.2.2 addresses temperature requirements when outside temperature is below or exceeds 90°F but fails to address an outside temperature of 90°F, placing residents at risk of developing heat-related illnesses.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Very minimal if any. The large majority of facilities currently cool their facilities below 85°F; however, anything over 85°F may compromise an elderly individuals health and well-being.

Impact to building and property owners relative to cost of compliance with code

Very minimal if any. The large majority of facilities currently cool their facilities below 85°F; however, anything over 85°F may compromise an elderly individuals health and well-being.

Impact to industry relative to the cost of compliance with code

Very minimal if any. The large majority of facilities currently cool their facilities below 85°F; however, anything over 85°F may compromise an elderly individuals health and well-being.

Impact to small business relative to the cost of compliance with code

Very minimal if any. The large majority of facilities currently cool their facilities below 85°F; however, anything over 85°F may compromise an elderly individuals health and well-being.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Safe temperatures levels in assisted living facilities are necessary to preserve the life and ensure the comfort of the homes' residents. Under the federal law [42 CFR Part 483. 483.15(h)(6)], nursing home facilities must maintain a temperature range of 71 to 81 degrees Fahrenheit.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed amendment strengthens and improves the code as the current code is very difficult, if not impossible, to impose.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed amendment does not suggest or discriminate against materials, products, methods, or systems as it does not propose a certain product or method be used.

Does not degrade the effectiveness of the code

The proposed amendment is more effective in that it conforms to national temperature requirements for similarly situated facilities.

464.4.2Heating and cooling.

464.4.2.2

Facilities shall maintain comfortable and safe temperature levels. During hours when residents are normally awake, mechanical cooling devices, such as electric fans, must be used in those areas ~~as are~~ of buildings used by residents when inside temperatures exceed 85° F (29° C) provided outside temperatures remain below 90°F (32°C). No residents shall be in any inside area that exceeds 85°F (29°C) ~~90°F (32°C)~~. However, during daytime hours when outside temperature~~s~~ is ~~exceeds~~ 90°F (32°C) or higher, and at night, an indoor temperature of no more than 81°F (27°C) must be maintained in all areas used by residents.

SP8220

Date Submitted	12/14/2018	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Revises and adds requirements for optional stand-by generators.

Rationale

This revision is necessary to get the requirements of the new Florida Administrative Code, Chapter 59A-4.1265 Emergency Environmental Control for Nursing Homes in accordance with Florida Statute 553.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is some fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, methods, or systems of construction. Does not permit the use of gasoline.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

1st Comment Period History

8220-A1

Proponent James gregory **Submitted** 2/18/2019 **Attachments** Yes

Rationale

This section has been revised to accommodate the use of an up-sized Level I generator being used to meet the cooling requirements of Florida Administrative Code 59A-4.1265. It also removes an additional requirement not found in the FAC for protection of the Optional Stand-by Generator.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact on building and property owners relative to cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no impact to industry relative to the cost of compliance.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves the health, safety, and welfare of the general public by clearly stating code requirements.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by providing more clarity.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not discriminate against materials, products, methods.

Does not degrade the effectiveness of the code

Improves the effectiveness of the code by being more detailed.

450.4.2.9.6 A new facility shall be equipped with either a Level I generator as described in Section 450.3.18 Essential electrical system or a permanent on-site ~~alternate power source, such as an~~ optional stand-by generator, to operate at least the nonessential loads of the electrical system or to operate the entire normal branch of the electrical system, for a period of 96 hours for the demand load of the generator. ~~or there shall be a permanently installed predesigned electrical service entry for the electrical system that will allow a quick connection to a temporary electrical generator to operate at least the nonessential loads of the electrical system or the entire normal branch of the electrical system. This quick connection shall be installed inside of a permanent metal enclosure rated for this purpose and may be located on the exterior of the building.~~ If the Level I generator is sized to provide this additional loading, it shall be designed to shed the load of all nonessential loads and shall meet all of the physical plant requirements for disaster preparedness for a generator and an essential electrical system as described in Section 450.4 of the code.

450.4.2.9.6.1 See Chapter 59A-4.1265 Emergency Environmental Control for Nursing Homes, FAC for additional requirements.

450.4.2.9.6.2 If an optional stand-by generator is used to meet this section, it ~~This generator~~ shall meet the requirements of NFPA 70 for an Optional Stand-by generator.

450.4.2.9.6.3 ~~This~~ Either generator shall be at a minimum connected to the cooling system of the facility to maintain the entire facility or the resident care areas of the facility at a dry-bulb temperature at or below 81 degrees Fahrenheit (27.2 degrees Celsius).

450.4.2.9.6.4 The fuel for ~~this~~ either generator may be natural gas, diesel, or propane. Gasoline shall not be permitted for use as fuel.

450.4.2.9.6.5 If a natural gas generator is utilized for an optional stand-by generator, on-site storage of additional fuel shall not be required. If natural gas is used to fuel a Level I generator, additional on-site fuel storage will be required for 96 hours of demand load.

450.4.2.9.6.6 Generator maintenance and testing for the optional stand-by generator shall be in accordance with the manufacturer's instructions. Generator maintenance and testing for the Level I generator shall be in accordance with NFPA 110.

450.4.2.9.6.7 The optional stand-by generator shall be located at a minimum to the same elevation of the facility served. The Level I generator shall be located as required by section 450.4.2.2 Site Standards.

~~450.4.2.9.6.8 The generator shall be protected from large missile impact.~~

450.4.2.9.6.~~9~~ 8 Except for the installation of an emergency stop, this optional stand-by generator is not required to meet the requirements of NFPA 110.

450.4.2.9.6 A new facility shall be equipped with ~~either~~ a permanent on-site alternate power source, such as an optional stand-by generator, to operate at least the non-essential loads of the electrical system or to operate the entire normal branch of the electrical system, for a period of 96 hours for the demand load of the generator. ~~or there shall be a permanently installed predesigned electrical service entry for the electrical system that will allow a quick connection to a temporary electrical generator to operate at least the nonessential loads of the electrical system or the entire normal branch of the electrical system. This quick connection shall be installed inside of a permanent metal enclosure rated for this purpose and may be located on the exterior of the building.~~

450.4.2.9.6.1 See Chapter 59A-4.1265 Emergency Environmental Control for Nursing Homes FAC for additional requirements.

450.4.2.9.6.2 This generator shall meet the requirements of NFPA 70 for an Optional Stand-by generator.

450.4.2.9.6.3 This generator shall be at a minimum connected to the cooling system of the facility to maintain the entire facility or the resident care areas of the facility at a dry-bulb temperature at or below 81 degrees Fahrenheit (27.2 degrees Celsius).

450.4.2.9.6.4 The fuel for this generator may be natural gas, diesel, or propane. Gasoline shall not be permitted for use as fuel.

450.4.2.9.6.5 If a natural gas generator is utilized, on-site storage of additional fuel shall not be required.

450.4.2.9.6.6 Generator maintenance and testing shall be in accordance with the manufacturer’s instructions.

450.4.2.9.6.7 The generator shall be located, at a minimum, to the same elevation of the facility served

450.4.2.9.6.8 The generator shall be protected from large missile impact.

450.4.2.9.6.9 Except for the installation of an emergency stop, this optional stand-by generator is not required to meet the requirements of NFPA 110.

SP8274

Date Submitted	12/14/2018	**Section**	450.4.2.4.2	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will enhance protection of the building envelope reducing the risk of water intrusion due to the dislodgement of roof top equipment.

Rationale

This modification is needed to reduce the risk of water infiltration due to the dislodgement of roof top equipment by high winds and debris impact during hurricanes. Lost of roof mechanical equipment exposes the building interior of water infiltration that is costly to repair and requires buildings or portions of building to vacated during remediation. Additionally the loss of air terminals can compromise the buildings lighting protection system and expose the facility to increase risk of lighting strikes. The referenced document is available on line at FEMA website.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Minimal cost increase.

Impact to industry relative to the cost of compliance with code

Minimal cost increase.

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Increases nursing homes ability to resist damage form high winds and water intrusion.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

450.4.2.4.2 All new roof appendages such as ducts, tanks, ventilators, receivers, dx condensing units, exhaust fans, lighting protection system components, and decorative mansard roofs and their attachment systems shall be structurally engineered to meet the wind load requirements of the applicable building code. At a minimum, rooftop equipment shall be attached securely to a curb or roof deck in accordance with the recommendation in Appendix E of *FEMA 549 - Hurricane Katrina in the Gulf Coast: Mitigation Assessment Team Report, Building Performance Observations, Recommendations, and Technical Guidance.*

MITIGATION ASSESSMENT TEAM REPORT

HURRICANE *Katrina* IN THE GULF COAST

E. FEMA Hurricane Katrina Recovery Advisories

FEMA has prepared a series of Recovery Advisories that present guidance for design, construction, and restoration of buildings in areas subject to coastal flooding and high winds from Hurricane Katrina. To date, eight advisories have been prepared and are included in this appendix:

- Reconstruction Guidance Using Hurricane Katrina Surge Inundation and Advisory Base Flood Elevation Maps
- Initial Restoration for Flooded Buildings
- Design and Construction in Coastal A Zones
- The ABCs of Returning to Flooded Buildings
- Attachment of Brick Veneer in High-Wind Regions
- Attachment of Rooftop Equipment in High-Wind Regions
- Rooftop Attachment of Lightning Protection Systems in High-Wind Regions
- Designing for Flood Levels Above the BFE

These Advisories are also available online at http://www.fema.gov/rebuild/mat/mat_katrina.shtm where future Advisories will also be posted.

Reconstruction Guidance Using Hurricane Katrina Surge Inundation and Advisory Base Flood Elevations

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To discuss available flood hazard information and to recommend reconstruction practices using Advisory Base Flood Elevations (ABFEs).

Key Issues

- Following Hurricane Katrina, FEMA updated its flood frequency analyses to include more recent storm surge data (including storm surge stillwater levels measured after Katrina). The results of the analysis show that the updated 1 percent annual chance stillwater levels (also known as the 100-year stillwater levels) are 3 to 8 feet above the stillwater levels previously used to produce the pre-Katrina Flood Insurance Rate Maps (FIRMs).
- For post-Katrina recovery purposes, FEMA devised a method to approximate 1 percent annual chance wave crest elevations. The results of this effort are known as Advisory Base Flood Elevations (ABFEs, sometimes referred to as Advisory Flood Elevations [AFEs]), which are shown on a series of 228 maps for Hancock, Harrison, and Jackson Counties, Mississippi. These maps are also known as "Katrina Recovery Maps" (see Figure 1).

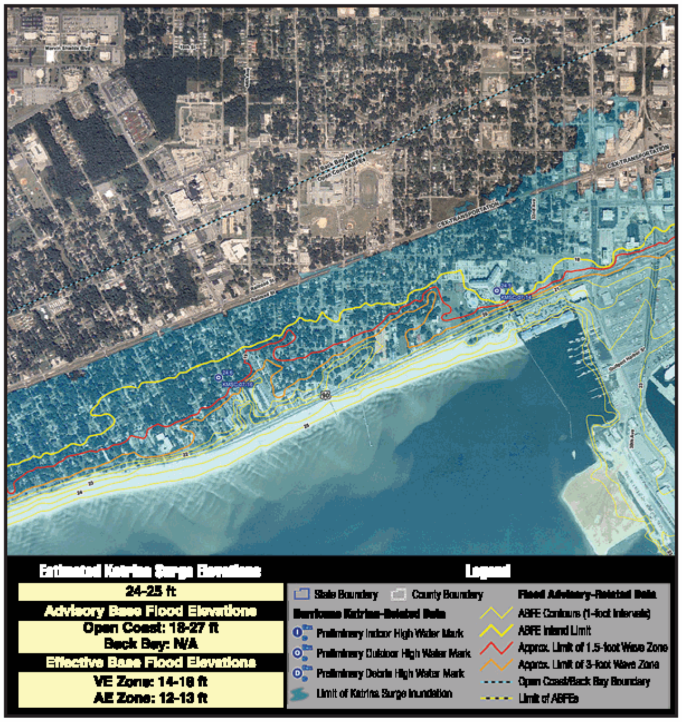


Figure 1. Sample Hurricane Katrina Surge Inundation and Advisory Base Flood Elevations. The shaded region in blue indicates the approximate inland extent of storm surge inundation experienced during Katrina; the ABFE contours are shown in yellow and the predicted inland limit of damaging wave effects during the advisory base flood is shown by the red line. Blue points indicate surveyed Katrina high water mark elevations.

- The ABFEs are updated estimates of the 1 percent annual chance flood elevations, and are generally 5 to 12 feet higher than the base flood elevations (BFEs) shown on the pre-Katrina FIRMs. ABFEs also extend farther inland than the Special Flood Hazard Areas (SFHAs) shown on the pre-Katrina FIRMs.
- The Katrina Recovery Maps also show the approximate inland extent of storm surge inundation experienced during Hurricane Katrina. Since Katrina exceeded the BFE in most locations (based on the updated flood frequency analysis), the inland extent of Katrina storm surge penetration generally lies inland of the ABFE limit. However, where the Katrina impact was less extreme (very near the eye where the hurricane winds are small, to the left of the eye where the peak winds blow offshore rather than onshore, and far to the right of the eye where the winds weaken), the Katrina surge penetration properly lies seaward of the ABFE limit.
- FEMA and the State of Mississippi will conduct detailed studies during 2005 and 2006 to produce revised FIRMs. The revised FIRMs will result from more detailed storm surge stillwater analyses and more detailed wave analysis methods than those used to produce the Katrina Recovery (ABFE) Maps. As a result, BFEs on the revised FIRMs may differ from the ABFEs. In the interim, the ABFEs should be treated as the best available 1 percent annual chance elevation information.

- Although the information contained on the Katrina Recovery Maps is advisory in nature, communities are encouraged to use ABFEs to regulate reconstruction and new construction until the revised FIRMs are produced by FEMA.
- Until such time as the revised FIRMs are published by FEMA and adopted by communities, those communities may use the pre-Katrina FIRMs, or Katrina Recovery Maps, or other flood elevations to regulate reconstruction and new construction (as long as the other flood elevations are not lower than those shown on the pre-Katrina FIRMs).

Advisory Base Flood Elevations (ABFEs)

The pre-Katrina FIRMs for communities in Hancock, Harrison, and Jackson Counties were published between the early 1980s and 2002; the current maps underestimate today's risk. Following Hurricane Katrina, FEMA updated the stillwater flood frequency analysis for coastal Mississippi to include tide and storm surge stillwater data for the past 25 plus years. These revised stillwater elevations formed the basis for FEMA's calculation of ABFEs.

The revised 1 percent annual chance storm surge stillwater levels were published by FEMA on October 3, 2005, for Hancock, Harrison, and Jackson Counties in Mississippi (see Table 1). The procedure which makes use of these elevations to compute ABFEs is illustrated in Figure 2 and the example below.

Table 1. Updated 1 Percent Annual Chance (100-Year) Stillwater Elevations for Use in Calculating ABFEs

County (Mississippi)	Updated 1 Percent Annual Chance Stillwater Elevations (SWEL), (ft NAVD*)	
	Gulf of Mexico Shoreline	Back Bay Shorelines
Jackson	14	12
Harrison	18	16
Hancock	20	18

*North American Vertical Datum of 1988
Storm Surge Stillwater Elevation (SWEL)

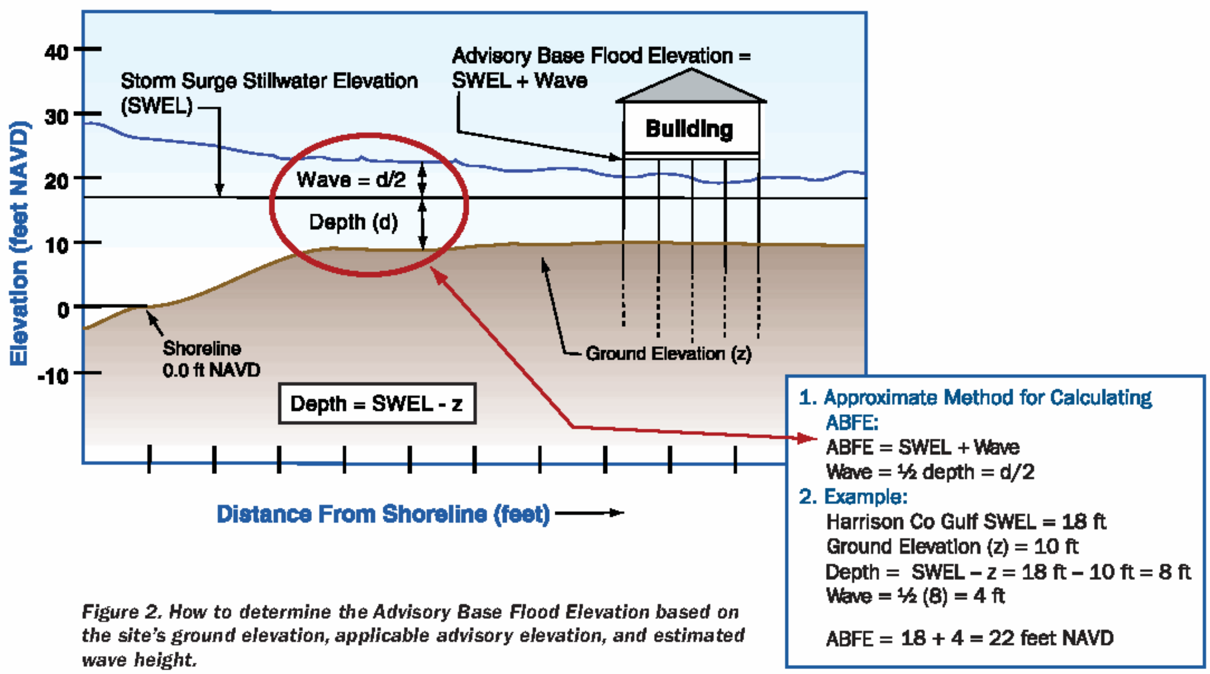


Figure 2. How to determine the Advisory Base Flood Elevation based on the site's ground elevation, applicable advisory elevation, and estimated wave height.

Communities and designers may note that the ABFE procedure is a simplified version of FEMA's Wave Height Analysis for Flood Insurance Studies (WHAFIS) program used to map base flood conditions on coastal FIRMs. The ABFE procedure does not account for wave attenuation due to dense stands of vegetation, buildings, or other obstructions. Nor does it account for wave growth and regeneration across flooded upland areas. Thus, BFEs on the revised FIRMs (anticipated in 2007) may differ from the ABFEs computed during this interim period. The ABFEs can be considered the best available data at this time.

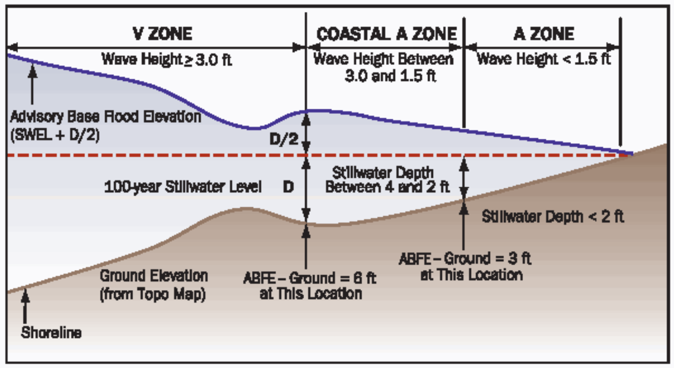


Figure 3. Cross-section showing 1 percent annual chance stillwater elevation, stillwater depth and ABFE, and inland limits of V Zone and Coastal A Zone.

Figure 3 illustrates the relationships between the stillwater flood elevation, ground elevations, associated 1 percent annual chance stillwater flood depths, ABFEs, and associated flood hazard zones.

Advisory Base Flood Elevations

The Katrina Recovery Maps (see Figure 1) include the following information:

- Pre-Katrina aerial photographs (as a base map)
- Approximate Katrina surge inundation limit (shaded area)
- ABFE contours (ft NAVD)
- Predicted inland limit of damaging wave effects during the advisory base flood (red line)
- Surveyed Katrina high water mark elevations

More background information on ABFEs and their use can be found in Flood Recovery Guidance-Frequently Asked Questions, dated October 3, 2005, and available at:

www.fema.gov/hazards/floods/recoverydata/katrina_ms_resources.shtm

Communities are encouraged to use the Katrina Recovery Maps. They may continue to enforce their adopted FIRMs and associated design and construction requirements. However, by using the ABFEs any reconstruction or new construction (following Katrina and before issuance of revised FIRMs, expected in 2007) will be at much less risk from future flood damage, and will be eligible for reduced flood insurance premiums (new and reconstructed buildings can be rated using BFEs and flood hazard zones on the effective FIRM, until revised FIRMs are adopted by the community).

Flood Protection Levels for Post-Katrina Reconstruction and New Construction

Until revised FIRMs are published by FEMA and adopted by communities, those communities are free to regulate reconstruction and new construction using several methods:

- Continue to use pre-Katrina FIRMs (understanding that this would knowingly put people and buildings at risk)
- Modify the use of pre-Katrina FIRMs (e.g., add freeboard to the pre-Katrina BFEs)
- Use the Katrina Recovery (Advisory Base Flood Elevation) Maps
- Modify the Katrina Recovery Maps (e.g., conduct a more detailed wave analysis and add to the 1 percent annual chance stillwater elevation, replacing ABFE contours shown on the maps)
- Develop other maps and methods (as long as the resulting BFEs and flood hazard zones are no less restrictive than the pre-Katrina FIRMs)

Each of these methods has advantages and disadvantages, both for implementation and for the long-term protection of buildings constructed after Hurricane Katrina. These are summarized in Table 2.

Table 2. Comparison of Various Methods for Providing Post-Katrina Flood Protection to Reconstructed Buildings and New Construction

Advantages	Disadvantages
Continue Use of Pre-Katrina FIRMs	
No change from pre-Katrina flood hazard maps	• Underestimates inland extent of flooding during base flood • Underestimates flood depths • Underestimates inland extent of the V Zone and damaging wave effects • Does not protect buildings outside the pre-Katrina SFHA against damage during the base flood • Limits eligibility for post-Katrina hazard mitigation grants and other reconstruction funds
Add Freeboard to Pre-Katrina FIRMs (where freeboard is less than that indicated by updated 1 percent annual chance flood analysis)	
• Provides increased flood protection for buildings within the pre-Katrina V Zone • Provides increased flood protection for buildings near the inland limit of the pre-Katrina A Zone • Buildings elevated to the new (freeboard) elevation will be eligible for flood insurance premium discounts (they can be rated using the pre-Katrina FIRM)	• Underestimates inland extent of flooding during base flood • Does not protect buildings outside the pre-Katrina SFHA against damage during the base flood • Does not expand the V Zone inland, and does not protect buildings in the seaward portion of the pre-Katrina A Zone against wave damage • Does not fully protect any buildings subject to the updated 1 percent annual chance flood • Limits eligibility for post-Katrina hazard mitigation grants and other reconstruction funds
Use Katrina Recovery (ABFE) Maps	
• Uses the latest 1 percent annual chance flood elevation and mapping guidance to characterize the extent, depth and severity of updated base flood hazards • ABFEs near the coast may be comparable to revised BFEs expected in 2007 • Provides flood protection consistent with the latest estimate of the updated base flood • Reduces potential floor elevation and foundation differences between buildings reconstructed/ constructed to ABFEs and those constructed after adoption of revised BFEs. • Buildings elevated to the ABFE will be eligible for flood insurance premium discounts (they can be rated using the pre-Katrina FIRM)	• Large differences between pre-Katrina building floor elevations and post-Katrina building floor elevations • ABFEs near the inland limit of flooding and in areas sheltered from wave effects may overstate wave hazards and wave crest elevations
Modify the Katrina Recovery (ABFE) Maps (via improved wave height analysis)	
• Same as ABFE entries above • Reduce wave height overestimates introduced by the ABFE approach	Large differences between pre-Katrina building floor elevations and post-Katrina building floor elevations
Other Methods	
Vary with method selected	Vary with method selected

Using the Advisory Base Flood Elevations

Communities can make use of the Advisory Base Flood Elevations by those methods summarized in Table 2. In addition, communities can take several steps that will help to protect reconstruction and new construction:

- Define the revised inland extent of the SFHA using ground contours equal to the stillwater elevations contained in Table 1.
- Define the revised inland extent of the coastal high hazard area (V Zone) based on a 4-foot stillwater depth (the depth required to support a 3-foot wave), using whatever new 1 percent stillwater elevation the community adopts. If the community adopts the stillwater elevations in Table 1, ground elevations corresponding to the new inland V Zone limit are shown in Table 3. In most cases, the first encounter with that ground elevation (starting at the shoreline and moving inland) will be the inland V Zone limit.
- Define the inland extent of a Coastal A Zone (see Hurricane Katrina Recovery Advisory, Design and Construction in Coastal A Zones) based on a 2-foot stillwater depth (the depth required to support a 1.5-foot wave), using whatever new 1 percent stillwater elevation the community adopts. If the community adopts the stillwater elevations in Table 1, ground elevations corresponding to the inland limit of the Coastal A Zone are shown in Table 3. In most cases, the first encounter with that ground elevation (starting at the shoreline and moving inland) will be the inland limit of the Coastal A Zone.
- Implement a local ABFE revision process, to allow for special circumstances where property owners can supply better topographic data or information which will result in a more accurate delineation of flood hazards. Note: such a revision process should not allow reduction of the stillwater elevations in Table 1.
- If a community has adopted the International Building Code or the International Residential Code, define the “Design Flood Elevation” as the ABFE. Define the “Flood Hazard Area” as the inland extent of flooding using the ABFE procedure.

Table 3. Ground Elevations Corresponding to Inland Limits of V Zones and Coastal A Zones (based on 1 percent annual chance stillwater elevations published by FEMA, October 3, 2005)

County, Flood Source	1 Percent Annual Chance Stillwater Elevation (ft NAVD)	Ground Elevation Corresponding to Inland Limit of V Zone (ft NAVD)	Ground Elevation Corresponding to Inland Limit of Coastal A Zone (ft NAVD*)
Jackson, Gulf of Mexico	14	10	12
Jackson, Back Bay	12	8	10
Harrison, Gulf of Mexico	18	14	16
Harrison, Back Bay	16	12	4
Hancock, Gulf of Mexico	20	16	18
Hancock, Back Bay	18	14	16

* North American Vertical Datum of 1988

Design and Construction Practices Using ABFEs

FEMA recommends that all reconstruction and new construction within the revised flood hazard area employ a "best practices" approach, incorporating those methods known to eliminate or reduce flood damage. This will mean:

- Elevating buildings higher than before Katrina, on stronger foundations, with continuous load paths and stronger connections, and with wind- and water-resistant walls, windows, doors, and roofs.
- Elevating buildings with the bottom of the lowest horizontal structural member supporting the lowest floor above the ABFE (or whatever regulatory flood elevation a community adopts). *In A Zones, do not elevate the building only such that the lowest floor walking surface is at the ABFE (or whatever regulatory flood elevation a community adopts).*
- Using flood-damage resistant building materials above the lowest floor elevation of the building (remember, floods more severe than the base flood can, and do, occur).
- Designing and constructing buildings using methods and materials described in:
    - The latest model building codes and standards
    - FEMA 55, *Coastal Construction Manual* (revised 2000)
    - FEMA 499, *Home Builder's Guide to Coastal Construction,* Technical Fact Sheet Series (2005) (http://www.fema.gov/fima/mat/fema499.shtm)

Initial Restoration for Flooded Buildings

HURRICANE KATRINA RECOVERY ADVISORY

NOTE: This advisory is specifically intended for buildings subject to the effects of long-term flooding and widespread mold growth following Hurricane Katrina. For additional information on more common water leakage and mold situations, refer to the FEMA website (http://www.fema.gov) and related links to the Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention (CDC) sites listed at the end of this advisory.

During the initial visit to a flood-damaged building, the situation often appears overwhelming (Figure 1). However, despite the shock that often accompanies an individual's first look at the damage, there are a number of straightforward principles can be applied to assist with the flood restoration effort. In addition to following the steps outlined below, individuals should review the Hurricane Katrina Recovery Advisory, *The ABC's of Returning to Flooded Buildings*.

Figure 1. Typical flood damage to furniture and interior walls (Hurricane Katrina).

1. Air Out

- To promote drying, open all doors and windows whenever you are present and leave as many open when you are not present as security concerns allow. Some styles of windows (double-hung) and patio doors may be able to be left partially open and secured from external opening by inserting a nail in the window frame or using a wooden dowel or stick. Upper floor windows can usually be left open all the time and will also assist in drying the whole house. Try to take advantage of cross-ventilation by opening windows on multiple levels and opposite sides of the building.
- Open interior doors, especially closets and interior rooms, to allow air movement to reach all areas of the building. Take doors off their hinges if necessary to promote air flow.
- Open kitchen cabinet and bathroom vanity doors; remove drawers and stack them to dry.
- Open the attic access, if available, to increase ventilation. Consider the benefits (improved drying) and risks (falling dust, insulation, or other debris) of adding an attic access where none exists.
- When electricity is available, use fans to push moist air outside. However, avoid use of fans if the house is contaminated with sewage as the air movement may spread bacterial contamination.

2. Move Out

- Remove salvageable contents that were not impacted by the water. If the upper floors are dry, it may be possible to move such items to those areas. When moving items from impacted areas of the building to other locations, consider using protective mats or non-slip drop cloths (e.g., fabric painter cloths) to avoid contamination of unimpacted surfaces.
- Remove saturated porous materials such as mattresses or upholstery, especially those with visible fungal growth. These items should be moved out of the building as soon as possible. Cover contaminated items with plastic drop cloths prior to moving to prevent spread of contaminants. Appropriate personal protective equipment should be utilized to avoid injury from possible exposure to mold and bacteria.

3. Tear Out

- Prior to beginning tear out, install plastic barriers between affected and unaffected areas of the premises (typically between the first and second floors). This will reduce the potential for secondary damage occurring in the unaffected areas.
- Remove wet carpet and padding. Tack strips should also be removed completely when the carpet is taken out to minimize injury during subsequent activities. Since carpet tack strips have protruding nails, wear leather gloves to protect hands from puncture wounds while removing and handling tack strips. Removing wooden baseboards prior to carpet tear out may allow for their later reinstallation.
- Remove any curled vinyl tiles or linoleum over concrete floors, and remove all vinyl tiles or linoleum over wooden sub-floors to allow the wood to dry. Respiratory protection should be worn as many older (pre-1970s) flooring products, such as 9-inch square tiles and adhesives, often contain asbestos.
- Although punching holes in walls for drainage is commonly recommended, this practice does not drain water nor does it cause the wall to dry faster. If holes are not punched in the walls, the drywall (gypsum board) may be able to be easily repaired and restored.
- If drywall or plaster has been saturated by contaminated floodwater, it should be removed. Respiratory protection should be worn when removing drywall as some older drywall joint compound contains asbestos. If the water level was less than 2½ feet, the wall material should be removed to a height of 4 feet to facilitate reinstallation of full sheets of drywall. If the water level was greater than 2½ feet, the wall material should be removed to a height of 8 feet or the ceiling junction, whichever is higher. Electrical outlet and wall switch plates and door and window moldings must be removed prior to the tear out of the wall material.
- Fibrous wall insulation (fiberglass, mineral wool, cellulose, wood fiberboard, etc.) saturated by floodwater should be removed completely. Foam plastic insulation may be left in place and allowed to dry.
- Flooded electrical receptacles should be removed completely after the appropriate circuit breakers or fuses are deactivated.
- Wall paneling should be removed if it is swollen or if saturated drywall is behind the paneling.

4. Clean Out

- Following any necessary tear out, clean up any remaining debris and muck. Squeegees, shovels, and brooms are effective for such cleaning. Personal protective equipment should be utilized. Detailed cleaning and sanitizing of the remaining materials should be conducted. A shop vacuum with dry filters in place and with a solution of clean water and disinfectant in the tank (2-inch depth) to minimize the spread of dust can be used.
- **Mold removal.** Treatment with commercial mold removers does eliminate visible evidence of mold growth on exposed surfaces and is recommended for restoring flood-damaged homes. Tests have found very little or no evidence of mold growth in the non-exposed (hidden) portions of the walls. Treating the non-exposed portions of the walls for mold control does not appear warranted in most cases. Spraying vertical surfaces using a compression (pump-up) garden sprayer with a commercial mildew remover is recommended.
- **Understand the limitations of bleach**. While this material is convenient and appropriate as a sanitizer for hard, non-porous items after they have been cleaned, it has distinct drawbacks when cleaning flood-impacted buildings. Application of bleach water can cause corrosion of electrical components and other metal parts of mechanical systems, and can compromise the effectiveness of termite treatments in the soil surrounding the building. Its effectiveness at killing bacteria and mold is significantly reduced when it comes in contact with residual dirt. Moldy surfaces should be cleaned first and then disinfected. Residual mold spores should then be removed, since killing them does not reduce their toxicity.
- Remove mud and gross contamination from floors by shoveling into suitable containers. Reduce soil and

Figure 2. Using a pressure washer to clean contaminated surfaces.

contaminant levels on surfaces by flushing off with clear water. The fastest and most efficient method to clean and decontaminate materials and surfaces is by using a residential-type pressure washer to apply a cleaner-disinfectant solution to the affected areas (Figure 2). Brushes improve decontamination of floors and some walls by scrubbing solution into affected surfaces. Avoid scrubbing drywall and plaster walls at this time because they have become softened by the flooding and moisture and may have their surface damaged by scrubbing. Following the first cleaning, floors and walls should be rinsed with water and the cleaning process redone a second time. Squeegees can be used to control or direct spent solution, and wet vacuums can be used to collect spent solution.

Warning: Failure to allow for adequate drying prior to reconstruction can trap moisture in the building, which can cause structural damage and potential health problems in the future.

5. Dry Out

- Once the clean process is completed, the building and any remaining contents need to dry. Drying is a naturally occurring process. Over time, all wetted building materials will dry. Drying of structural materials will take an extended period of time to dry to pre-flood conditions. Exterior rooms with excellent ventilation can take 2 to 4 weeks to dry, depending on the temperature and humidity outside. Interior rooms, or those with minimal ventilation, can take 4 to 6 weeks or more to dry and are candidates for the use of mechanical drying equipment. The use of fans, dehumidifiers, air conditioners, and/or auxiliary electric heaters will speed drying. Allowing materials to dry naturally will take considerably longer.
- **Wood framing**. The moisture content of wood framing must be checked professionally or with a commercially available moisture meter before refinishing or recovering so that excessive moisture does not become trapped in the materials and cause future problems (Figures 3a and 3b). Dryness of wood framing materials can be determined quantitatively using the table on the right above. Wetted materials are presumed dry when their moisture content readings are less than or equal to 15 percent when taken with an intrusive/penetrating moisture meter (Figure 3a). If an intrusive/penetrating moisture meter is not available, a non-intrusive/penetrating moisture meter (Figure 3b) may be used; however, keep in mind that the material moisture results measured from non-intrusive meters may be less accurate than intrusive meters.
- **Walls, floors, and other building materials**. The moisture content of drywall (gypsum board), plywood floors, and other building materials must also be checked professionally or with a commercially available moisture meter before refinishing or recovering so that excessive moisture does not become trapped in the materials and cause future problems (Figures 3a and 3b). Unlike wood framing, the dryness of other building materials must be confirmed qualitatively by comparing readings between like materials in affected areas of the building (at or below flood level) and unaffected areas of the building (a room or upper floor above the flood

Summary of Moisture Reading Results for Wood Framing Materials

Moisture Reading	Results
> 20%	Wet - no good
15 - 20%	Partially dry - caution
< 15%	Dry - OK

Figure 3a. An intrusive/penetrating moisture meter--recommended for final moisture readings.

Figure 3b. A non-intrusive/non-penetrating moisture meter–recommended for initial and interim moisture readings.

level, or inside a nearby building that was not flooded). Wetted materials are presumed dry when their moisture content readings are within 5 percent of those of like materials in unaffected areas of the building when taken with an intrusive/penetrating moisture meter (Figure 3a). If an intrusive/penetrating moisture meter is not available, a non-intrusive/penetrating moisture meter (Figure 3b) may be used; however, keep in mind that the material moisture results measured from non-intrusive meters may be less accurate than intrusive meters.

- Kitchen cabinets, bathroom vanities, and other “built-in” furnishings that were subjected to flood water should be removed from their location to permit drying of the material behind them. Once these “hidden” areas are dried, the furnishings can be reinstalled if they are salvageable.
- When saturated wood, drywall, and/or other structural materials vulnerable to fungal growth are naturally air dried over an extended period (weeks), the application of a disinfectant prior to drying can prevent mold growth. Materials should be closely observed and disinfectant reapplied at the first sight of mold.

General Notes for Drying Foundation Floors

- **Crawlspaces**. Access to crawlspaces is necessary for decontamination purposes. For crawlspaces that do not have an existing access opening, the simplest method to access the crawlspace is by strategically removing sections of overlying flooring to permit access. When the flooring is not salvageable, removal of the flooring provides the necessary access openings. Once access is obtained, gross (solid) contamination should be removed from the ground underneath the building for health and sanitation purposes. Next, any remaining water should be removed. If there is an existing vapor retarder on the ground, it can be left in place to collect spent water and cleaning solutions. Following remediation and any necessary final cleaning, the vapor retarder can be left in place to facilitate drying. If there is exposed ground within the crawlspace after cleaning, it should be covered with a plastic vapor retarder to minimize potential mold growth and future moisture migration into the house. Plastic vapor retarders can be made watertight by overlapping and sealing them together using either glue or heavy-duty adhesive. Suitable adhesives can be obtained from hardware stores or home improvement centers. After the vapor retarder is placed, the underlying support structure of salvageable wooden floor joists, wood sub-floors, and foundation walls should be cleaned and sanitized. Following cleaning, application of a wood preservative will provide protection against fungi and wood destroying insects.
- **Grade slabs**. Concrete grade slabs provide a dense barrier between the ground and the interior of the home. Remove mud and gross contamination from slabs by shoveling into suitable containers. Reduce soil and contaminant levels on surfaces by flushing off with clear water. The fastest and most efficient method to clean and decontaminate contaminated grade slabs and adjacent building materials and surfaces is by using a residential type of pressure washer to apply a cleaner-disinfectant solution to affected areas. Brushes improve decontamination of floors and base of walls by scrubbing solution into affected surfaces. Following the first cleaning, floors and base of walls should be rinsed with water and the cleaning process redone a second time. Squeegees can be used to control or direct spent solution, and wet vacuums can be used to collect spent solutions. Following cleaning, the slab should be visually examined for signs of heaving or cracking due to hydrostatic pressure. When in doubt, contact the local building inspector, structural engineer or other appropriate professional.

Additional Resources

- Repairing Your Flooded Home (ARC #4477/FEMA 23)
  http://www.redcross.org/services/disaster/0,1082,0_570_,00.html
- Cleaning Flood-Damaged Homes (LSU AgCenter)
  http://www.louisianafloods.org/en/family_home/hazards_and_threats/recovery_assistance/cleaning_up/structural_damage/Cleaning+FloodDamaged+Homes.htm
- Mold Fact Sheet (LSU AgCenter)
  http://www.louisianafloods.org/en/family_home/home/health_safety/indoor_air_quality_mold/Mold+Fact+Sheet.htm

For additional information on more common water leakage and mold situations:

- Environmental Protection Agency (EPA), http://www.epa.gov/mold
- Centers for Disease Control and Prevention (CDC), http://www.cdc.gov/mold

Design and Construction in Coastal A Zones

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend design and construction practices in coastal areas where wave and flood conditions during the base flood will be less severe than in V Zones, but still cause significant damage to typical light-frame construction

Key Issues

- Recent post-storm investigations have shown that typical A Zone construction techniques (e.g., wood-frame, light gauge steel or masonry walls on shallow footings or slabs, etc.) are subject to damage when exposed to less than 3-foot breaking waves, which is the current threshold for V Zone conditions.
- Coastal A zone buildings that employ typical residential and light commercial walls to elevate and support habitable space above the flood level will be susceptible to flood damage (see Figure 1). Laboratory tests and recent field investigations confirm that breaking wave heights as small as 1.5 feet will cause failure of these types of walls (see Figures 2 and 3).
- Other flood hazards associated with coastal waves (e.g., floating debris, high velocity flow, erosion and scour) also damage A Zone type construction in coastal areas (see Figures 4 and 5).
- NFIP flood hazard mapping is generally divided into two categories, V Zone and A Zone. In coastal areas, the A Zone category could be subdivided into "Coastal A Zone" and "A Zone." Base flood conditions in the Coastal A Zone will be similar to, but less severe than, those in the V Zone; base flood conditions in the A Zone will be similar to those in riverine or lake floodplains.
- The Coastal A Zone is not shown on the FIRM at present; therefore, communities, designers, and owners will have to determine whether a site lies within a Coastal A Zone.
- **V Zone design and construction standards are recommended in Coastal A Zones subject to erosion, high velocity flow, and/or wave heights greater than 1.5 feet.**

Figure 1. Failure of wood-frame walls used to support a coastal building, which was subjected to shallow flooding, small waves, and floating debris (Hurricane Opal).

Figure 2. Masonry walls destroyed by 3 feet of stillwater flooding and small waves (Hurricane Dennis).

V Zone	A Zones in Coastal Areas	
V	Coastal A — Areas With Potential for Breaking Waves and Erosion During Base Flood	A — Areas With Shallow Flooding Only, Where Potential for Breaking Waves and Erosion Is Low

Figure 3. Failure of wood-frame wall, brick veneer, and windows as a result of 4 feet of stillwater flooding and small waves (Hurricane Katrina).

Figure 4. Failure of A Zone type foundation in coastal area, not subject to V Zone conditions (Hurricane Fran).

Figure 5. Damage to light frame walls due to floating debris and small waves. The damaged home was in the third row back from a bay shoreline (Hurricane Ivan).

Coastal A Zone, Defined

Coastal A Zone: area landward of a V Zone, or landward of an open coast without mapped V Zones. In a Coastal A Zone, the principal source of flooding will be astronomical tides, storm surges, seiches or tsunamis, not riverine flooding. During base flood conditions, the potential for breaking wave heights between 1.5 feet and 3.0 feet will exist (see Figure 6).

Coastal A Zone design and construction practices described herein are not mandated by the NFIP, but are recommended for communities that wish to adopt higher floodplain management standards. Community Rating System (CRS) credits are available for doing so. Note that some Coastal A Zone practices may be required by the International Building Code, through its reference to ASCE 24-98.

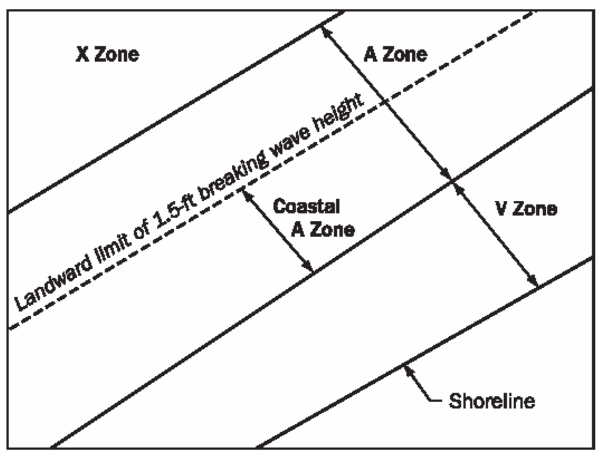


Figure 6. Plan view showing Coastal A Zone landward of V Zone (source: ASCE 24-05).

Coastal A Zone Construction Guidance

Because of the presence of damaging waves, V Zone design, construction, and certification practices are recommended for Coastal A Zones.

Coastal A Zone construction should include:

- Use of open foundations (pile or pier) designed to resist all base flood conditions (waves, high velocity flow, erosion and scour, floodborne debris). Where high velocity flow, scour, and erosion will not be experienced under base flood conditions, a traditional stem wall foundation may be acceptable – see Table 1.
- Elevation of the bottom of the lowest horizontal structural member supporting the lowest floor above the base flood wave crest elevation (see Figure 7).Since waves and debris will be impacting on the floor joists and other foundation elements during the base flood, *do not follow current NFIP minimum requirements that allow the lowest floor's walking surface to be set at the wave crest elevation in Zone A.*
- Use of flood-resistant materials above the level of the walking surface of the lowest floor (in the event that future flooding exceeds the lowest floor level).
- Specification of connections between the foundation and the elevated building that are capable of withstanding simultaneous wind and flood forces. Post-Katrina investigations found many foundation-to-building connections to be deficient (see Figure 8).
- Use of space below the lowest horizontal structural member for parking, access, or storage only. Adding sufficient freeboard to allow parking beneath the building will not only reduce future flood damages, but will also lower flood insurance premiums.
- Use of screen, lattice, or breakaway walls if space below the elevated floor is enclosed. Note: until flood regulations are changed, breakaway walls in Coastal A Zones must be equipped with flood openings.

Additional guidance for design and construction in Coastal A Zones can be found in FEMA 499, *Home Builder's Guide to Coastal Construction* (http://www.fema.gov/fima/mat/fema499.shtm). The publication is a series of 31 fact sheets that provide recommended design and construction practices for foundations, connections, building envelope, etc. Fact Sheet 2 summarizes recommended practices for Coastal A Zones, and references other fact sheets that provide more details.

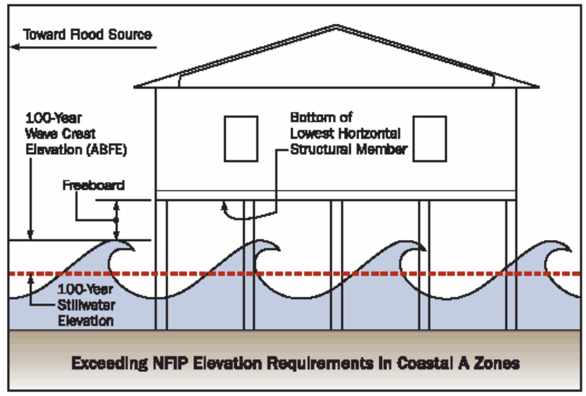


Figure 7. Recommended post-Katrina building standards in Coastal A Zones.

Figure 8. Post-Katrina investigations showed that many buildings were attached to foundation piers with light gauge metal straps. These straps failed in many instances. A stronger (preferably bolted) connection is recommended when attaching Coastal A Zone buildings to their foundations.

Table 1. Foundation Recommendations for Coastal A Zones (Users should read across from a foundation type to see under what soil and base flood conditions that foundation is acceptable. A foundation must be capable of resisting all base flood conditions likely to exist at the site, or it should not be used. For example, a properly constructed pier on a shallow footing will generally withstand 1.5- to 3.0-foot wave heights, but should not be used where soils are erodible, and where high velocity flow is possible, or where large floodborne debris may be present.)

Foundation Type	Base Flood Condition Present		
	Wave Heights Between 1.5 and 3.0 Feet*	Velocity Flow, Erodible Soils	Large Debris
Fill	no	no	no
Slab on grade	no	no	no
Crawlspace, shallow footing	no	no	no
Foundation walls, shallow footing	no	no	no
Stemwall, shallow footing	yes	no	yes
Stemwall, deep footing**	yes	yes	yes
Pier, shallow footing	yes	no	no
Pier, deep footing**	yes	yes	no
Post, shallow embedment	no	no	no
Pile/Column, deep embedment**	yes	yes	yes

*Wave heights greater than 3.0 feet mapped as V Zone: fill, slab, crawlspace, wall foundations not permitted.

**Deep means sufficiently deep to withstand erosion and scour, including that induced by the presence of the foundation itself.

Identifying Coastal A Zones

Coastal A zones are not shown on present day Flood Insurance Rate Maps (FIRMs) or mentioned in a community's Flood Insurance Study (FIS) Report. Those maps and studies show zones VE, AE, and X (or older designations V1-30, A1-30, B, and C). Therefore, until Coastal A Zone designations or wave height contours are incorporated into Flood Insurance Studies, the community official, designer, or owner will have to determine whether or not a site will be subject to Coastal A Zone conditions during the base flood.

In order for a Coastal A Zone to be designated, two conditions are required:

1) a water depth sufficient to support waves between 1.5 and 3.0 feet high, and

2) the actual presence of wave heights between 1.5 and 3.0 feet.

Condition 1 requires stillwater depths (vertical distance between the 100-year stillwater elevation and the ground elevation) of 2 to 4 feet at the site.

Condition 2 requires wave heights at the shoreline greater than 1.5 to 3.0 feet (under the 100-year flood conditions), sufficient water depth between the shoreline and the site and few, if any obstructions (buildings, dense tree stands, etc.) that may block or dampen the waves, between the shoreline and the site.

Figure 9 illustrates the relationships between the stillwater flood elevation, ground elevations, associated 1 percent annual chance (100-year) stillwater flood depths, ABFEs, and associated flood hazard zones (see Hurricane Katrina Recovery Advisory *Reconstruction Guidance Using Hurricane Katrina Surge Inundation and ABFE Maps*).

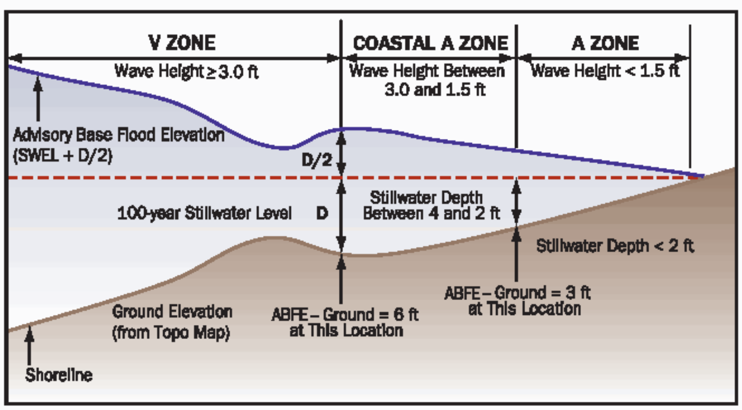


***Figure 9.** Cross-section showing 1 percent annual chance stillwater elevation, stillwater depth and ABFE, and inland limits of V Zone and Coastal A Zone.*

Communities, designers, and owners can obtain the information necessary to make a post-Katrina Coastal A Zone determination by observing the site and its surroundings, knowing site ground elevations, and using 1 percent annual chance stillwater elevations from the Advisory Base Flood Elevation (ABFE) guidance (see Table 2). Figure 10 shows how site and surrounding conditions would influence a Coastal A Zone determination.

Table 2. Updated 1 Percent Annual Chance (100-Year) Stillwater Elevations for Use in Calculating ABFEs (see Figure 9)

County	Updated 100-year Stillwater Elevations (SWEL), (ft NGVD*)	
	Gulf of Mexico Shoreline	Back Bay Shorelines
Jackson	14	12
Harrison	18	16
Hancock	20	18

*National Geodetic Vertical Datum

Figure 10. Although the site on the left is mapped Zone AE, proximity to the Gulf of Mexico shoreline and limited obstructions to waves indicate the site could be classified as a Coastal A Zone. The site on the right is over 4,000 feet from the Gulf shoreline and over 1,000 feet from the bayou, mapped as Zone AE, and has a base flood stillwater level sufficient to support >1.5-foot wave heights -- but obstructions to waves (e.g., trees and other buildings between the site and the shoreline), and distance from the sources of flooding would indicate the area is not a Coastal A Zone.

The ABC's of Returning to Flooded Buildings

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Hurricane Katrina produced widespread flooding from both storm surge and levee breaches. The combination of water intrusion and delayed re-entry due to evacuation requirements and power interruption has created a situation that demands careful planning by individuals returning to flood damaged buildings. The following tips are designed to assist impacted individuals when they are able to reach their flooded property. Additional information can be found in the Hurricane Katrina Recovery Advisory, *Initial Restoration for Flooded Buildings*.

Anticipate what you will need

- Personal protective equipment including safety shoes or boots (rubber boots may be best if you are not sure if the water has been pumped out), work gloves, eye protection, rubber gloves for cleaning or when using sanitizing chemicals, a hard hat, and respiratory protection in case there is mold or bacteria contamination (respirators with HEPA cartridges or dust masks with a rating of N-95 or higher should be used). These can be obtained from hardware stores or home improvement stores. If materials containing asbestos are suspected, it will be necessary to use a respirator with a HEPA cartridge in accordance with Federal requirements.
- Tools for entry and cleaning such as a pry bar, shovel, and a flashlight with extra batteries (Figure 1)
- Camera or video recorder for recording conditions for use in insurance claims
- Hand and face cleaning supplies such as alcohol swabs or hand sanitizer gel
- Cleaning supplies for salvagable materials including potable water, chemical cleaners/sanitizers, sponges, buckets, and wiping rags
- Packing supplies to protect fragile salvaged items during transport
- First aid kit
- Pen and paper, tape, scissors, and small plastic storage bags for writing down serial numbers and saving samples of discarded materials to support insurance claims

Figure 1. Tools for entry and cleaning

Be realistic about your limitations

- Even initial assessment and salvage can be hot, heavy work.
- If at all possible, work with another person while in the house. Unforeseen hazards can exist, so having help nearby is prudent.
- Avoid entry, even with personal protective equipment, if you have serious pre-existing health issues:
  - Asthma/allergies
  - Compromised immune system
  - Heart problems
  - Open cuts or wounds
- Get help moving large items such as furniture and appliances.
- Do not underestimate the impact of psychological shock and physical effort:
  - Identify someone in advance who you can talk to about your situation and feelings
  - See the resource section for some potential contacts

Check the situation for hazards

- Downed power lines
- Gas leaks
- Evidence of structural damage such as sagging ceilings, large wall or floor cracks, walls out of plumb, etc.
- Unstable materials
  - Furniture and even vehicles can be stacked in hazardous positions (Figure 2)
- Chemical spills
  - Paints, solvents, lawn fertilizers, pesticides
- Vermin such as snakes, rats, fire ants, bee colonies, etc.
- Other hazards
  - Rotting food
  - Dead animals

Figure 2. Furniture stacked by flood waters creates a safety hazard.

Document conditions

- Photos or videos are best
  - Shoot multiple pictures of each room from different corners
  - Make sure the photos will be clear before changing the conditions
  - Use a camera with a time/date stamp for photos if possible
- Make written notes of the dates that you were at the building
- Save samples of high-quality contents such as carpets to support insurance claims

Extract the salvageable items

- Focus on high value items that were not water impacted and items that have special significance. If an entire item cannot be saved, consider parts that could be saved. For example, if a family heirloom such as an antique chest cannot be saved, consider saving the non-porous handles or hinges for use on a replacement piece.
- Porous items that were not water logged or moldy should be the second priority.
- Non-porous items such as glassware, silverware, and plastic furniture that need to be cleaned should be separated. (Note: Contaminated items should be cleaned on site if possible. Transporting wet/contaminated items presents the risk of cross contamination of the vehicle and location where the item is moved.)
- Be aware of termites. If a termite infestation is found, consult a professional exterminator. When discarding or salvaging wood, paper, and other cellulose, protect your property and keep Formosan subterranean termites from spreading. For additional information, refer to the Louisiana Ag Center. *(http://www.louisianafloods.org/en/family_home/hazards_and_threats/recovery_assistance/insect_pest_management/Keeping+Formosan+Termites+from+Spreading+after+Hurricanes.htm)*

Facilitate restoration

- Do what you can to salvage the contents on the property.
- See American Red Cross, *Repairing Your Flooded Home*, *http://www.redcross.org/services/disaster/0,1082,0_570_,00.html*

Get help

- The following resources may be useful in providing technical support during your recovery from a flooding event:
  - American Red Cross (*http://www.redcross.org*)
  - FEMA (*http://www.fema.gov*)
  - Association of Specialists in Cleaning & Restoration (*http://www.ascr.org*)
  - Louisiana State University AgCenter - Cooperative Extension Service (*http://www.LouisianaFloods.org*)
  - National Association of Home Builders (*http://www.nahb.org/category.aspx?sectionID=843*)
  - National Association of the Remodeling Industry (*http://www.nari.org*)
- The following resources may be useful in providing financial and/or psychological support during your recovery from a flooding event:
  - American Red Cross (*http://www.redcross.org*)
  - Salvation Army (*http://www.salvationarmyusa.org/usn/www_usn.nsf*)
  - FEMA (*http://www.fema.gov*)
  - Small Business Administration (*http://www.sba.gov*)
  - State/local health departments - such as the North Carolina Department of Health and Human Services (*http://www.dhhs.state.nc.us/docs/hurricaneoccupant.htm*)

Attachment of Brick Veneer in High-Wind Regions

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend practices for installing brick veneer that will enhance wind resistance in high-wind areas.

Key Issues

- Brick veneer is frequently blown off walls of residential and commercial buildings (Figure 1). When brick veneer fails, wind-driven water can enter and damage buildings, and building occupants can be vulnerable to injury from windborne debris (particularly if walls are sheathed with plastic foam insulation or wood fiberboard in lieu of wood panels). Pedestrians in the vicinity of damaged walls can also be vulnerable to injury from falling veneer (Figure 2).
- Common failure modes include tie (anchor) fastener pull-out (Figure 3), failure of masons to embed ties into the mortar (Figure 4), poor bonding between ties and mortar and mortar of poor quality (Figure 5), and tie corrosion (Figure 6).
- Ties are often installed before brick laying begins. When this is done, ties are often improperly placed above or below the mortar joints. When misaligned, the ties must be angled up or down in order for the ties to be embedded into the mortar joints (Figure 7). Misalignment not only reduces embedment depth but also reduces the effectiveness of the ties because wind forces do not act parallel to the ties themselves.
- Corrugated ties typically used in residential veneer construction provide little resistance to compressive loads. Use of compression struts would likely be beneficial, but off-the-shelf devices do not currently exist. Two-piece adjustable ties (Figure 8) provide significantly greater compressive strength than corrugated ties.

Figure 1. Failed brick veneer. Plastic foam wall sheathing was installed over the wood studs (plywood was temporarily installed after the brick failure).

Figure 2. The upper portion of the brick veneer at this apartment building collapsed. Pedestrian and vehicular traffic in the vicinity of the damaged wall were vulnerable to injury and damage if remaining portions of the wall were to collapse during subsequent storms.

Figure 3. This tie remained embedded in the mortar joint while the smooth-shank nail pulled from the stud.

- Many buildings that exhibited damaged veneer were not in compliance with current building codes. Building code requirements for brick veneer have changed over the years. Model codes prior to 1995 permitted brick veneer in any location, with no wind speed restrictions. Wall area per tie in some model codes was greater than the current maximum. The current masonry code referenced in model building codes, Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402 (ACI 530) addresses brick veneer in two manners: rational design and prescriptive requirements. Essentially all brick veneer in residential and low-rise construction follows the prescriptive requirements. The first edition of American Concrete Institute's (ACI's) 530 limited the use of prescriptive design to areas with a basic wind speed of 110 mph or less. The 2005 edition of ACI 530 extended the prescriptive requirements to include a basic wind speed of 130 mph, with lower area per tie limits. In locations with a basic wind speed above 130 mph, the rational design approach must be used. Compliance with ACI 530-05 should reduce wind damage.
- The following Brick Industry Association (BIA) Technical Notes provide guidance on brick veneer: Technical Notes 28 – Anchored Brick Veneer, Wood Frame Construction, Technical Notes 28B – Brick Veneer/Steel Stud Walls, and Technical Notes 44B – Wall Ties (available online at www.bia.org). These Technical Notes provide attachment recommendations, but the recommendations are not specific for high-wind regions and are, therefore, inadequate.

Construction Guidance

The brick veneer wall system is complex in its behavior. There are limited test data on which to draw. The following guidance is based on professional judgment, wind loads specified in ASCE 7-02 "Design Loads for Buildings and Other Structures," fastener strengths specified in the American Forest and Paper Association's (AF&PA's) National Design Specification for Wood Construction, and brick veneer standards contained in ACI 530-05. In addition to the general guidance given in BIA Technical Notes 28 and 28B, the following are recommended:

Note: In areas that are also susceptible to high seismic loads, brick veneer should be evaluated by an engineer to ensure it can resist seismic and wind design loads.

Stud Spacing: For new construction, space studs 16" on center, so that ties can be anchored at this spacing.

Figure 4. These four ties were never embedded into the mortar joint.

Figure 5. This tie was embedded in the mortar, but the bond was poor.

Figure 6. There were several ties in this portion of the wall, but they failed due to severe corrosion.

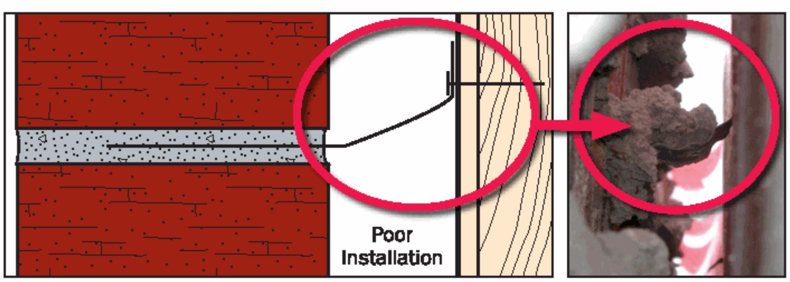


Figure 7. Misalignment of the tie reduces the embedment and promotes veneer failure.

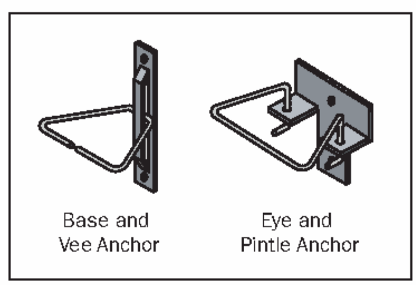


Figure 8. Examples of two-piece adjustable ties

Tie Fasteners: Ring-shank nails are recommended in lieu of smooth-shank nails. A minimum embedment of 2" is suggested.

Ties: For use with wood studs: two-piece adjustable ties are recommended. However, where corrugated steel ties are used, use 22-gauge minimum, 7/8" wide by 6" long, complying with ASTM A 366 with a zinc coating complying with ASTM A 153 Class B2. For ties for use with steel studs, see BIA "Technical Notes 28B – Brick Veneer/Steel Stud Walls." Stainless steel ties should be used in areas within 3,000 feet of the coast.

Tie Installation

- Install ties as the brick is laid so that the ties are properly aligned with the mortar joints.
- Install brick ties spaced per Table 1. Studs should be installed at 16" spacing. Veneer tie locations for 24" stud spacing are included for repairing damaged veneer on existing buildings with the wider stud spacing.
- Locate ties within 8" of door and window openings and within 12" of the top of veneer sections.
- Bend the ties at a 90-degree angle at the nail head in order to minimize tie flexing when the ties are loaded in tension or compression (Figure 9).
- Embed ties in joints so that mortar completely encapsulates the ties. Embed a minimum of 1.5" into the bed joint, with a minimum mortar cover of 5/8" to the outside face of the wall (Figure 10).

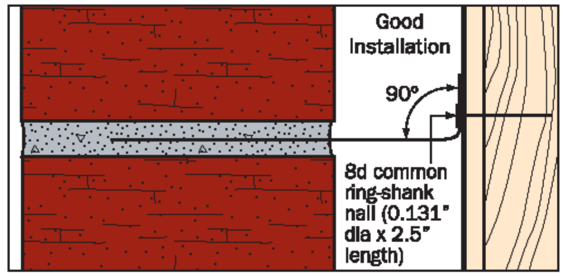


Figure 9. Bend ties at nail heads

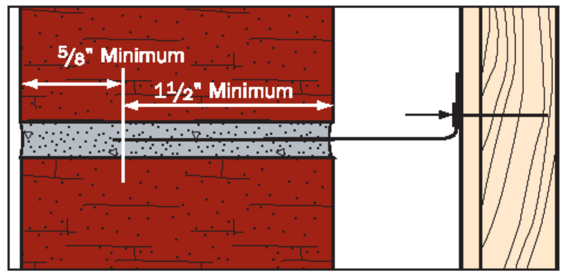


Figure 10. Tie embedment

Table 1. Brick Veneer Tie Spacing

Wind Speed (mph) (3-Second Peak Gust)	Wind Pressure (psf)	Maximum Vertical Spacing for Ties	
		16" stud spacing	24" stud spacing
90	17.8	18.0[a]	16.0[a]
100	22.0	18.0[a]	16.0[a]
110	26.6	18.0[a]	14.8
120	31.6	18.0[a]	NA[b]
130	37.1	15.9	NA[b]
140	43.0	13.7	NA[b]
150	49.4	10.2	NA[b]

Notes:

1. The tie spacing is based on wind loads derived from Method 1 of ASCE 7-02, for the corner area of buildings up to 30' high, located in Exposure B with an importance factor (I) of 1.0 and no topographic influence. For other heights, exposure, or importance factor, an engineered design is recommended.
2. Fastener strength is for wall framing with a Specific Gravity G=0.55 with moisture contents less than 19% and the following adjustment factors, Ct=0.8; and CD, CM, Ceg, and Ctn=1.0.
3. Nail embedment depth of 2" for 2.5" long 8d common (0.131" diameter) ring-shank fasteners

[a] Maximum spacing allowed by ACI 530-05

[b] 24" stud spacing exceeds the maximum horizontal tie spacing of ACI 530-05 prescribed for wind speeds over 100 mph

Attachment of Rooftop Equipment in High-Wind Regions

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend practices for designing and installing rooftop equipment that will enhance wind resistance in high-wind regions.

Note: For attachment of lightning protection systems, see Hurricane Katrina Recovery Advisory on Rooftop Attachment of Lightning Protection Systems in High-Wind Regions.

Key Issues

Rooftop equipment frequently becomes detached from rooftops during hurricanes. Water can enter the building at displaced equipment (see Figure 1); displaced equipment can puncture and tear roof coverings (thus allowing water to leak into the building). Equipment blown from a roof can damage buildings and injure people. Damaged equipment may no longer provide service to the building.

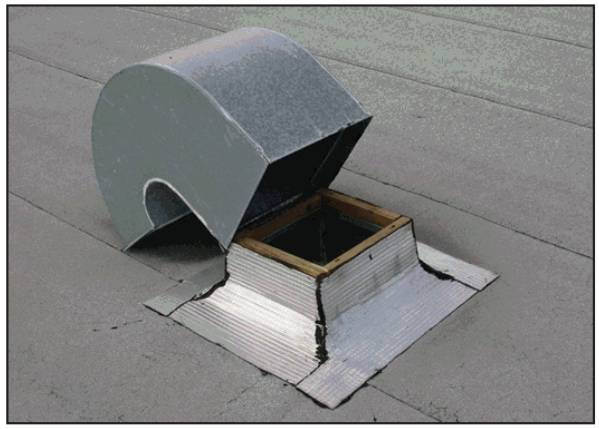


Figure 1. This gooseneck was attached with only two small screws. A substantial amount of water was able to enter the building during the hurricane.

Construction Guidance

Mechanical Penthouse: By placing equipment in mechanical penthouses rather than being exposed on the roof, equipment within penthouses is shielded from high-wind loads and windborne debris (see Figure 2). Therefore, use of mechanical penthouses designed and constructed in accordance with a current building code are recommended, particularly for critical and essential facilities.

Design Loads and Safety Factors: Loads on rooftop equipment should be determined in accordance with the 2005 edition of ASCE 7.

Note: For guidance on load calculations, see "Calculating Wind Loads and Anchorage Requirements for Rooftop Equipment," ASHRAE Journal, volume 48, number 3, March 2006.

A minimum safety factor of 3 is recommended for critical and essential facilities, and a minimum safety factor of 2 is recommended for other buildings. Loads and resistance should also be calculated for heavy pieces of equipment (see Figure 2).

Figure 2. This 30' x 10' x 8' 18,000-pound HVAC unit was attached to its curb with 16 straps (one screw per strap). Although the wind speeds were estimated to be only 85 to 95 miles per hour (3-second peak gust), it blew off the building.

Simplified Attachment Table: To anchor fans, small HVAC units, and relief air hoods, the following minimum attachment schedule is recommended (see Table 1) (note: the attachment of the curb to the roof deck also needs to be designed to resist the design loads):

Table 1. Number of #12 Screws for Base Case Attachment of Rooftop Equipment

Case No.	Curb Size and Equipment Type	Equipment Attachment	Fastener Factor for Each Side of Curb or Flange
1	12”x 12” Curb with Gooseneck Relief Air Hood	Hood Screwed to Curb	1.6
2	12”x 12” Gooseneck Relief Air Hood with Flange	Flange Screwed to 22 Gauge Steel Roof Deck	2.8
3	12”x 12” Gooseneck Relief Air Hood with Flange	Flange Screwed to 15/32” OSB Roof Deck	2.9
4	24”x 24” Curb with Gooseneck Relief Air Hood	Hood Screwed to Curb	4.6
5	24”x 24” Gooseneck Relief Air Hood with Flange	Flange Screwed to 22 Gauge Steel Roof Deck	8.1
6	24”x 24” Gooseneck Relief Air Hood with Flange	Flange Screwed to 15/32” OSB Roof Deck	8.2
7	24”x 24” Curb with Exhaust Fan	Fan Screwed to Curb	2.5
8	36”x 36” Curb with Exhaust Fan	Fan Screwed to Curb	3.3
9	5’-9”x 3’- 8” Curb with 2’- 8” high HVAC Unit	HVAC Unit Screwed to Curb	4.5*
10	5’-9”x 3’- 8” Curb with 2’- 8” high Relief Air Hood	Hood Screwed to Curb	35.6*

Notes to Table:

1. The loads are based on the 2005 edition of ASCE 7. The resistance includes equipment weight.

2. The Base Case of the tabulated numbers of #12 screws (or ¼ pan-head screws for flange-attachment) is a 90-mph basic wind speed, 1.15 importance factor, 30’ building height, Exposure C, using a safety factor of 3.

3. For other basic wind speeds, or for an importance factor of 1, multiply the tabulated number of #12 screws by $\left(\frac{V_D^2 \cdot I}{90^2 \cdot 1.15}\right)$ to determine the required number of #12 screws or (¼ pan-head screws) required for the desired basic wind speed, V_D (mph) and importance factor, I.

4. For other roof heights up to 200’, multiply the tabulated number of #12 screws by (1.00 + 0.003 [h - 30]) to determine the required number of #12 screws or ¼ pan-head screws for buildings between 30’ and 200’.

Example A: 24” x 24” exhaust fan screwed to curb (table row 7), Base Case conditions (see Note 1): 2.5 screws per side; therefore, round up and specify 3 screws per side.

Example B: 24” x 24” exhaust fan screwed to curb (table row 7), Base Case conditions, except 120 mph and importance factor of 1: $120^2 \times 1 \div 90^2 \times 1.15 = 1.55 \times 2.5$ screws per side = 3.86 screws per side; therefore, round up and specify 4 screws per side.

Example C: 24” x 24” exhaust fan screwed to curb (table row 7), Base Case conditions, except 150’ roof height: 1.00 + 0.003 (150’ - 30’) = 1.00 + 0.36 = 1.36 x 2.5 screws per side = 3.4 screws per side; therefore, round down and specify 3 screws per side.

* This factor only applies to the long sides. At the short sides, use the fastener spacing used at the long sides.

Fan Cowling Attachment: Fans are frequently blown off their curbs because they are poorly attached. When fans are well attached, the cowlings frequently blow off (see Figure 3). Unless the fan manufacturer specifically engineered the cowling attachment to resist the design wind load, cable tie-downs (see Figure 4) are recommended to avoid cowling blow-off. For fan cowlings less than 4 feet in diameter, 1/8-inch diameter stainless steel cables are recommended.

Figure 3. Cowlings blew off two of the three fans shown in this photo. Cowlings can tear roof membranes and break glazing.

Figure 4. To overcome blow-off of the fan cowling, this cowling was attached to the curb with cables.

For larger cowlings, use 3/16-inch diameter cables. When the basic wind speed is 120 mph or less, specify two cables. Where the basic wind speed is greater than 120 mph, specify four cables. To minimize leakage potential at the anchor point, it is recommended that the cables be adequately anchored to the equipment curb (rather than anchored to the roof deck). The attachment of the curb itself also needs to be designed and specified.

Ductwork: To avoid wind and windborne debris damage to rooftop ductwork, it is recommended that ductwork not be installed on the roof (see Figure 5). If ductwork is installed on the roof, it is recommended that the gauge of the ducts and their attachment be sufficient to resist the design wind loads.

Figure 5. Two large openings remained (circled area and inset to the right) after the ductwork on this roof blew away.

Condensers: In lieu of placing rooftop-mounted condensers on wood sleepers resting on the roof (see Figure 6), it is recommended that condensers be anchored to equipment stands. (Note: the attachment of the stand to the roof deck also needs to be designed to resist the design loads.) In addition to anchoring the base of the condenser to the stand, two metal straps with two side-by-side #14 screws or bolts at each strap end are recommended (see Figure 7).

Figure 6. Sleeper-mounted condensers displaced by high winds.

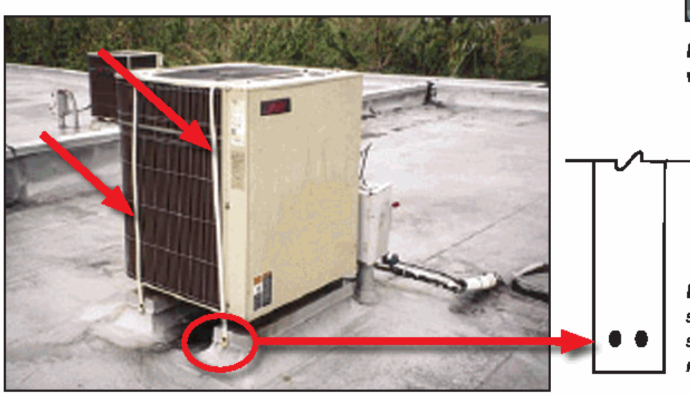


Figure 7. This condenser had supplemental securement straps (see arrows). Two side-by-side screws with the proper edge and end distances are recommended at the end of the strap.

Vibration Isolators: When equipment is mounted on vibration isolators, an isolator that has sufficient resistance to meet the design uplift loads should be specified and installed, or an alternative means to accommodate uplift resistance should be provided (see Figure 8).

Access Panel Attachment: Access panels frequently blow off. To minimize blow-off of access panels, job-site modification will typically be necessary (for example, the attachment of hasps and locking devices such as a carabiner). The modification details will need to be tailored for the equipment, which may necessitate detail design after the equipment has been delivered to the job site. Modification details should be approved by the equipment manufacturer.

Figure 8. The equipment on this stand was resting on vibration isolators that provided lateral resistance but no uplift resistance (above). A damaged vibration isolator is shown in the inset (left).

Figure 9. Several of the equipment screen panels were blown away. Loose panels can break glazing and puncture roof membranes.

Equipment Screens: Equipment screens around rooftop equipment are frequently blown away (see Figure 9). Equipment screens should be designed to resist the wind loads derived from ASCE 7.

Note: The extent that screens may reduce or increase wind loads on equipment is unknown. Therefore, the equipment behind screens should be designed to resist the loads previously noted.

Other resources: Three publications pertaining to seismic restraint of equipment provide general information on fasteners and edge distances:

- Installing Seismic Restraints for Mechanical Equipment (FEMA 412)
- Installing Seismic Restraints for Electrical Equipment (FEMA 413)
- Installing Seismic Restraints for Duct and Pipe (FEMA 414)

Rooftop Attachment of Lightning Protection Systems in High-Wind Regions

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend practices for installing lightning protection systems (LPS) that will enhance wind resistance in high-wind regions.

Key Issues

- Lightning protection systems frequently become disconnected from rooftops during hurricanes. Displaced LPS components can puncture and tear roof coverings, thus allowing water to leak into buildings (see Figures 1 and 2). Also, when displaced, the LPS is no longer capable of providing lightning protection in the vicinity of the displaced conductors ("cables") and air terminals ("lightning rods").
- Lightning protection standards such as NFPA 780 and UL 96A currently provide inadequate guidance for attachment of LPS to rooftops in high-wind regions.
- Some LPS manufacturers provide guidance for attachment, while other manufacturers refer to the roofing material manufacturer for attachment guidance. Some roofing material manufacturers provide guidance for attachment, while other manufacturers refer to the LPS manufacturer for attachment guidance. In most cases, the attachment guidance provided by LPS and roofing material manufacturers is inadequate for hurricane-prone regions.
- LPS conductors are typically attached to the roof at 3 foot intervals. Because the conductors are flexible, when they are exposed to high winds, the conductors exert dynamic loads on the conductor connectors ("clips"). Guidance for calculating the dynamic loads does not exist. The attachment guidance that follows is therefore based on professional judgment.
- LPS conductor connectors typically have prongs to anchor the conductor. When the connector is well-attached to the roof surface, during high winds the conductor frequently bends back the malleable connector prongs (see Figure 3). Conductor connectors have also debonded from roof surfaces during high winds. Based on observations after Hurricane Katrina and other hurricanes, it is apparent that pronged conductor connectors do not provide reliable attachment.

Figure 1. This displaced air terminal punctured the membrane in several locations.

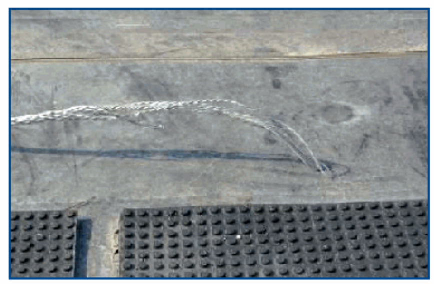


Figure 2. View of an abraded end of a conductor that became disconnected.

Figure 3. During high winds, the conductor deformed the prongs and pulled away from this conductor connector.

Construction Guidance

Parapet attachment: When the parapet is 12-inch high or greater, it is recommended that the air terminal base plates and conductor connectors be mechanically attached with #12 screws that have 1.25 inch minimum embedment into the inside face of the parapet nailer and properly sealed for watertight protection. In lieu of conductor connectors that have prongs, it is recommended that mechanically attached looped connectors be installed (see Figure 4).

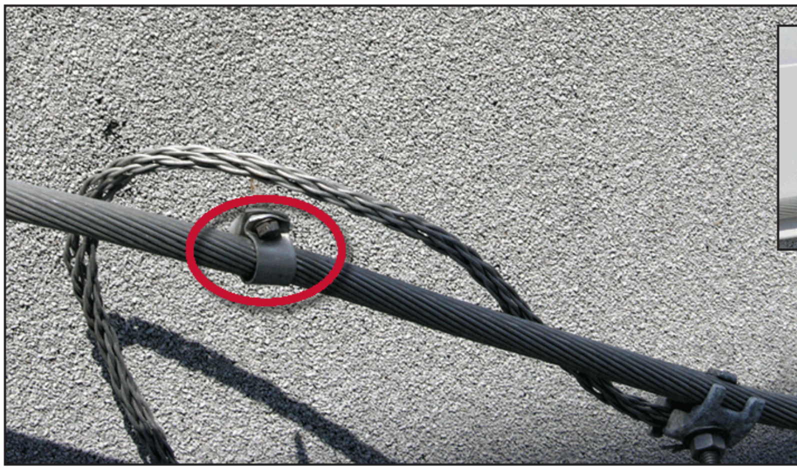


Figure 4. This conductor was attached to the coping with a looped connector (above). However, a gasket was not installed between the connector and the coping. Also, because the connector screws were too short to engage the wood nailer, the screws pulled out and the conductor was displaced in some areas (figure at left).

Attachment to built-up, modified bitumen and single-ply membranes: For built-up and modified bitumen membranes, attach air terminal base plates with asphalt roof cement. For single-ply membranes, attach air terminal base plates with pourable sealer (type recommended by the membrane manufacturer).

In lieu of attaching conductors with conductor connectors, it is recommended that conductors be attached with strips of membrane installed by the roofing contractor. For built-up and modified bitumen membranes, use strips of modified bitumen cap sheet, approximately 9-inch wide minimum. If strips are torch-applied, avoid overheating the conductors. For single-ply membranes, use self-adhering flashing strips, approximately 9" wide minimum. Start the strips approximately 3 inches from either side of the air terminal base plates. Place strips that are approximately 3' long, followed by a gap of approximately 3 inches (see Figure 5).

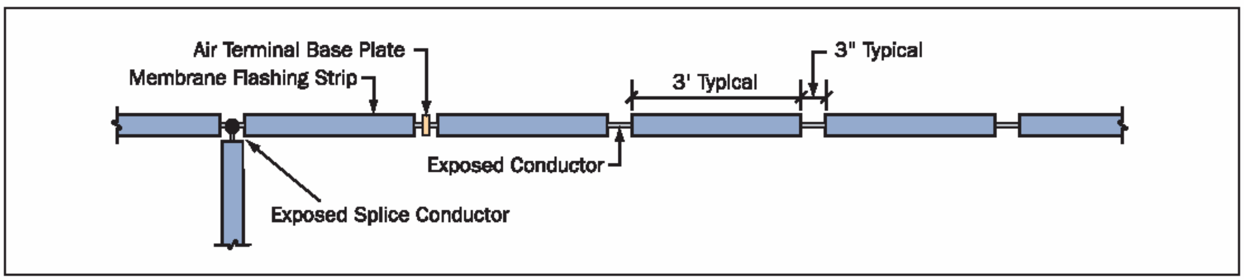


Figure 5. Plan showing conductor attachment.

Note: As an option to securing the conductors with stripping plies, conductor connectors that do not rely on prongs (such as the one shown in Figure 6) could be used. However, because the magnitude of the dynamic loads induced by the conductor are unknown and because of the lack of data on the resistance provided by adhesively-attached connectors, attachment with stripping plies is the preferred option because the stripping plies shield the conductor from the wind.

If adhesive-applied conductor connectors are used, it is recommended that they be spaced more closely than the 3 foot spacing required by NFPA 780 and UL 96A. Depending upon wind loads, spacings in the range of 6 to 12 inches on center may be needed in the corner regions of the roof, with spacings in the range of 12 to 18 inches on center at roof perimeters (see ASCE 7 for size of corner regions).

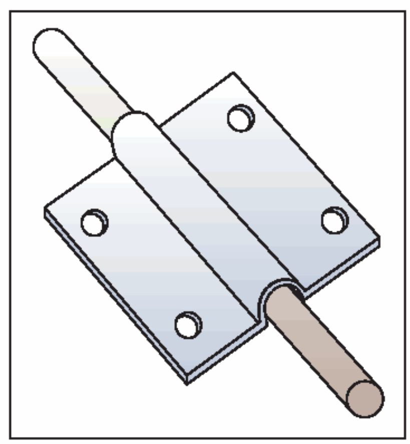


Figure 6. Adhesively-attached conductor connector that does not use prongs.

Figure 7. A failed prong-type splice connector. If conductors become detached from the roof, they are likely to pull from pronged splice connectors.

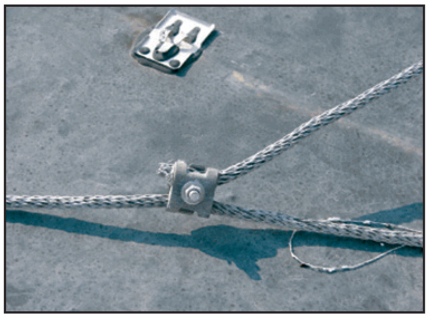


Figure 8. To avoid free ends of connectors being whipped around by wind, bolted splice connectors are recommended because they provide a more reliable connection.

Mechanically Attached Single-Ply Membranes: It is recommended that conductors be placed parallel and within 8 inches of membrane fastener rows. Where the conductor falls between or is perpendicular to membrane fastener rows, install an additional row of membrane fasteners where the conductor will be located and install a membrane cover-strip over the membrane fasteners. Place the conductor over the cover-strip and secure the conductor as recommended above.

Note: By following the above recommendations, additional rows of membrane fasteners beyond those needed to attach the membrane may be needed to accommodate layout of the conductors. The additional membrane fasteners and cover-strip should be coordinated with and installed by the roofing contractor.

Standing Seam Metal Roofs: It is recommended that pre-manufactured mechanically attached clips that are commonly used to attach various items to roof panels be used. After anchoring the clips to the panel ribs, the air terminal base plates and conductor connectors are anchored to the panel clips. In lieu of conductor connectors that have prongs, it is recommended that mechanically attached looped connectors be installed.

Conductor Splice Connectors: In lieu of pronged splice connectors (see Figure 7), bolted splice connectors are recommended (see Figure 8). It is recommended that strips of flashing membrane (as recommended above) be placed approximately 3 inches from either side of the splice connector to minimize conductor movement and avoid the possibility of the conductors from becoming disconnected. To allow for observation during maintenance inspections, do not cover the connectors.

Periodic Inspection and Maintenance: Each spring, it is recommended that the lightning protection system be inspected to verify that connectors are still attached to the roof surface and still engage the conductors. Also check to ensure that splice connectors are still secure. Inspections are also recommended after high wind events.

Strengthening Attachment of Existing Systems: On critically important buildings that use adhesively-attached connectors and pronged splice connectors, it is recommended that attachment modifications based on the Construction Guidance be made in order to provide more reliable securement.

Designing for Flood Levels Above the BFE

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend design and construction practices that reduce the likelihood of flood damage in the event that flood levels exceed the Base Flood Elevation (BFE).

Key Issues

- BFEs are established at a flood level, including wave effects, that has a 1-percent chance of being equaled or exceeded in any given year, also known as the 100-year flood or base flood. Floods more severe and less frequent than the 1-percent flood can occur in any year.
- Flood levels during some recent storms have exceeded BFEs depicted on the Flood Insurance Rate Maps (FIRMs), sometimes by several feet (see Figure 1). In many communities, flooding extended inland, well beyond the 100-year floodplain (Special Flood Hazard Area (SFHA)) shown on the FIRM (see Figure 2).
- Flood damage increases rapidly once the elevation of the flood extends above the lowest floor of a building, especially in areas subject to coastal waves. In a V Zone, a coastal flood with a wave crest 3 to 4 feet above the bottom of the floor beam (approximately 1 to 2 feet above the walking surface of the floor) will be sufficient to substantially damage or destroy most light-framed residential and commercial construction (see Figure 4).
- There are design and construction practices that can eliminate or minimize damage to buildings when flood levels exceed the BFE. The most common approach is to add freeboard to the design (i.e., to elevate the building higher than required by the FIRM).

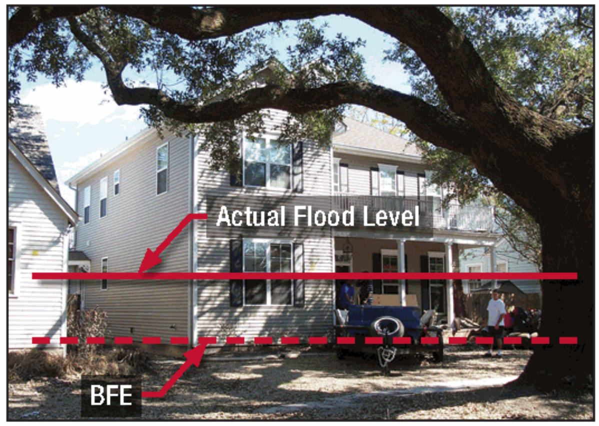
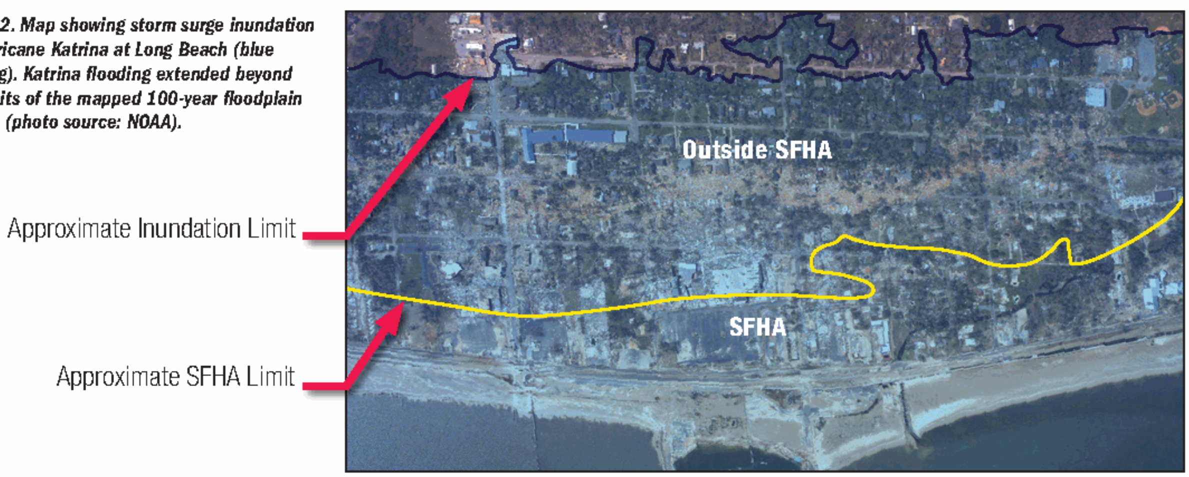


Figure 1. Levee failures and overtopping during Hurricanes Katrina and Rita (2005) resulted in flood levels (solid red line) several feet above the BFE (dashed red line) over large portions of the greater New Orleans area.

Figure 2. Map showing storm surge inundation by Hurricane Katrina at Long Beach (blue shading). Katrina flooding extended beyond the limits of the mapped 100-year floodplain (SFHA) (photo source: NOAA).



- There are other benefits of designing for flood levels above the BFE: reduced building damage and maintenance: longer building life; reduced flood insurance premiums; reduced displacement and dislocation of building occupants after floods (and need for temporary shelter and assistance); reduced job loss; and increased retention of tax base.

Flood Insurance Rate Maps and Flood Risk

Hurricanes Ivan (2004) and Katrina (2005) have demonstrated that constructing a building to the minimum National Flood Insurance Program (NFIP) requirements – or constructing a building outside the SFHA shown on the FIRMs – is no guarantee that the building will not be damaged by flooding. This is due to two factors: 1) flooding more severe than the base flood occurs, and 2) some FIRMs, particularly older FIRMs, may no longer depict the true base flood level and SFHA boundary.

The black line in Figure 3 shows the probability that the level of the flood will exceed the 100-year flood level during time periods between 1 year and 100 years; there is an 18-percent chance that the 100-year flood level will be exceeded in 20 years, a 39-percent chance it will be exceeded in 50 years, and a 51-percent chance it will be exceeded in 70 years. As the time period increases, the likelihood that the 100-year flood will be exceeded also increases.

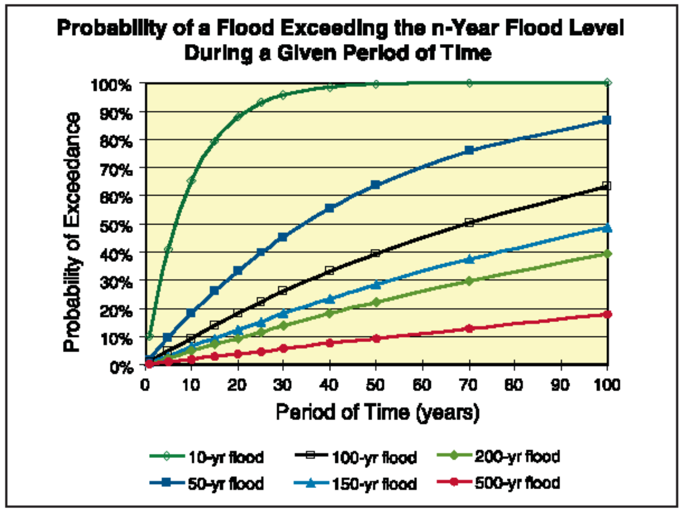


Figure 3. Probability that a flood will exceed the n-year flood level over a given period of time (Note: this analysis assumes no shoreline erosion, and no increase in sea level or storm frequency/severity over time).

Figure 3 also shows the probabilities that floods of other severities will be exceeded. For example, taking a 30-year time period where there is a 26-percent chance that the 100-year flood level will be exceeded, there is an 18-percent chance that the 150-year flood will be exceeded, a 14-percent chance that the 200-year flood will be exceeded, and a 6-percent chance that a flood more severe than the 500-year flood will occur.

FIRMs depict the limits of flooding, flood elevations, and flood hazard zones during the base flood. As seen in Figure 3, buildings elevated only to the BFEs shown on the FIRMs have a significant chance of being flooded over a period of decades. Users should also be aware that the flood limits, flood elevations, and flood hazard zones shown on the FIRM reflect ground elevations, development, and flood conditions at the time of the Flood Insurance Study (FIS).[1]

Consequences of Flood Levels Exceeding the BFE

Buildings are designed to resist most environmental hazards (e.g., wind, seismic, snow, etc.), but are generally designed to avoid flooding by elevating the building above the anticipated flood elevation. The difference in design approach is a result of the sudden onset of damage when a flood exceeds the lowest floor elevation of a building. Unlike wind – where exposure to a wind speed slightly above the design speed does not generally lead to severe building damage – occurrence of a flood level even a few inches above the lowest floor elevation generally leads to significant flood damage, therefore, the recommendation to add freeboard.

This is especially true in cases where waves accompany coastal flooding. Figure 4 illustrates the expected flood damage (expressed as a percent of a building's pre-damage market value) versus flood depth above the bottom of the lowest

FIRMs do not account for the following:

- Shoreline erosion, wetland loss, subsidence, and relative sea level rise
- Upland development or topographic changes
- Degradation or settlement of levees and floodwalls
- Changes in storm climatology (frequency and severity)
- The effects of multiple storm events

Thus, what was once an accurate depiction of the 100-year floodplain and flood elevations may no longer be so.

[1] Sections 7.8.1.3 and 7.9 of FEMA's *Coastal Construction Manual* (FEMA 55, 2000 ed.) provide guidance on evaluating a FIRM to determine whether it still provides an accurate depiction of base flood conditions, or whether it is obsolete.

horizontal structural member supporting the lowest floor (e.g., bottom of the floor beam), for a V Zone building and for a riverine A Zone building.[2]

One striking difference between the two curves is that a V Zone flood depth (wave crest elevation) 3 to 4 feet above the bottom of the floor beam (or approximately 1 to 2 feet above the top of the floor) is sufficient to cause substantial (>50 percent) damage to a building. In contrast, A Zone riverine flooding (without waves and high velocity) can submerge a structure without causing substantial damage. This difference in building damage is a direct result of the energy contained in coastal waves striking buildings – something obvious to those who saw the wave damage that Hurricane Katrina caused in Mississippi and Louisiana (see Figure 5).

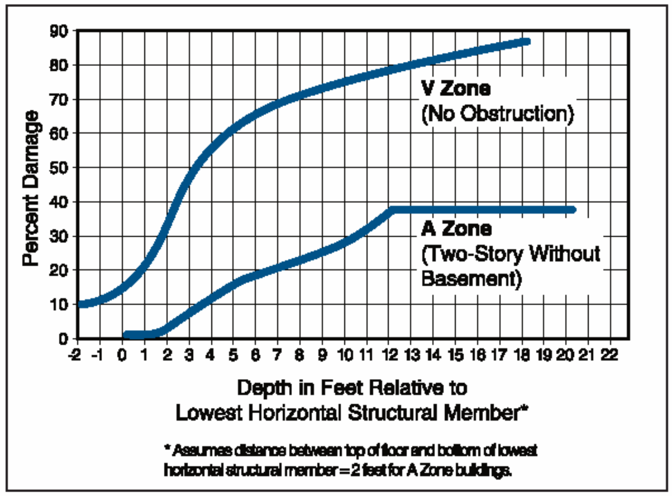


Figure 4. Flood depth versus building damage curves for V Zones and riverine A Zones (Source: FEMA 55, Coastal Construction Manual).

Figure 5. Hurricane Katrina damage to buildings in coastal Mississippi. The upper left, upper right, and lower left photos are of buildings that were close to the Gulf shoreline and subjected to storm surge above the floor and large waves striking the building walls. The lower right photo is of a building almost 1 mile from the Gulf, and subjected to storm surge flooding only.

[2] Since the normal floor reference for A Zone buildings is the top of the lowest floor, the A Zone curve was shifted for comparison with the V Zone curve.

In cases where buildings are situated behind levees, a levee failure can result in rapid flooding of the area. Buildings near a levee breach may be exposed to high velocity flows, and damages to those buildings will likely be characterized by the V Zone damage curve in Figure 4. Damages to buildings farther away from the breach will be a result of inundation by floodwaters, and will likely resemble the A Zone curve in Figure 4.

General Recommendations

The goal of this Advisory is to provide methods to minimize damage to buildings in the event that coastal flood levels rise above the BFE. Achieving this goal will require adherence to one or more of the following general recommendations:

- **In all areas where flooding is a concern**, inside and outside the SFHA, **elevate the lowest floor so that the bottom of the lowest horizontal structural member is at or above the Design Flood Elevation** (DFE). Do not place the top of the lowest floor at the DFE, since this guarantees flood damage to wood floor systems, wood floors, floor coverings, and lower walls during the design flood, and may lead to mold/contamination damage (see Figure 6).
- **In flood Zones V and A**, use a DFE that results in **freeboard** (elevate the lowest floor above the BFE) (see Figure 7).
- In flood Zones V and A, **calculate design loads and conditions** (hydrostatic loads, hydrodynamic loads, wave loads, floating debris loads, and erosion and scour) under the assumption that the flood level will exceed the BFE.
- In an **A Zone subject to waves and erosion** (i.e., a Coastal A Zone), use a pile or column foundation (see Figure 7).
- Outside the SFHA (in **flood Zones B, C, and X**), **adopt flood-resistant design and construction practices** if historical evidence or a review of the available flood data shows the building could be damaged by a flood more severe than the base flood (see Figure 8).
- **Design and construct buildings using the latest model building code, ASCE 7-05** *Minimum Design Loads for Buildings and Other Structures* and **ASCE 24-05** *Standard for Flood Resistant Design and Construction*.
- **Follow the recommendations in FEMA 499**, *Home Builder's Guide to Coastal Construction Technical Fact Sheets* Series (available at http://www.fema.gov/rebuild/mat/mat_fema499.shtm).
- **Use the pre-engineered foundations shown in FEMA 550**, *Recommended Residential Construction for the Gulf Coast: Building on Strong and Safe Foundations*).

Figure 6. Other concerns when flood levels rise above the lowest floor are mold and biological/chemical contamination. These may render an otherwise repairable building unrepairable, or will at least make the cleanup, restoration, and repairs much more expensive and time-consuming.

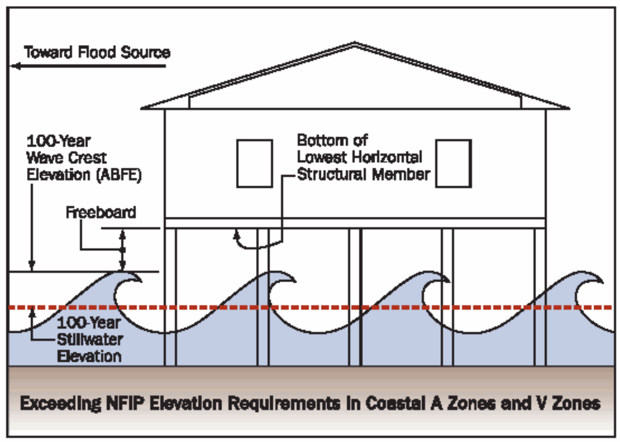


Figure 7. Recommended construction in Coastal A Zones and V Zones.

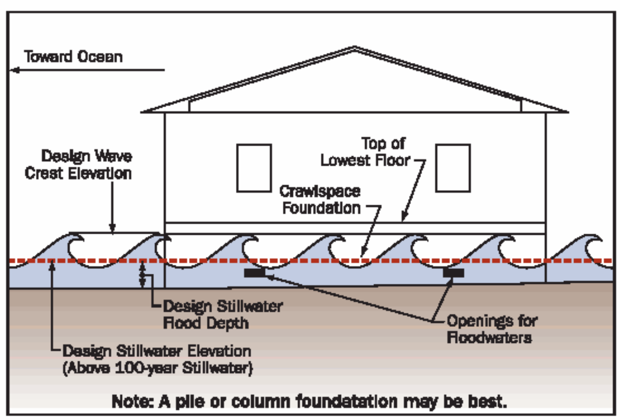


Figure 8. Recommended construction in Zones B, C, and X.

- Use **strong connections between the foundation and the elevated building** to prevent the building from floating or washing off the foundation, in the event that flood levels do rise above the lowest floor.
- Use **flood damage resistant building materials and methods** above the lowest floor. For example, consider using drainable, dryable interior wall assemblies (see Figure 9). This allows interior walls to be opened up and dried after a flood above the lowest floor, minimizing damage to the structure. For cavity and mass wall assemblies, the methods and materials in Figures 10 and 11 are recommended.

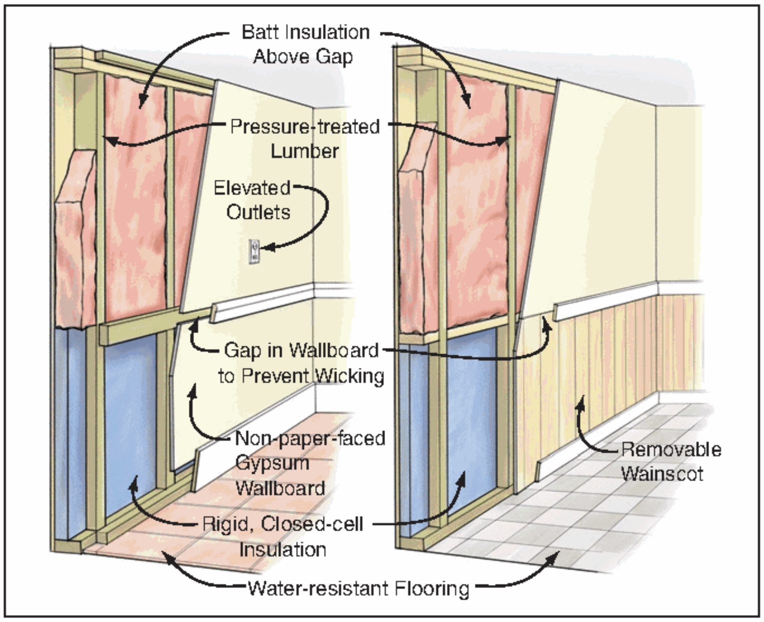


Figure 9. Recommended wet floodproofing techniques for interior wall construction. The following flood damage resistant materials and methods will prevent wicking and limit flood damage: 1) construct walls with horizontal gaps in wallboard; 2) use non-paper-faced gypsum wallboard below gap, painted with latex paint; 3) use rigid, closed-cell insulation in lower portion of walls; 4) use water-resistant flooring with waterproof adhesive; and 5) use pressure treated wood framing (Source: LSU AgCenter and Coastal Contractor Magazine).

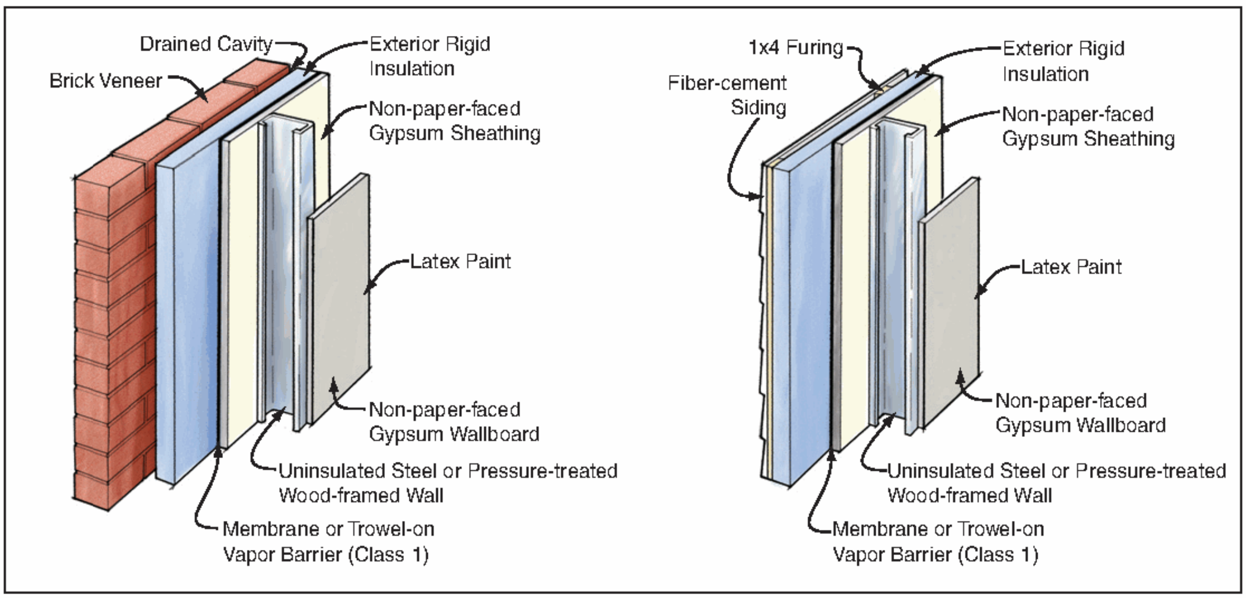


Figure 10. Recommended flood-resistant exterior cavity wall construction. The following materials and methods will limit flood damage to exterior cavity walls: 1) use brick veneer or fiber-cement siding, with non-paper-faced gypsum sheathing (vinyl siding is also flood-resistant but is less resistant to wind damage); 2) provide cavity for drainage; 3) use rigid, closed-cell insulation; 4) use steel or pressure treated wood studs and framing; and 5) use non-paper-faced gypsum wallboard painted with latex paint (Source: Coastal Contractor Magazine and Building Science Corporation).

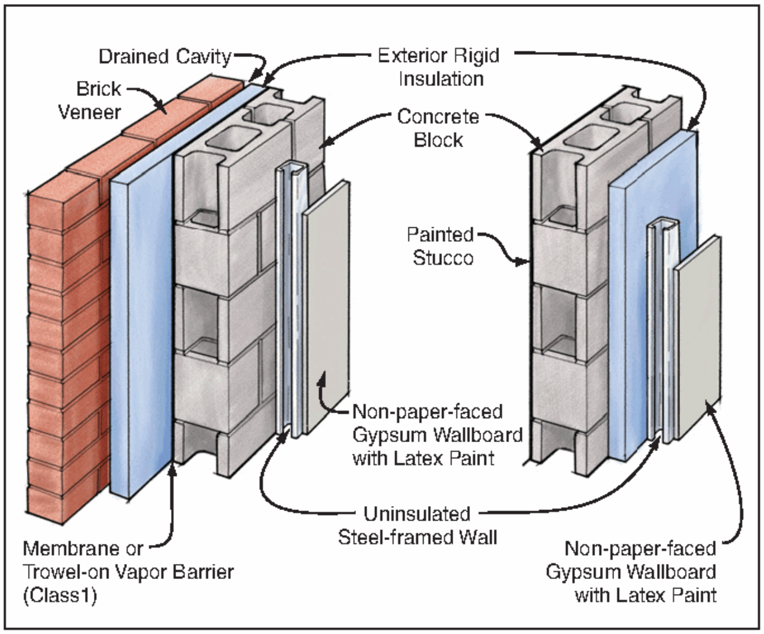


Figure 11. Recommended flood-resistant exterior mass wall construction. The following materials and methods will limit flood damage to exterior mass walls: 1) use concrete masonry with stucco or brick veneer (provide drainage cavity if brick veneer is used); 2) use rigid, closed-cell insulation; 3) use steel framing; and 4) use non-paper-faced gypsum wallboard painted with latex paint (Source: Coastal Contractor Magazine and Building Science Corporation).

- **New and replacement manufactured homes should be installed in accordance with the provisions of the 2005 edition of NEPA 225,** *Model Manufactured Home Installation Standard* (http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=225&cookie%5Ftest=1). The standard provides flood, wind, and seismic resistant installation procedures. It also calls for elevating A Zone manufactured homes with the bottom of the main chassis frame beam at or above the BFE, not with the top of the floor at the BFE.

How High Above the BFE Should a Building be Elevated?

Ultimately, the building elevation will depend on several factors, all of which must be considered before a final determination is made:

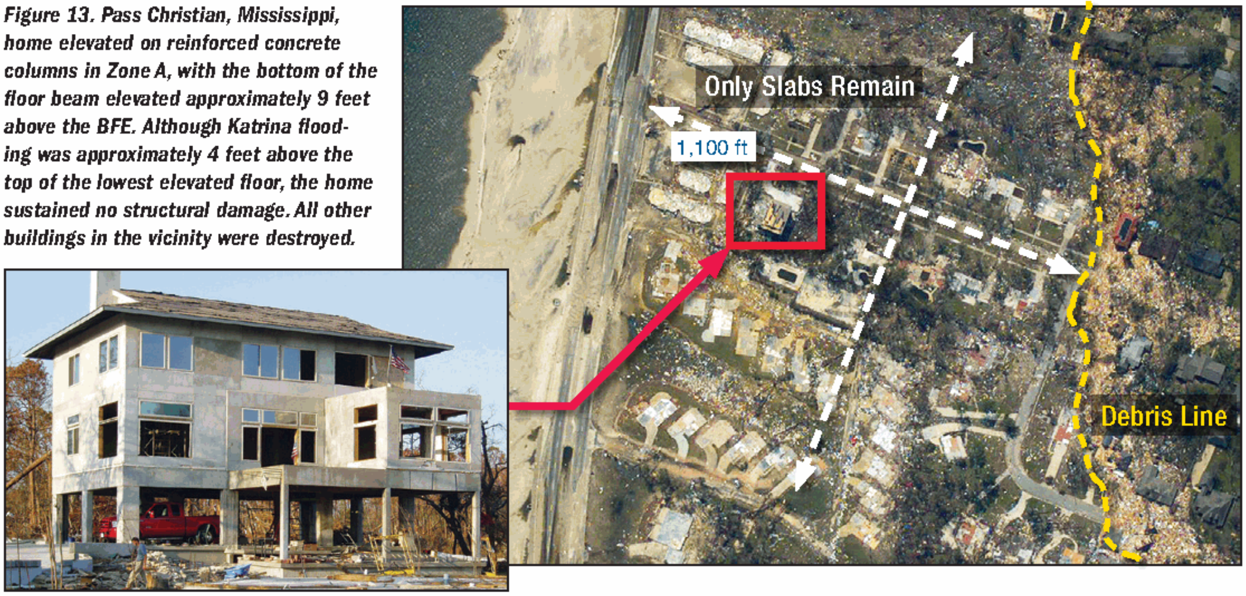
- **The accuracy of the BFE shown on the FIRM:** If the BFE is suspect, it is probably best to elevate several feet above the BFE; if the BFE is deemed accurate, it may only be necessary to elevate a couple of feet above the BFE.
- **Availability of Advisory Base Flood Elevations (ABFEs):** ABFEs have been produced for coastal areas following Hurricanes Ivan, Katrina, and Rita. These elevations are intended to be interim recommendations until new FISs can be completed. Some communities have adopted ABFEs, but not all (see the Hurricane Katrina Recovery Advisory posted at http://www.fema.gov/pdf/rebuild/mat/reconst_guidance.pdf).
- **Future conditions:** Since the FIRM reflects conditions at the time of the FIS, some owners or jurisdictions may wish to consider future conditions (such as sea level rise, wetland loss, shoreline erosion, increased storm frequency/intensity, and levee settlement/failure) when they decide how high to elevate.
- **State or local requirements:** The state or local jurisdiction may require a minimum freeboard through its floodplain management regulations.
- **Building code requirements:** The International Building Code (IBC) requires buildings be designed and constructed in accordance with ASCE 24 (*Standard for Flood Resistant Design and Construction*). ASCE 24 requires between 0 and 2 feet of freeboard, depending on the building importance and the edition of ASCE 24 referenced.[3]
- **Critical and essential facilities:** Given the importance of these facilities, some of which must remain operational during a hurricane, they should be elevated higher than most commercial and residential buildings.

[3] The 1998 edition of ASCE 24 is referenced by the 2003 edition of the IBC, and requires between 0 and 1 feet of freeboard. The 2005 edition of ASCE 24 is referenced by the 2006 edition of the IBC, and requires between 0 and 2 feet of freeboard.

- **Building owner tolerance for damage, displacement, and downtime:** Some building owners may wish to avoid building damage and disruption, and may choose to elevate far above the BFE (see Figures 12 and 13).

Figure 12. Ocean Springs, Mississippi, home elevated approximately 14 feet above the BFE. Katrina flooding was 4 feet below the elevated floor (photo taken after the storm surge had dropped several feet. Courtesy of Ocean Springs, Mississippi, fire chief).

Figure 13. Pass Christian, Mississippi, home elevated on reinforced concrete columns in Zone A, with the bottom of the floor beam elevated approximately 9 feet above the BFE. Although Katrina flooding was approximately 4 feet above the top of the lowest elevated floor, the home sustained no structural damage. All other buildings in the vicinity were destroyed.



The *Hurricane Katrina Summary Report on Building Performance* (FEMA 548) recommends that critical and essential facilities be elevated to the 500-year flood elevation or based on the requirements of ASCE 24-05, whichever is higher. This recommendation may also be appropriate for residential and commercial structures, as well.

The 500-year elevation can be approximated as 1.5 times the 500-year stillwater depth (500-year stillwater elevation minus the ground elevation) added to the ground elevation. This procedure is similar to the procedure used to calculate ABFEs, but with a different stillwater level.

If the 500-year stillwater elevation (feet North American Vertical Datum of 1988 [NAVD] or feet National Geodetic Vertical Datum of 1929 [NGVD]) is not available, a rule of thumb can be used to approximate it as 1.25 times the 100-year stillwater elevation (feet NAVD or feet NGVD).

Coastal A Zones

The Coastal A Zone is the area where wave heights between 1.5 and 3.0 feet are expected during the base flood. It is recommended that buildings in this area, with a few exceptions, be designed and constructed similar to V Zone buildings. See the Hurricane Katrina Recovery Advisory at http://www.fema.gov/pdf/rebuild/mat/coastal_a_zones.pdf for details.

Other Considerations

As previously stated, in addition to reduced building damage, there are other reasons to design for flood levels above the BFE:

- Reduced building maintenance and longer building life
- Reduced flood insurance premiums
- Reduced displacement and dislocation of building occupants after floods (and need for temporary shelter and assistance)
- Reduced job loss
- Increased retention of tax base

Until flooded, many homeowners and communities don't think about these benefits. However, one of the most persuasive (to homeowners) arguments for elevating homes above the BFE is the reduction in annual flood insurance premiums. In most cases, flood premiums can be cut in half by elevating a home 2 feet above the BFE, saving several hundred dollars per year in A Zones, and $2,000 or more per year in V Zones. In V Zones, savings continue to increase with added freeboard.

Flood Insurance Premium Reductions Can Be Significant

Example 1: V Zone building, supported on piles or piers, no below-BFE enclosure or obstruction. $250,000 building coverage, $100,000 contents coverage.		**Example 2:** A Zone building, slab or crawlspace foundation (no basement). $200,000 building coverage, $75,000 contents coverage.	
Floor Elevation above BFE	**Reduction in Annual Flood Premium***	**Floor Elevation above BFE**	**Reduction in Annual Flood Premium***
1 foot	25%	1 foot	39%
2 feet	50%	2 feet	48%
3 feet	62%	3 feet	48%
4 feet	67%	4 feet	48%

* Compared to flood premium with lowest floor at BFE

References

ASCE. 2005. *Minimum Design Loads for Buildings and Other Structures*. ASCE 7-05.

ASCE. 2005. *Standard for Flood Resistant Design and Construction*. ASCE 24-05.

Building Science Corporation. 2006. (relevant articles and publications are available at http://www.buildingscience.com).

Coastal Contractor. July 2006. *Low Country Rx: Wet Floodproofing. Drainable, dryable assemblies made with water-tolerant materials help speed recovery from deeper than-expected floods*, by Ted Cushman. (available at http://www.coastalcontractor.net/cgi-bin/issue.pl?issue=9).

FEMA. 2000. *Coastal Construction Manual*. FEMA-55 (ordering information at http://www.fema.gov/pdf/plan/prevent/nhp/nhp_fema55.pdf).

FEMA. 2005. *Home Builder's Guide to Coastal Construction Fact Sheets* Series. FEMA 499 (available at http://www.fema.gov/rebuild/mat/mat_fema499.shtm).

FEMA. 2006. *Hurricane Katrina Summary Report*. FEMA-548 (available at http://www.fema.gov/pdf/rebuild/mat/fema548/548_SumRprt0329fnl.pdf).

FEMA. 2006. *Recommended Residential Construction for the Gulf Coast, Building on Strong and Safe Foundations*. FEMA-550.

LSU AgCenter. 1999. *Wet Floodproofing. Reducing Damage from Floods*. Publication 2771. (available at http://www.louisianafloods.org/NR/rdonlyres/2AEAF3E7-F068-40E6-A4CD-C4B6901F4307/26120/pub2771Wet6.pdf).

NFPA. 2005. *Model Manufactured Home Installation Standard*. NFPA 225. (available at http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=225&cookie%5Ftest=1).

SP8279

Date Submitted	12/14/2018	**Section**	429.4.2.4.2	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	No Affirmative Recommendation				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will enhance protection of the building envelope reducing the risk of water intrusion due to the dislodgement of roof top equipment.

Rationale

This modification is needed to reduce the risk of water infiltration due to the dislodgement of roof top equipment by high winds and debris impact during hurricanes. Lost of roof mechanical equipment exposes the building interior of water infiltration that is costly to repair and requires buildings or portions of building to vacated during remediation. Additionally the loss of air terminals can compromise the buildings lighting protection system and expose the facility to increase risk of lighting strikes. The referenced document is available on line at FEMA website.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Minimal cost increase.

Impact to industry relative to the cost of compliance with code

Minimal cost increase.

Impact to small business relative to the cost of compliance with code

none

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Increases hospitals ability to resist damage form high winds and water intrusion.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

449.4.2.4.2 All new roof appendages such as ducts, tanks, ventilators, receivers, dx condensing units, exhaust fans, lighting protection system components, and decorative mansard roofs and their attachment systems shall be structurally engineered to meet the wind load requirements of the applicable building code. At a minimum, rooftop equipment shall be attached securely to a curb or roof deck in accordance with the recommendation in Appendix E of *FEMA 549 - Hurricane Katrina in the Gulf Coast: Mitigation Assessment Team Report, Building Performance Observations, Recommendations, and Technical Guidance.*

E. FEMA Hurricane Katrina Recovery Advisories

FEMA has prepared a series of Recovery Advisories that present guidance for design, construction, and restoration of buildings in areas subject to coastal flooding and high winds from Hurricane Katrina. To date, eight advisories have been prepared and are included in this appendix:

- Reconstruction Guidance Using Hurricane Katrina Surge Inundation and Advisory Base Flood Elevation Maps
- Initial Restoration for Flooded Buildings
- Design and Construction in Coastal A Zones
- The ABCs of Returning to Flooded Buildings
- Attachment of Brick Veneer in High-Wind Regions
- Attachment of Rooftop Equipment in High-Wind Regions
- Rooftop Attachment of Lightning Protection Systems in High-Wind Regions
- Designing for Flood Levels Above the BFE

These Advisories are also available online at http://www.fema.gov/rebuild/mat/mat_katrina.shtm where future Advisories will also be posted.

Reconstruction Guidance Using Hurricane Katrina Surge Inundation and Advisory Base Flood Elevations

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To discuss available flood hazard information and to recommend reconstruction practices using Advisory Base Flood Elevations (ABFEs).

Key Issues

- Following Hurricane Katrina, FEMA updated its flood frequency analyses to include more recent storm surge data (including storm surge stillwater levels measured after Katrina). The results of the analysis show that the updated 1 percent annual chance stillwater levels (also known as the 100-year stillwater levels) are 3 to 8 feet above the stillwater levels previously used to produce the pre-Katrina Flood Insurance Rate Maps (FIRMs).
- For post-Katrina recovery purposes, FEMA devised a method to approximate 1 percent annual chance wave crest elevations. The results of this effort are known as Advisory Base Flood Elevations (ABFEs, sometimes referred to as Advisory Flood Elevations [AFEs]), which are shown on a series of 228 maps for Hancock, Harrison, and Jackson Counties, Mississippi. These maps are also known as "Katrina Recovery Maps" (see Figure 1).
- The ABFEs are updated estimates of the 1 percent annual chance flood elevations, and are generally 5 to 12 feet higher than the base flood elevations (BFEs) shown on the pre-Katrina FIRMs. ABFEs also extend farther inland than the Special Flood Hazard Areas (SFHAs) shown on the pre-Katrina FIRMs.

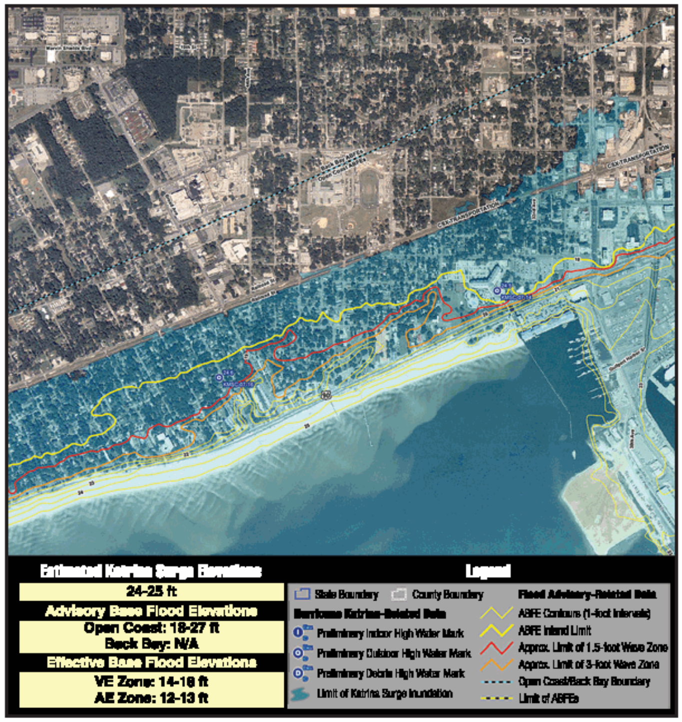


Figure 1. Sample Hurricane Katrina Surge Inundation and Advisory Base Flood Elevations. The shaded region in blue indicates the approximate inland extent of storm surge inundation experienced during Katrina; the ABFE contours are shown in yellow and the predicted inland limit of damaging wave effects during the advisory base flood is shown by the red line. Blue points indicate surveyed Katrina high water mark elevations.

- The Katrina Recovery Maps also show the approximate inland extent of storm surge inundation experienced during Hurricane Katrina. Since Katrina exceeded the BFE in most locations (based on the updated flood frequency analysis), the inland extent of Katrina storm surge penetration generally lies inland of the ABFE limit. However, where the Katrina impact was less extreme (very near the eye where the hurricane winds are small, to the left of the eye where the peak winds blow offshore rather than onshore, and far to the right of the eye where the winds weaken), the Katrina surge penetration properly lies seaward of the ABFE limit.
- FEMA and the State of Mississippi will conduct detailed studies during 2005 and 2006 to produce revised FIRMs. The revised FIRMs will result from more detailed storm surge stillwater analyses and more detailed wave analysis methods than those used to produce the Katrina Recovery (ABFE) Maps. As a result, BFEs on the revised FIRMs may differ from the ABFEs. In the interim, the ABFEs should be treated as the best available 1 percent annual chance elevation information.

- Although the information contained on the Katrina Recovery Maps is advisory in nature, communities are encouraged to use ABFEs to regulate reconstruction and new construction until the revised FIRMs are produced by FEMA.
- Until such time as the revised FIRMs are published by FEMA and adopted by communities, those communities may use the pre-Katrina FIRMs, or Katrina Recovery Maps, or other flood elevations to regulate reconstruction and new construction (as long as the other flood elevations are not lower than those shown on the pre-Katrina FIRMs).

Advisory Base Flood Elevations (ABFEs)

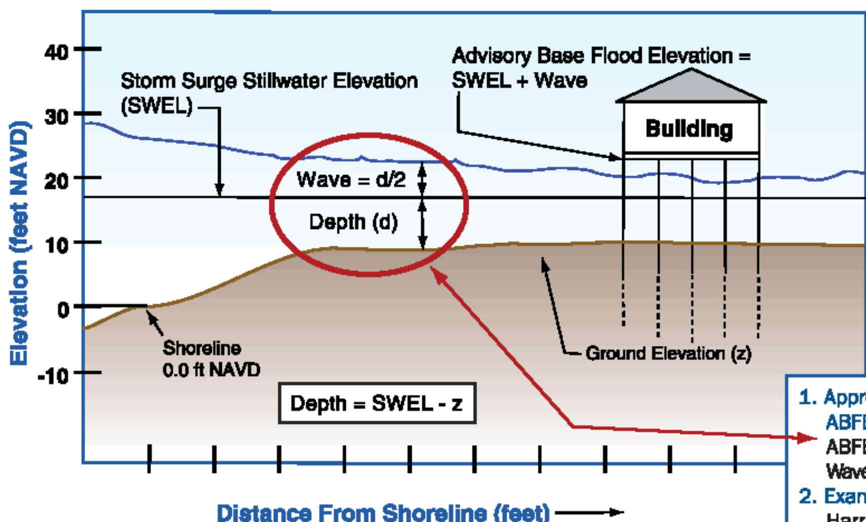
The pre-Katrina FIRMs for communities in Hancock, Harrison, and Jackson Counties were published between the early 1980s and 2002; the current maps underestimate today's risk. Following Hurricane Katrina, FEMA updated the stillwater flood frequency analysis for coastal Mississippi to include tide and storm surge stillwater data for the past 25 plus years. These revised stillwater elevations formed the basis for FEMA's calculation of ABFEs.

The revised 1 percent annual chance storm surge stillwater levels were published by FEMA on October 3, 2005, for Hancock, Harrison, and Jackson Counties in Mississippi (see Table 1). The procedure which makes use of these elevations to compute ABFEs is illustrated in Figure 2 and the example below.

Table 1. Updated 1 Percent Annual Chance (100-Year) Stillwater Elevations for Use in Calculating ABFEs

County (Mississippi)	Updated 1 Percent Annual Chance Stillwater Elevations (SWEL), (ft NAVD*)	
	Gulf of Mexico Shoreline	Back Bay Shorelines
Jackson	14	12
Harrison	18	16
Hancock	20	18

*North American Vertical Datum of 1988
Storm Surge Stillwater Elevation (SWEL)



1. Approximate Method for Calculating ABFE:
   ABFE = SWEL + Wave
   Wave = ½ depth = d/2
2. Example:
   Harrison Co Gulf SWEL = 18 ft
   Ground Elevation (z) = 10 ft
   Depth = SWEL – z = 18 ft – 10 ft = 8 ft
   Wave = ½ (8) = 4 ft

   ABFE = 18 + 4 = 22 feet NAVD

Figure 2. How to determine the Advisory Base Flood Elevation based on the site's ground elevation, applicable advisory elevation, and estimated wave height.

Communities and designers may note that the ABFE procedure is a simplified version of FEMA's Wave Height Analysis for Flood Insurance Studies (WHAFIS) program used to map base flood conditions on coastal FIRMs. The ABFE procedure does not account for wave attenuation due to dense stands of vegetation, buildings, or other obstructions. Nor does it account for wave growth and regeneration across flooded upland areas. Thus, BFEs on the revised FIRMs (anticipated in 2007) may differ from the ABFEs computed during this interim period. The ABFEs can be considered the best available data at this time.

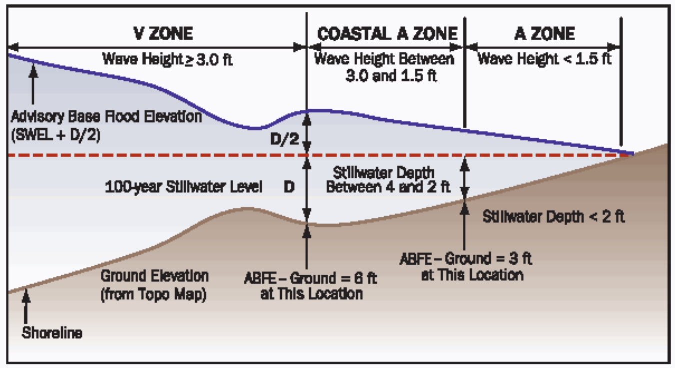


Figure 3. Cross-section showing 1 percent annual chance stillwater elevation, stillwater depth and ABFE, and inland limits of V Zone and Coastal A Zone.

Figure 3 illustrates the relationships between the stillwater flood elevation, ground elevations, associated 1 percent annual chance stillwater flood depths, ABFEs, and associated flood hazard zones.

Advisory Base Flood Elevations

The Katrina Recovery Maps (see Figure 1) include the following information:

- Pre-Katrina aerial photographs (as a base map)
- Approximate Katrina surge inundation limit (shaded area)
- ABFE contours (ft NAVD)
- Predicted inland limit of damaging wave effects during the advisory base flood (red line)
- Surveyed Katrina high water mark elevations

More background information on ABFEs and their use can be found in Flood Recovery Guidance-Frequently Asked Questions, dated October 3, 2005, and available at:

www.fema.gov/hazards/floods/recoverydata/katrina_ms_resources.shtm

Communities are encouraged to use the Katrina Recovery Maps. They may continue to enforce their adopted FIRMs and associated design and construction requirements. However, by using the ABFEs any reconstruction or new construction (following Katrina and before issuance of revised FIRMs, expected in 2007) will be at much less risk from future flood damage, and will be eligible for reduced flood insurance premiums (new and reconstructed buildings can be rated using BFEs and flood hazard zones on the effective FIRM, until revised FIRMs are adopted by the community).

Flood Protection Levels for Post-Katrina Reconstruction and New Construction

Until revised FIRMs are published by FEMA and adopted by communities, those communities are free to regulate reconstruction and new construction using several methods:

- Continue to use pre-Katrina FIRMs (understanding that this would knowingly put people and buildings at risk)
- Modify the use of pre-Katrina FIRMs (e.g., add freeboard to the pre-Katrina BFEs)
- Use the Katrina Recovery (Advisory Base Flood Elevation) Maps
- Modify the Katrina Recovery Maps (e.g., conduct a more detailed wave analysis and add to the 1 percent annual chance stillwater elevation, replacing ABFE contours shown on the maps)
- Develop other maps and methods (as long as the resulting BFEs and flood hazard zones are no less restrictive than the pre-Katrina FIRMs)

Each of these methods has advantages and disadvantages, both for implementation and for the long-term protection of buildings constructed after Hurricane Katrina. These are summarized in Table 2.

Table 2. Comparison of Various Methods for Providing Post-Katrina Flood Protection to Reconstructed Buildings and New Construction

Advantages	Disadvantages
Continue Use of Pre-Katrina FIRMs	
No change from pre-Katrina flood hazard maps	• Underestimates inland extent of flooding during base flood • Underestimates flood depths • Underestimates inland extent of the V Zone and damaging wave effects • Does not protect buildings outside the pre-Katrina SFHA against damage during the base flood • Limits eligibility for post-Katrina hazard mitigation grants and other reconstruction funds
Add Freeboard to Pre-Katrina FIRMs (where freeboard is less than that indicated by updated 1 percent annual chance flood analysis)	
• Provides increased flood protection for buildings within the pre-Katrina V Zone • Provides increased flood protection for buildings near the inland limit of the pre-Katrina A Zone • Buildings elevated to the new (freeboard) elevation will be eligible for flood insurance premium discounts (they can be rated using the pre-Katrina FIRM)	• Underestimates inland extent of flooding during base flood • Does not protect buildings outside the pre-Katrina SFHA against damage during the base flood • Does not expand the V Zone inland, and does not protect buildings in the seaward portion of the pre-Katrina A Zone against wave damage • Does not fully protect any buildings subject to the updated 1 percent annual chance flood • Limits eligibility for post-Katrina hazard mitigation grants and other reconstruction funds
Use Katrina Recovery (ABFE) Maps	
• Uses the latest 1 percent annual chance flood elevation and mapping guidance to characterize the extent, depth and severity of updated base flood hazards • ABFEs near the coast may be comparable to revised BFEs expected in 2007 • Provides flood protection consistent with the latest estimate of the updated base flood • Reduces potential floor elevation and foundation differences between buildings reconstructed/ constructed to ABFEs and those constructed after adoption of revised BFEs. • Buildings elevated to the ABFE will be eligible for flood insurance premium discounts (they can be rated using the pre-Katrina FIRM)	• Large differences between pre-Katrina building floor elevations and post-Katrina building floor elevations • ABFEs near the inland limit of flooding and in areas sheltered from wave effects may overstate wave hazards and wave crest elevations
Modify the Katrina Recovery (ABFE) Maps (via improved wave height analysis)	
• Same as ABFE entries above • Reduce wave height overestimates introduced by the ABFE approach	Large differences between pre-Katrina building floor elevations and post-Katrina building floor elevations
Other Methods	
Vary with method selected	Vary with method selected

Using the Advisory Base Flood Elevations

Communities can make use of the Advisory Base Flood Elevations by those methods summarized in Table 2. In addition, communities can take several steps that will help to protect reconstruction and new construction:

- Define the revised inland extent of the SFHA using ground contours equal to the stillwater elevations contained in Table 1.
- Define the revised inland extent of the coastal high hazard area (V Zone) based on a 4-foot stillwater depth (the depth required to support a 3-foot wave), using whatever new 1 percent stillwater elevation the community adopts. If the community adopts the stillwater elevations in Table 1, ground elevations corresponding to the new inland V Zone limit are shown in Table 3. In most cases, the first encounter with that ground elevation (starting at the shoreline and moving inland) will be the inland V Zone limit.
- Define the inland extent of a Coastal A Zone (see Hurricane Katrina Recovery Advisory, Design and Construction in Coastal A Zones) based on a 2-foot stillwater depth (the depth required to support a 1.5-foot wave), using whatever new 1 percent stillwater elevation the community adopts. If the community adopts the stillwater elevations in Table 1, ground elevations corresponding to the inland limit of the Coastal A Zone are shown in Table 3. In most cases, the first encounter with that ground elevation (starting at the shoreline and moving inland) will be the inland limit of the Coastal A Zone.
- Implement a local ABFE revision process, to allow for special circumstances where property owners can supply better topographic data or information which will result in a more accurate delineation of flood hazards. Note: such a revision process should not allow reduction of the stillwater elevations in Table 1.
- If a community has adopted the International Building Code or the International Residential Code, define the "Design Flood Elevation" as the ABFE. Define the "Flood Hazard Area" as the inland extent of flooding using the ABFE procedure.

Table 3. Ground Elevations Corresponding to Inland Limits of V Zones and Coastal A Zones (based on 1 percent annual chance stillwater elevations published by FEMA, October 3, 2005)

County, Flood Source	1 Percent Annual Chance Stillwater Elevation (ft NAVD)	Ground Elevation Corresponding to Inland Limit of V Zone (ft NAVD)	Ground Elevation Corresponding to Inland Limit of Coastal A Zone (ft NAVD*)
Jackson, Gulf of Mexico	14	10	12
Jackson, Back Bay	12	8	10
Harrison, Gulf of Mexico	18	14	16
Harrison, Back Bay	16	12	4
Hancock, Gulf of Mexico	20	16	18
Hancock, Back Bay	18	14	16

* North American Vertical Datum of 1988

Design and Construction Practices Using ABFEs

FEMA recommends that all reconstruction and new construction within the revised flood hazard area employ a "best practices" approach, incorporating those methods known to eliminate or reduce flood damage. This will mean:

- Elevating buildings higher than before Katrina, on stronger foundations, with continuous load paths and stronger connections, and with wind- and water-resistant walls, windows, doors, and roofs.
- Elevating buildings with the bottom of the lowest horizontal structural member supporting the lowest floor above the ABFE (or whatever regulatory flood elevation a community adopts). *In A Zones, do not elevate the building only such that the lowest floor walking surface is at the ABFE (or whatever regulatory flood elevation a community adopts).*
- Using flood-damage resistant building materials above the lowest floor elevation of the building (remember, floods more severe than the base flood can, and do, occur).
- Designing and constructing buildings using methods and materials described in:
    - The latest model building codes and standards
    - FEMA 55, *Coastal Construction Manual* (revised 2000)
    - FEMA 499, *Home Builder's Guide to Coastal Construction,* Technical Fact Sheet Series (2005) (http://www.fema.gov/fima/mat/fema499.shtm)

Initial Restoration for Flooded Buildings

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

NOTE: This advisory is specifically intended for buildings subject to the effects of long-term flooding and widespread mold growth following Hurricane Katrina. For additional information on more common water leakage and mold situations, refer to the FEMA website (http://www.fema.gov) and related links to the Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention (CDC) sites listed at the end of this advisory.

During the initial visit to a flood-damaged building, the situation often appears overwhelming (Figure 1). However, despite the shock that often accompanies an individual's first look at the damage, there are a number of straightforward principles can be applied to assist with the flood restoration effort. In addition to following the steps outlined below, individuals should review the Hurricane Katrina Recovery Advisory, *The ABC's of Returning to Flooded Buildings*.

Figure 1. Typical flood damage to furniture and interior walls (Hurricane Katrina).

1. Air Out

- To promote drying, open all doors and windows whenever you are present and leave as many open when you are not present as security concerns allow. Some styles of windows (double-hung) and patio doors may be able to be left partially open and secured from external opening by inserting a nail in the window frame or using a wooden dowel or stick. Upper floor windows can usually be left open all the time and will also assist in drying the whole house. Try to take advantage of cross-ventilation by opening windows on multiple levels and opposite sides of the building.
- Open interior doors, especially closets and interior rooms, to allow air movement to reach all areas of the building. Take doors off their hinges if necessary to promote air flow.
- Open kitchen cabinet and bathroom vanity doors; remove drawers and stack them to dry.
- Open the attic access, if available, to increase ventilation. Consider the benefits (improved drying) and risks (falling dust, insulation, or other debris) of adding an attic access where none exists.
- When electricity is available, use fans to push moist air outside. However, avoid use of fans if the house is contaminated with sewage as the air movement may spread bacterial contamination.

2. Move Out

- Remove salvageable contents that were not impacted by the water. If the upper floors are dry, it may be possible to move such items to those areas. When moving items from impacted areas of the building to other locations, consider using protective mats or non-slip drop cloths (e.g., fabric painter cloths) to avoid contamination of unimpacted surfaces.
- Remove saturated porous materials such as mattresses or upholstery, especially those with visible fungal growth. These items should be moved out of the building as soon as possible. Cover contaminated items with plastic drop cloths prior to moving to prevent spread of contaminants. Appropriate personal protective equipment should be utilized to avoid injury from possible exposure to mold and bacteria.

3. Tear Out

- Prior to beginning tear out, install plastic barriers between affected and unaffected areas of the premises (typically between the first and second floors). This will reduce the potential for secondary damage occurring in the unaffected areas.
- Remove wet carpet and padding. Tack strips should also be removed completely when the carpet is taken out to minimize injury during subsequent activities. Since carpet tack strips have protruding nails, wear leather gloves to protect hands from puncture wounds while removing and handling tack strips. Removing wooden baseboards prior to carpet tear out may allow for their later reinstallation.
- Remove any curled vinyl tiles or linoleum over concrete floors, and remove all vinyl tiles or linoleum over wooden sub-floors to allow the wood to dry. Respiratory protection should be worn as many older (pre-1970s) flooring products, such as 9-inch square tiles and adhesives, often contain asbestos.
- Although punching holes in walls for drainage is commonly recommended, this practice does not drain water nor does it cause the wall to dry faster. If holes are not punched in the walls, the drywall (gypsum board) may be able to be easily repaired and restored.
- If drywall or plaster has been saturated by contaminated floodwater, it should be removed. Respiratory protection should be worn when removing drywall as some older drywall joint compound contains asbestos. If the water level was less than 2½ feet, the wall material should be removed to a height of 4 feet to facilitate reinstallation of full sheets of drywall. If the water level was greater than 2½ feet, the wall material should be removed to a height of 8 feet or the ceiling junction, whichever is higher. Electrical outlet and wall switch plates and door and window moldings must be removed prior to the tear out of the wall material.
- Fibrous wall insulation (fiberglass, mineral wool, cellulose, wood fiberboard, etc.) saturated by floodwater should be removed completely. Foam plastic insulation may be left in place and allowed to dry.
- Flooded electrical receptacles should be removed completely after the appropriate circuit breakers or fuses are deactivated.
- Wall paneling should be removed if it is swollen or if saturated drywall is behind the paneling.

4. Clean Out

- Following any necessary tear out, clean up any remaining debris and muck. Squeegees, shovels, and brooms are effective for such cleaning. Personal protective equipment should be utilized. Detailed cleaning and sanitizing of the remaining materials should be conducted. A shop vacuum with dry filters in place and with a solution of clean water and disinfectant in the tank (2-inch depth) to minimize the spread of dust can be used.
- **Mold removal.** Treatment with commercial mold removers does eliminate visible evidence of mold growth on exposed surfaces and is recommended for restoring flood-damaged homes. Tests have found very little or no evidence of mold growth in the non-exposed (hidden) portions of the walls. Treating the non-exposed portions of the walls for mold control does not appear warranted in most cases. Spraying vertical surfaces using a compression (pump-up) garden sprayer with a commercial mildew remover is recommended.
- **Understand the limitations of bleach**. While this material is convenient and appropriate as a sanitizer for hard, non-porous items after they have been cleaned, it has distinct drawbacks when cleaning flood-impacted buildings. Application of bleach water can cause corrosion of electrical components and other metal parts of mechanical systems, and can compromise the effectiveness of termite treatments in the soil surrounding the building. Its effectiveness at killing bacteria and mold is significantly reduced when it comes in contact with residual dirt. Moldy surfaces should be cleaned first and then disinfected. Residual mold spores should then be removed, since killing them does not reduce their toxicity.
- Remove mud and gross contamination from floors by shoveling into suitable containers. Reduce soil and

Figure 2. Using a pressure washer to clean contaminated surfaces.

contaminant levels on surfaces by flushing off with clear water. The fastest and most efficient method to clean and decontaminate materials and surfaces is by using a residential-type pressure washer to apply a cleaner-disinfectant solution to the affected areas (Figure 2). Brushes improve decontamination of floors and some walls by scrubbing solution into affected surfaces. Avoid scrubbing drywall and plaster walls at this time because they have become softened by the flooding and moisture and may have their surface damaged by scrubbing. Following the first cleaning, floors and walls should be rinsed with water and the cleaning process redone a second time. Squeegees can be used to control or direct spent solution, and wet vacuums can be used to collect spent solution.

Warning: Failure to allow for adequate drying prior to reconstruction can trap moisture in the building, which can cause structural damage and potential health problems in the future.

5. Dry Out

- Once the clean process is completed, the building and any remaining contents need to dry. Drying is a naturally occurring process. Over time, all wetted building materials will dry. Drying of structural materials will take an extended period of time to dry to pre-flood conditions. Exterior rooms with excellent ventilation can take 2 to 4 weeks to dry, depending on the temperature and humidity outside. Interior rooms, or those with minimal ventilation, can take 4 to 6 weeks or more to dry and are candidates for the use of mechanical drying equipment. The use of fans, dehumidifiers, air conditioners, and/or auxiliary electric heaters will speed drying. Allowing materials to dry naturally will take considerably longer.
- **Wood framing**. The moisture content of wood framing must be checked professionally or with a commercially available moisture meter before refinishing or recovering so that excessive moisture does not become trapped in the materials and cause future problems (Figures 3a and 3b). Dryness of wood framing materials can be determined quantitatively using the table on the right above. Wetted materials are presumed dry when their moisture content readings are less than or equal to 15 percent when taken with an intrusive/penetrating moisture meter (Figure 3a). If an intrusive/penetrating moisture meter is not available, a non-intrusive/penetrating moisture meter (Figure 3b) may be used; however, keep in mind that the material moisture results measured from non-intrusive meters may be less accurate than intrusive meters.
- **Walls, floors, and other building materials**. The moisture content of drywall (gypsum board), plywood floors, and other building materials must also be checked professionally or with a commercially available moisture meter before refinishing or recovering so that excessive moisture does not become trapped in the materials and cause future problems (Figures 3a and 3b). Unlike wood framing, the dryness of other building materials must be confirmed qualitatively by comparing readings between like materials in affected areas of the building (at or below flood level) and unaffected areas of the building (a room or upper floor above the flood

Summary of Moisture Reading Results for Wood Framing Materials

Moisture Reading	Results
> 20%	Wet - no good
15 - 20%	Partially dry - caution
< 15%	Dry - OK

Figure 3a. An intrusive/penetrating moisture meter--recommended for final moisture readings.

Figure 3b. A non-intrusive/non-penetrating moisture meter–recommended for initial and interim moisture readings.

level, or inside a nearby building that was not flooded). Wetted materials are presumed dry when their moisture content readings are within 5 percent of those of like materials in unaffected areas of the building when taken with an intrusive/penetrating moisture meter (Figure 3a). If an intrusive/penetrating moisture meter is not available, a non-intrusive/penetrating moisture meter (Figure 3b) may be used; however, keep in mind that the material moisture results measured from non-intrusive meters may be less accurate than intrusive meters.

- Kitchen cabinets, bathroom vanities, and other "built-in" furnishings that were subjected to flood water should be removed from their location to permit drying of the material behind them. Once these "hidden" areas are dried, the furnishings can be reinstalled if they are salvageable.
- When saturated wood, drywall, and/or other structural materials vulnerable to fungal growth are naturally air dried over an extended period (weeks), the application of a disinfectant prior to drying can prevent mold growth. Materials should be closely observed and disinfectant reapplied at the first sight of mold.

General Notes for Drying Foundation Floors

- **Crawlspaces**. Access to crawlspaces is necessary for decontamination purposes. For crawlspaces that do not have an existing access opening, the simplest method to access the crawlspace is by strategically removing sections of overlying flooring to permit access. When the flooring is not salvageable, removal of the flooring provides the necessary access openings. Once access is obtained, gross (solid) contamination should be removed from the ground underneath the building for health and sanitation purposes. Next, any remaining water should be removed. If there is an existing vapor retarder on the ground, it can be left in place to collect spent water and cleaning solutions. Following remediation and any necessary final cleaning, the vapor retarder can be left in place to facilitate drying. If there is exposed ground within the crawlspace after cleaning, it should be covered with a plastic vapor retarder to minimize potential mold growth and future moisture migration into the house. Plastic vapor retarders can be made watertight by overlapping and sealing them together using either glue or heavy-duty adhesive. Suitable adhesives can be obtained from hardware stores or home improvement centers. After the vapor retarder is placed, the underlying support structure of salvageable wooden floor joists, wood sub-floors, and foundation walls should be cleaned and sanitized. Following cleaning, application of a wood preservative will provide protection against fungi and wood destroying insects.
- **Grade slabs**. Concrete grade slabs provide a dense barrier between the ground and the interior of the home. Remove mud and gross contamination from slabs by shoveling into suitable containers. Reduce soil and contaminant levels on surfaces by flushing off with clear water. The fastest and most efficient method to clean and decontaminate contaminated grade slabs and adjacent building materials and surfaces is by using a residential type of pressure washer to apply a cleaner-disinfectant solution to affected areas. Brushes improve decontamination of floors and base of walls by scrubbing solution into affected surfaces. Following the first cleaning, floors and base of walls should be rinsed with water and the cleaning process redone a second time. Squeegees can be used to control or direct spent solution, and wet vacuums can be used to collect spent solutions. Following cleaning, the slab should be visually examined for signs of heaving or cracking due to hydrostatic pressure. When in doubt, contact the local building inspector, structural engineer or other appropriate professional.

Additional Resources

- Repairing Your Flooded Home (ARC #4477/FEMA 23)
  http://www.redcross.org/services/disaster/0,1082,0_570_,00.html
- Cleaning Flood-Damaged Homes (LSU AgCenter)
  http://www.louisianafloods.org/en/family_home/hazards_and_threats/recovery_assistance/cleaning_up/structural_damage/Cleaning+FloodDamaged+Homes.htm
- Mold Fact Sheet (LSU AgCenter)
  http://www.louisianafloods.org/en/family_home/home/health_safety/indoor_air_quality_mold/Mold+Fact+Sheet.htm

For additional information on more common water leakage and mold situations:

- Environmental Protection Agency (EPA), http://www.epa.gov/mold
- Centers for Disease Control and Prevention (CDC), http://www.cdc.gov/mold

Design and Construction in Coastal A Zones

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend design and construction practices in coastal areas where wave and flood conditions during the base flood will be less severe than in V Zones, but still cause significant damage to typical light-frame construction

Key Issues

- Recent post-storm investigations have shown that typical A Zone construction techniques (e.g., wood-frame, light gauge steel or masonry walls on shallow footings or slabs, etc.) are subject to damage when exposed to less than 3-foot breaking waves, which is the current threshold for V Zone conditions.
- Coastal A zone buildings that employ typical residential and light commercial walls to elevate and support habitable space above the flood level will be susceptible to flood damage (see Figure 1). Laboratory tests and recent field investigations confirm that breaking wave heights as small as 1.5 feet will cause failure of these types of walls (see Figures 2 and 3).
- Other flood hazards associated with coastal waves (e.g., floating debris, high velocity flow, erosion and scour) also damage A Zone type construction in coastal areas (see Figures 4 and 5).
- NFIP flood hazard mapping is generally divided into two categories, V Zone and A Zone. In coastal areas, the A Zone category could be subdivided into “Coastal A Zone” and “A Zone.” Base flood conditions in the Coastal A Zone will be similar to, but less severe than, those in the V Zone; base flood conditions in the A Zone will be similar to those in riverine or lake floodplains.
- The Coastal A Zone is not shown on the FIRM at present; therefore, communities, designers, and owners will have to determine whether a site lies within a Coastal A Zone.
- **V Zone design and construction standards are recommended in Coastal A Zones subject to erosion, high velocity flow, and/or wave heights greater than 1.5 feet.**

Figure 1. Failure of wood-frame walls used to support a coastal building, which was subjected to shallow flooding, small waves, and floating debris (Hurricane Opal).

Figure 2. Masonry walls destroyed by 3 feet of stillwater flooding and small waves (Hurricane Dennis).

V Zone	A Zones in Coastal Areas	
V **V Zone**	Coastal A — **Areas With Potential for Breaking Waves and Erosion During Base Flood**	A — **Areas With Shallow Flooding Only, Where Potential for Breaking Waves and Erosion Is Low**

Figure 3. Failure of wood-frame wall, brick veneer, and windows as a result of 4 feet of stillwater flooding and small waves (Hurricane Katrina).

Figure 4. Failure of A Zone type foundation in coastal area, not subject to V Zone conditions (Hurricane Fran).

Figure 5. Damage to light frame walls due to floating debris and small waves. The damaged home was in the third row back from a bay shoreline (Hurricane Ivan).

Coastal A Zone, Defined

Coastal A Zone: area landward of a V Zone, or landward of an open coast without mapped V Zones. In a Coastal A Zone, the principal source of flooding will be astronomical tides, storm surges, seiches or tsunamis, not riverine flooding. During base flood conditions, the potential for breaking wave heights between 1.5 feet and 3.0 feet will exist (see Figure 6).

Coastal A Zone design and construction practices described herein are not mandated by the NFIP, but are recommended for communities that wish to adopt higher floodplain management standards. Community Rating System (CRS) credits are available for doing so. Note that some Coastal A Zone practices may be required by the International Building Code, through its reference to ASCE 24-98.

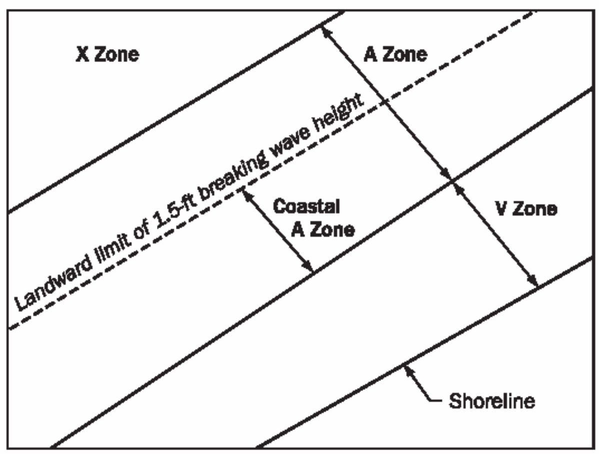


Figure 6. Plan view showing Coastal A Zone landward of V Zone (source: ASCE 24-05).

Coastal A Zone Construction Guidance

Because of the presence of damaging waves, V Zone design, construction, and certification practices are recommended for Coastal A Zones.

Coastal A Zone construction should include:

- Use of open foundations (pile or pier) designed to resist all base flood conditions (waves, high velocity flow, erosion and scour, floodborne debris). Where high velocity flow, scour, and erosion will not be experienced under base flood conditions, a traditional stem wall foundation may be acceptable – see Table 1.
- Elevation of the bottom of the lowest horizontal structural member supporting the lowest floor above the base flood wave crest elevation (see Figure 7).Since waves and debris will be impacting on the floor joists and other foundation elements during the base flood, *do not follow current NFIP minimum requirements that allow the lowest floor's walking surface to be set at the wave crest elevation in Zone A.*
- Use of flood-resistant materials above the level of the walking surface of the lowest floor (in the event that future flooding exceeds the lowest floor level).
- Specification of connections between the foundation and the elevated building that are capable of withstanding simultaneous wind and flood forces. Post-Katrina investigations found many foundation-to-building connections to be deficient (see Figure 8).
- Use of space below the lowest horizontal structural member for parking, access, or storage only. Adding sufficient freeboard to allow parking beneath the building will not only reduce future flood damages, but will also lower flood insurance premiums.
- Use of screen, lattice, or breakaway walls if space below the elevated floor is enclosed. Note: until flood regulations are changed, breakaway walls in Coastal A Zones must be equipped with flood openings.

Additional guidance for design and construction in Coastal A Zones can be found in FEMA 499, *Home Builder's Guide to Coastal Construction* (http://www.fema.gov/fima/mat/fema499.shtm). The publication is a series of 31 fact sheets that provide recommended design and construction practices for foundations, connections, building envelope, etc. Fact Sheet 2 summarizes recommended practices for Coastal A Zones, and references other fact sheets that provide more details.

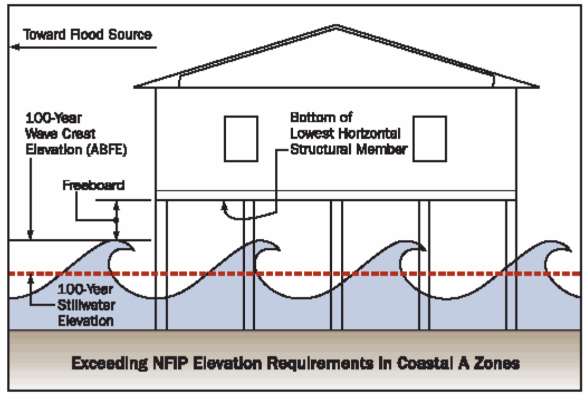


Figure 7. Recommended post-Katrina building standards in Coastal A Zones.

Figure 8. Post-Katrina investigations showed that many buildings were attached to foundation piers with light gauge metal straps. These straps failed in many instances. A stronger (preferably bolted) connection is recommended when attaching Coastal A Zone buildings to their foundations.

Table 1. Foundation Recommendations for Coastal A Zones (Users should read across from a foundation type to see under what soil and base flood conditions that foundation is acceptable. A foundation must be capable of resisting all base flood conditions likely to exist at the site, or it should not be used. For example, a properly constructed pier on a shallow footing will generally withstand 1.5- to 3.0-foot wave heights, but should not be used where soils are erodible, and where high velocity flow is possible, or where large floodborne debris may be present.)

Foundation Type	Base Flood Condition Present		
	Wave Heights Between 1.5 and 3.0 Feet*	Velocity Flow, Erodible Soils	Large Debris
Fill	no	no	no
Slab on grade	no	no	no
Crawlspace, shallow footing	no	no	no
Foundation walls, shallow footing	no	no	no
Stemwall, shallow footing	yes	no	yes
Stemwall, deep footing**	yes	yes	yes
Pier, shallow footing	yes	no	no
Pier, deep footing**	yes	yes	no
Post, shallow embedment	no	no	no
Pile/Column, deep embedment**	yes	yes	yes

*Wave heights greater than 3.0 feet mapped as V Zone: fill, slab, crawlspace, wall foundations not permitted.

**Deep means sufficiently deep to withstand erosion and scour, including that induced by the presence of the foundation itself.

Identifying Coastal A Zones

Coastal A zones are not shown on present day Flood Insurance Rate Maps (FIRMs) or mentioned in a community's Flood Insurance Study (FIS) Report. Those maps and studies show zones VE, AE, and X (or older designations V1-30, A1-30, B, and C). Therefore, until Coastal A Zone designations or wave height contours are incorporated into Flood Insurance Studies, the community official, designer, or owner will have to determine whether or not a site will be subject to Coastal A Zone conditions during the base flood.

In order for a Coastal A Zone to be designated, two conditions are required:

1) a water depth sufficient to support waves between 1.5 and 3.0 feet high, and

2) the actual presence of wave heights between 1.5 and 3.0 feet.

Condition 1 requires stillwater depths (vertical distance between the 100-year stillwater elevation and the ground elevation) of 2 to 4 feet at the site.

Condition 2 requires wave heights at the shoreline greater than 1.5 to 3.0 feet (under the 100-year flood conditions), sufficient water depth between the shoreline and the site and few, if any obstructions (buildings, dense tree stands, etc.) that may block or dampen the waves, between the shoreline and the site.

Figure 9 illustrates the relationships between the stillwater flood elevation, ground elevations, associated 1 percent annual chance (100-year) stillwater flood depths, ABFEs, and associated flood hazard zones (see Hurricane Katrina Recovery Advisory *Reconstruction Guidance Using Hurricane Katrina Surge Inundation and ABFE Maps*).

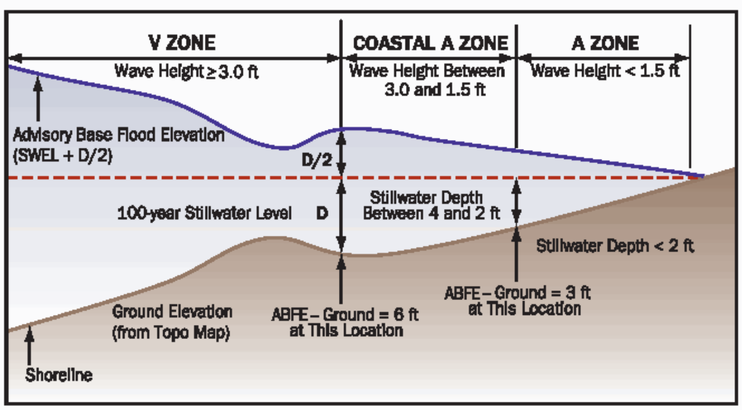


***Figure 9.** Cross-section showing 1 percent annual chance stillwater elevation, stillwater depth and ABFE, and inland limits of V Zone and Coastal A Zone.*

Communities, designers, and owners can obtain the information necessary to make a post-Katrina Coastal A Zone determination by observing the site and its surroundings, knowing site ground elevations, and using 1 percent annual chance stillwater elevations from the Advisory Base Flood Elevation (ABFE) guidance (see Table 2). Figure 10 shows how site and surrounding conditions would influence a Coastal A Zone determination.

Table 2. Updated 1 Percent Annual Chance (100-Year) Stillwater Elevations for Use in Calculating ABFEs (see Figure 9)

County	Updated 100-year Stillwater Elevations (SWEL), (ft NGVD*)	
	Gulf of Mexico Shoreline	Back Bay Shorelines
Jackson	14	12
Harrison	18	16
Hancock	20	18

*National Geodetic Vertical Datum

Figure 10. Although the site on the left is mapped Zone AE, proximity to the Gulf of Mexico shoreline and limited obstructions to waves indicate the site could be classified as a Coastal A Zone. The site on the right is over 4,000 feet from the Gulf shoreline and over 1,000 feet from the bayou, mapped as Zone AE, and has a base flood stillwater level sufficient to support >1.5-foot wave heights -- but obstructions to waves (e.g., trees and other buildings between the site and the shoreline), and distance from the sources of flooding would indicate the area is not a Coastal A Zone.

The ABC's of Returning to Flooded Buildings

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Hurricane Katrina produced widespread flooding from both storm surge and levee breaches. The combination of water intrusion and delayed re-entry due to evacuation requirements and power interruption has created a situation that demands careful planning by individuals returning to flood damaged buildings. The following tips are designed to assist impacted individuals when they are able to reach their flooded property. Additional information can be found in the Hurricane Katrina Recovery Advisory, *Initial Restoration for Flooded Buildings*.

Anticipate what you will need

- Personal protective equipment including safety shoes or boots (rubber boots may be best if you are not sure if the water has been pumped out), work gloves, eye protection, rubber gloves for cleaning or when using sanitizing chemicals, a hard hat, and respiratory protection in case there is mold or bacteria contamination (respirators with HEPA cartridges or dust masks with a rating of N-95 or higher should be used). These can be obtained from hardware stores or home improvement stores. If materials containing asbestos are suspected, it will be necessary to use a respirator with a HEPA cartridge in accordance with Federal requirements.
- Tools for entry and cleaning such as a pry bar, shovel, and a flashlight with extra batteries (Figure 1)
- Camera or video recorder for recording conditions for use in insurance claims
- Hand and face cleaning supplies such as alcohol swabs or hand sanitizer gel
- Cleaning supplies for salvagable materials including potable water, chemical cleaners/sanitizers, sponges, buckets, and wiping rags
- Packing supplies to protect fragile salvaged items during transport
- First aid kit
- Pen and paper, tape, scissors, and small plastic storage bags for writing down serial numbers and saving samples of discarded materials to support insurance claims

Figure 1. Tools for entry and cleaning

Be realistic about your limitations

- Even initial assessment and salvage can be hot, heavy work.
- If at all possible, work with another person while in the house. Unforeseen hazards can exist, so having help nearby is prudent.
- Avoid entry, even with personal protective equipment, if you have serious pre-existing health issues:
  - Asthma/allergies
  - Compromised immune system
  - Heart problems
  - Open cuts or wounds
- Get help moving large items such as furniture and appliances.
- Do not underestimate the impact of psychological shock and physical effort:
  - Identify someone in advance who you can talk to about your situation and feelings
  - See the resource section for some potential contacts

Check the situation for hazards

- Downed power lines
- Gas leaks
- Evidence of structural damage such as sagging ceilings, large wall or floor cracks, walls out of plumb, etc.
- Unstable materials
  - Furniture and even vehicles can be stacked in hazardous positions (Figure 2)
- Chemical spills
  - Paints, solvents, lawn fertilizers, pesticides
- Vermin such as snakes, rats, fire ants, bee colonies, etc.
- Other hazards
  - Rotting food
  - Dead animals

Figure 2. Furniture stacked by flood waters creates a safety hazard.

Document conditions

- Photos or videos are best
  - Shoot multiple pictures of each room from different corners
  - Make sure the photos will be clear before changing the conditions
  - Use a camera with a time/date stamp for photos if possible
- Make written notes of the dates that you were at the building
- Save samples of high-quality contents such as carpets to support insurance claims

Extract the salvageable items

- Focus on high value items that were not water impacted and items that have special significance. If an entire item cannot be saved, consider parts that could be saved. For example, if a family heirloom such as an antique chest cannot be saved, consider saving the non-porous handles or hinges for use on a replacement piece.
- Porous items that were not water logged or moldy should be the second priority.
- Non-porous items such as glassware, silverware, and plastic furniture that need to be cleaned should be separated. (Note: Contaminated items should be cleaned on site if possible. Transporting wet/contaminated items presents the risk of cross contamination of the vehicle and location where the item is moved.)
- Be aware of termites. If a termite infestation is found, consult a professional exterminator. When discarding or salvaging wood, paper, and other cellulose, protect your property and keep Formosan subterranean termites from spreading. For additional information, refer to the Louisiana Ag Center. *(http://www.louisianafloods.org/en/family_home/hazards_and_threats/recovery_assistance/insect_pest_management/Keeping+Formosan+Termites+from+Spreading+after+Hurricanes.htm)*

Facilitate restoration

- Do what you can to salvage the contents on the property.
- See American Red Cross, *Repairing Your Flooded Home*, *http://www.redcross.org/services/disaster/0,1082,0_570_,00.html*

Get help

- The following resources may be useful in providing technical support during your recovery from a flooding event:
  - American Red Cross (*http://www.redcross.org*)
  - FEMA (*http://www.fema.gov*)
  - Association of Specialists in Cleaning & Restoration (*http://www.ascr.org*)
  - Louisiana State University AgCenter - Cooperative Extension Service (*http://www.LouisianaFloods.org*)
  - National Association of Home Builders (*http://www.nahb.org/category.aspx?sectionID=843*)
  - National Association of the Remodeling Industry (*http://www.nari.org*)
- The following resources may be useful in providing financial and/or psychological support during your recovery from a flooding event:
  - American Red Cross (*http://www.redcross.org*)
  - Salvation Army (*http://www.salvationarmyusa.org/usn/www_usn.nsf*)
  - FEMA (*http://www.fema.gov*)
  - Small Business Administration (*http://www.sba.gov*)
  - State/local health departments - such as the North Carolina Department of Health and Human Services (*http://www.dhhs.state.nc.us/docs/hurricaneoccupant.htm*)

Attachment of Brick Veneer in High-Wind Regions

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend practices for installing brick veneer that will enhance wind resistance in high-wind areas.

Key Issues

- Brick veneer is frequently blown off walls of residential and commercial buildings (Figure 1). When brick veneer fails, wind-driven water can enter and damage buildings, and building occupants can be vulnerable to injury from windborne debris (particularly if walls are sheathed with plastic foam insulation or wood fiberboard in lieu of wood panels). Pedestrians in the vicinity of damaged walls can also be vulnerable to injury from falling veneer (Figure 2).
- Common failure modes include tie (anchor) fastener pull-out (Figure 3), failure of masons to embed ties into the mortar (Figure 4), poor bonding between ties and mortar and mortar of poor quality (Figure 5), and tie corrosion (Figure 6).
- Ties are often installed before brick laying begins. When this is done, ties are often improperly placed above or below the mortar joints. When misaligned, the ties must be angled up or down in order for the ties to be embedded into the mortar joints (Figure 7). Misalignment not only reduces embedment depth but also reduces the effectiveness of the ties because wind forces do not act parallel to the ties themselves.
- Corrugated ties typically used in residential veneer construction provide little resistance to compressive loads. Use of compression struts would likely be beneficial, but off-the-shelf devices do not currently exist. Two-piece adjustable ties (Figure 8) provide significantly greater compressive strength than corrugated ties.

Figure 1. Failed brick veneer. Plastic foam wall sheathing was installed over the wood studs (plywood was temporarily installed after the brick failure).

Figure 2. The upper portion of the brick veneer at this apartment building collapsed. Pedestrian and vehicular traffic in the vicinity of the damaged wall were vulnerable to injury and damage if remaining portions of the wall were to collapse during subsequent storms.

Figure 3. This tie remained embedded in the mortar joint while the smooth-shank nail pulled from the stud.

- Many buildings that exhibited damaged veneer were not in compliance with current building codes. Building code requirements for brick veneer have changed over the years. Model codes prior to 1995 permitted brick veneer in any location, with no wind speed restrictions. Wall area per tie in some model codes was greater than the current maximum. The current masonry code referenced in model building codes, Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402 (ACI 530) addresses brick veneer in two manners: rational design and prescriptive requirements. Essentially all brick veneer in residential and low-rise construction follows the prescriptive requirements. The first edition of American Concrete Institute's (ACI's) 530 limited the use of prescriptive design to areas with a basic wind speed of 110 mph or less. The 2005 edition of ACI 530 extended the prescriptive requirements to include a basic wind speed of 130 mph, with lower area per tie limits. In locations with a basic wind speed above 130 mph, the rational design approach must be used. Compliance with ACI 530-05 should reduce wind damage.
- The following Brick Industry Association (BIA) Technical Notes provide guidance on brick veneer: Technical Notes 28 – Anchored Brick Veneer, Wood Frame Construction, Technical Notes 28B – Brick Veneer/Steel Stud Walls, and Technical Notes 44B – Wall Ties (available online at www.bia.org). These Technical Notes provide attachment recommendations, but the recommendations are not specific for high-wind regions and are, therefore, inadequate.

Construction Guidance

The brick veneer wall system is complex in its behavior. There are limited test data on which to draw. The following guidance is based on professional judgment, wind loads specified in ASCE 7-02 "Design Loads for Buildings and Other Structures," fastener strengths specified in the American Forest and Paper Association's (AF&PA's) National Design Specification for Wood Construction, and brick veneer standards contained in ACI 530-05. In addition to the general guidance given in BIA Technical Notes 28 and 28B, the following are recommended:

Note: In areas that are also susceptible to high seismic loads, brick veneer should be evaluated by an engineer to ensure it can resist seismic and wind design loads.

Stud Spacing: For new construction, space studs 16" on center, so that ties can be anchored at this spacing.

Figure 4. These four ties were never embedded into the mortar joint.

Figure 5. This tie was embedded in the mortar, but the bond was poor.

Figure 6. There were several ties in this portion of the wall, but they failed due to severe corrosion.

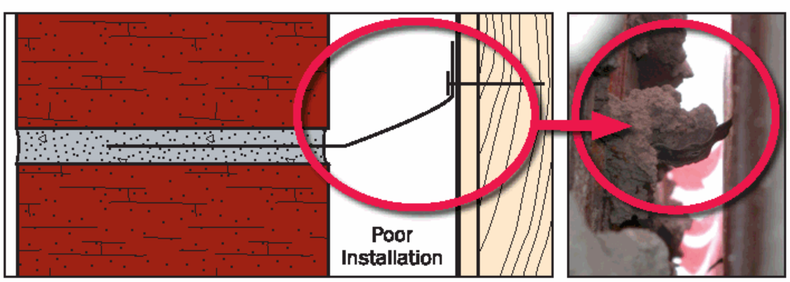


Figure 7. Misalignment of the tie reduces the embedment and promotes veneer failure.

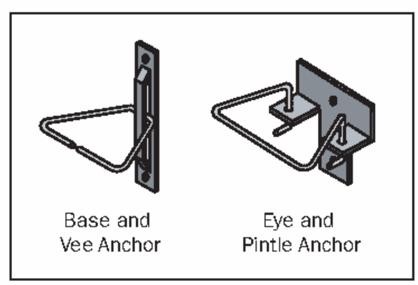


Figure 8. Examples of two-piece adjustable ties

Tie Fasteners: Ring-shank nails are recommended in lieu of smooth-shank nails. A minimum embedment of 2" is suggested.

Ties: For use with wood studs: two-piece adjustable ties are recommended. However, where corrugated steel ties are used, use 22-gauge minimum, 7/8" wide by 6" long, complying with ASTM A 366 with a zinc coating complying with ASTM A 153 Class B2. For ties for use with steel studs, see BIA "Technical Notes 28B – Brick Veneer/Steel Stud Walls." Stainless steel ties should be used in areas within 3,000 feet of the coast.

Tie Installation

- Install ties as the brick is laid so that the ties are properly aligned with the mortar joints.
- Install brick ties spaced per Table 1. Studs should be installed at 16" spacing. Veneer tie locations for 24" stud spacing are included for repairing damaged veneer on existing buildings with the wider stud spacing.
- Locate ties within 8" of door and window openings and within 12" of the top of veneer sections.
- Bend the ties at a 90-degree angle at the nail head in order to minimize tie flexing when the ties are loaded in tension or compression (Figure 9).
- Embed ties in joints so that mortar completely encapsulates the ties. Embed a minimum of 1.5" into the bed joint, with a minimum mortar cover of 5/8" to the outside face of the wall (Figure 10).

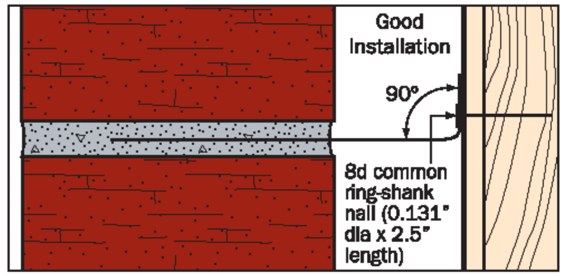


Figure 9. Bend ties at nail heads

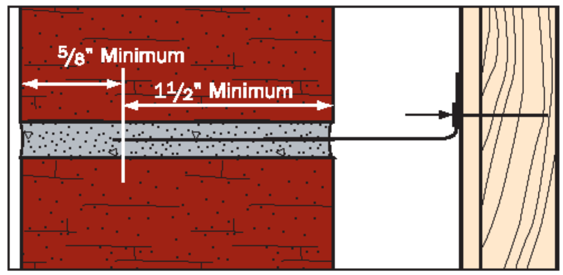


Figure 10. Tie embedment

Table 1. Brick Veneer Tie Spacing

Wind Speed (mph) (3-Second Peak Gust)	Wind Pressure (psf)	Maximum Vertical Spacing for Ties	
		16" stud spacing	24" stud spacing
90	17.8	18.0[a]	16.0[a]
100	22.0	18.0[a]	16.0[a]
110	26.6	18.0[a]	14.8
120	31.6	18.0[a]	NA[b]
130	37.1	15.9	NA[b]
140	43.0	13.7	NA[b]
150	49.4	10.2	NA[b]

Notes:

1. The tie spacing is based on wind loads derived from Method 1 of ASCE 7-02, for the corner area of buildings up to 30' high, located in Exposure B with an importance factor (I) of 1.0 and no topographic influence. For other heights, exposure, or importance factor, an engineered design is recommended.
2. Fastener strength is for wall framing with a Specific Gravity G=0.55 with moisture contents less than 19% and the following adjustment factors, Ct=0.8; and CD, CM, Ceg, and Ctn=1.0.
3. Nail embedment depth of 2" for 2.5" long 8d common (0.131" diameter) ring-shank fasteners

[a] Maximum spacing allowed by ACI 530-05

[b] 24" stud spacing exceeds the maximum horizontal tie spacing of ACI 530-05 prescribed for wind speeds over 100 mph

Attachment of Rooftop Equipment in High-Wind Regions

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend practices for designing and installing rooftop equipment that will enhance wind resistance in high-wind regions.

Note: For attachment of lightning protection systems, see Hurricane Katrina Recovery Advisory on Rooftop Attachment of Lightning Protection Systems in High-Wind Regions.

Key Issues

Rooftop equipment frequently becomes detached from rooftops during hurricanes. Water can enter the building at displaced equipment (see Figure 1); displaced equipment can puncture and tear roof coverings (thus allowing water to leak into the building). Equipment blown from a roof can damage buildings and injure people. Damaged equipment may no longer provide service to the building.

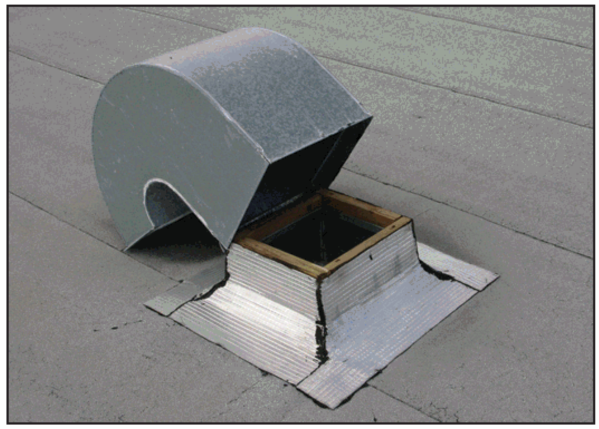


Figure 1. This gooseneck was attached with only two small screws. A substantial amount of water was able to enter the building during the hurricane.

Construction Guidance

Mechanical Penthouse: By placing equipment in mechanical penthouses rather than being exposed on the roof, equipment within penthouses is shielded from high-wind loads and windborne debris (see Figure 2). Therefore, use of mechanical penthouses designed and constructed in accordance with a current building code are recommended, particularly for critical and essential facilities.

Design Loads and Safety Factors: Loads on rooftop equipment should be determined in accordance with the 2005 edition of ASCE 7.

> Note: For guidance on load calculations, see "Calculating Wind Loads and Anchorage Requirements for Rooftop Equipment," ASHRAE Journal, volume 48, number 3, March 2006.

A minimum safety factor of 3 is recommended for critical and essential facilities, and a minimum safety factor of 2 is recommended for other buildings. Loads and resistance should also be calculated for heavy pieces of equipment (see Figure 2).

Figure 2. This 30' x 10' x 8' 18,000-pound HVAC unit was attached to its curb with 16 straps (one screw per strap). Although the wind speeds were estimated to be only 85 to 95 miles per hour (3-second peak gust), it blew off the building.

Simplified Attachment Table: To anchor fans, small HVAC units, and relief air hoods, the following minimum attachment schedule is recommended (see Table 1) (note: the attachment of the curb to the roof deck also needs to be designed to resist the design loads):

Table 1. Number of #12 Screws for Base Case Attachment of Rooftop Equipment

Case No.	Curb Size and Equipment Type	Equipment Attachment	Fastener Factor for Each Side of Curb or Flange
1	12"x 12" Curb with Gooseneck Relief Air Hood	Hood Screwed to Curb	1.6
2	12"x 12" Gooseneck Relief Air Hood with Flange	Flange Screwed to 22 Gauge Steel Roof Deck	2.8
3	12"x 12" Gooseneck Relief Air Hood with Flange	Flange Screwed to 15/32" OSB Roof Deck	2.9
4	24"x 24" Curb with Gooseneck Relief Air Hood	Hood Screwed to Curb	4.6
5	24"x 24" Gooseneck Relief Air Hood with Flange	Flange Screwed to 22 Gauge Steel Roof Deck	8.1
6	24"x 24" Gooseneck Relief Air Hood with Flange	Flange Screwed to 15/32" OSB Roof Deck	8.2
7	24"x 24" Curb with Exhaust Fan	Fan Screwed to Curb	2.5
8	36"x 36" Curb with Exhaust Fan	Fan Screwed to Curb	3.3
9	5'-9"x 3'- 8" Curb with 2'- 8" high HVAC Unit	HVAC Unit Screwed to Curb	4.5*
10	5'-9"x 3'- 8" Curb with 2'- 8" high Relief Air Hood	Hood Screwed to Curb	35.6*

Notes to Table:

1. The loads are based on the 2005 edition of ASCE 7. The resistance includes equipment weight.

2. The Base Case of the tabulated numbers of #12 screws (or ¼ pan-head screws for flange-attachment) is a 90-mph basic wind speed, 1.15 importance factor, 30' building height, Exposure C, using a safety factor of 3.

3. For other basic wind speeds, or for an importance factor of 1, multiply the tabulated number of #12 screws by $\left(\frac{V_D^2 \cdot I}{90^2 \cdot 1.15}\right)$ to determine the required number of #12 screws or (¼ pan-head screws) required for the desired basic wind speed, V_D (mph) and importance factor, I.

4. For other roof heights up to 200', multiply the tabulated number of #12 screws by (1.00 + 0.003 [h - 30]) to determine the required number of #12 screws or ¼ pan-head screws for buildings between 30' and 200'.

Example A: 24" x 24" exhaust fan screwed to curb (table row 7), Base Case conditions (see Note 1): 2.5 screws per side; therefore, round up and specify 3 screws per side.

Example B: 24" x 24" exhaust fan screwed to curb (table row 7), Base Case conditions, except 120 mph and importance factor of 1: 120^2 x 1 ÷ 90^2 x 1.15 = 1.55 x 2.5 screws per side = 3.86 screws per side; therefore, round up and specify 4 screws per side.

Example C: 24" x 24" exhaust fan screwed to curb (table row 7), Base Case conditions, except 150' roof height: 1.00 + 0.003 (150' - 30') = 1.00 + 0.36 = 1.36 x 2.5 screws per side = 3.4 screws per side; therefore, round down and specify 3 screws per side.

* This factor only applies to the long sides. At the short sides, use the fastener spacing used at the long sides.

Fan Cowling Attachment: Fans are frequently blown off their curbs because they are poorly attached. When fans are well attached, the cowlings frequently blow off (see Figure 3). Unless the fan manufacturer specifically engineered the cowling attachment to resist the design wind load, cable tie-downs (see Figure 4) are recommended to avoid cowling blow-off. For fan cowlings less than 4 feet in diameter, 1/8-inch diameter stainless steel cables are recommended.

Figure 3. Cowlings blew off two of the three fans shown in this photo. Cowlings can tear roof membranes and break glazing.

Figure 4. To overcome blow-off of the fan cowling, this cowling was attached to the curb with cables.

For larger cowlings, use 3/16-inch diameter cables. When the basic wind speed is 120 mph or less, specify two cables. Where the basic wind speed is greater than 120 mph, specify four cables. To minimize leakage potential at the anchor point, it is recommended that the cables be adequately anchored to the equipment curb (rather than anchored to the roof deck). The attachment of the curb itself also needs to be designed and specified.

Ductwork: To avoid wind and windborne debris damage to rooftop ductwork, it is recommended that ductwork not be installed on the roof (see Figure 5). If ductwork is installed on the roof, it is recommended that the gauge of the ducts and their attachment be sufficient to resist the design wind loads.

Figure 5. Two large openings remained (circled area and inset to the right) after the ductwork on this roof blew away.

Condensers: In lieu of placing rooftop-mounted condensers on wood sleepers resting on the roof (see Figure 6), it is recommended that condensers be anchored to equipment stands. (Note: the attachment of the stand to the roof deck also needs to be designed to resist the design loads.) In addition to anchoring the base of the condenser to the stand, two metal straps with two side-by-side #14 screws or bolts at each strap end are recommended (see Figure 7).

Figure 6. Sleeper-mounted condensers displaced by high winds.

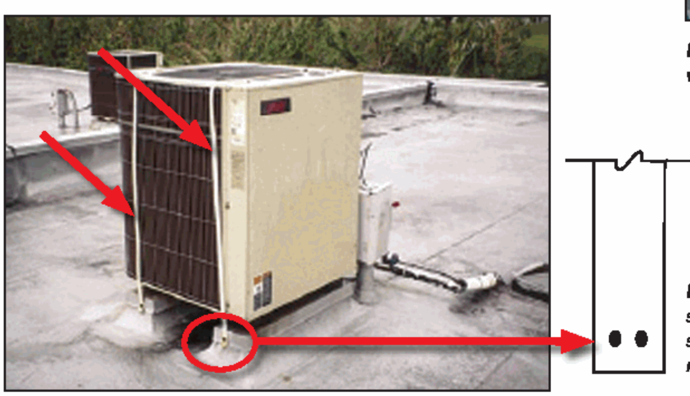


Figure 7. This condenser had supplemental securement straps (see arrows). Two side-by-side screws with the proper edge and end distances are recommended at the end of the strap.

Vibration Isolators: When equipment is mounted on vibration isolators, an isolator that has sufficient resistance to meet the design uplift loads should be specified and installed, or an alternative means to accommodate uplift resistance should be provided (see Figure 8).

Figure 8. The equipment on this stand was resting on vibration isolators that provided lateral resistance but no uplift resistance (above). A damaged vibration isolator is shown in the inset (left).

Access Panel Attachment: Access panels frequently blow off. To minimize blow-off of access panels, job-site modification will typically be necessary (for example, the attachment of hasps and locking devices such as a carabiner). The modification details will need to be tailored for the equipment, which may necessitate detail design after the equipment has been delivered to the job site. Modification details should be approved by the equipment manufacturer.

Figure 9. Several of the equipment screen panels were blown away. Loose panels can break glazing and puncture roof membranes.

Equipment Screens: Equipment screens around rooftop equipment are frequently blown away (see Figure 9). Equipment screens should be designed to resist the wind loads derived from ASCE 7.

Note: The extent that screens may reduce or increase wind loads on equipment is unknown. Therefore, the equipment behind screens should be designed to resist the loads previously noted.

Other resources: Three publications pertaining to seismic restraint of equipment provide general information on fasteners and edge distances:

- Installing Seismic Restraints for Mechanical Equipment (FEMA 412)
- Installing Seismic Restraints for Electrical Equipment (FEMA 413)
- Installing Seismic Restraints for Duct and Pipe (FEMA 414)

Rooftop Attachment of Lightning Protection Systems in High-Wind Regions

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend practices for installing lightning protection systems (LPS) that will enhance wind resistance in high-wind regions.

Key Issues

- Lightning protection systems frequently become disconnected from rooftops during hurricanes. Displaced LPS components can puncture and tear roof coverings, thus allowing water to leak into buildings (see Figures 1 and 2). Also, when displaced, the LPS is no longer capable of providing lightning protection in the vicinity of the displaced conductors ("cables") and air terminals ("lightning rods").
- Lightning protection standards such as NFPA 780 and UL 96A currently provide inadequate guidance for attachment of LPS to rooftops in high-wind regions.
- Some LPS manufacturers provide guidance for attachment, while other manufacturers refer to the roofing material manufacturer for attachment guidance. Some roofing material manufacturers provide guidance for attachment, while other manufacturers refer to the LPS manufacturer for attachment guidance. In most cases, the attachment guidance provided by LPS and roofing material manufacturers is inadequate for hurricane-prone regions.
- LPS conductors are typically attached to the roof at 3 foot intervals. Because the conductors are flexible, when they are exposed to high winds, the conductors exert dynamic loads on the conductor connectors ("clips"). Guidance for calculating the dynamic loads does not exist. The attachment guidance that follows is therefore based on professional judgment.
- LPS conductor connectors typically have prongs to anchor the conductor. When the connector is well-attached to the roof surface, during high winds the conductor frequently bends back the malleable connector prongs (see Figure 3). Conductor connectors have also debonded from roof surfaces during high winds. Based on observations after Hurricane Katrina and other hurricanes, it is apparent that pronged conductor connectors do not provide reliable attachment.

***Figure 1.** This displaced air terminal punctured the membrane in several locations.*

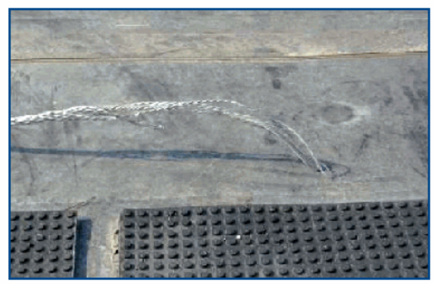
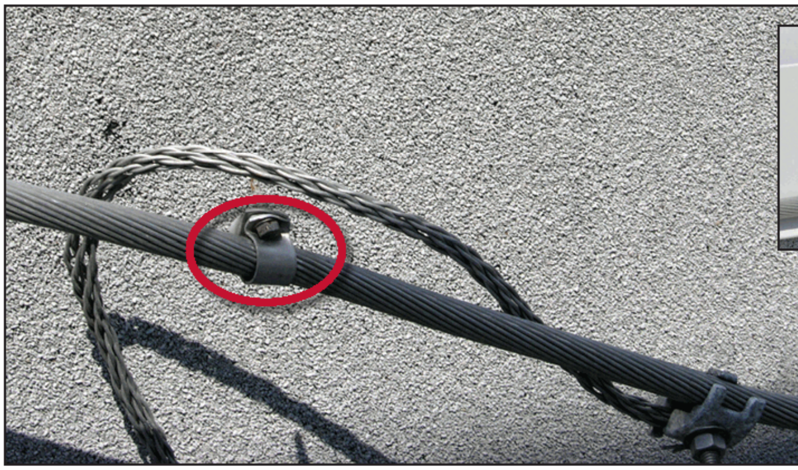


***Figure 2.** View of an abraded end of a conductor that became disconnected.*

***Figure 3.** During high winds, the conductor deformed the prongs and pulled away from this conductor connector.*

Construction Guidance

Parapet attachment: When the parapet is 12-inch high or greater, it is recommended that the air terminal base plates and conductor connectors be mechanically attached with #12 screws that have 1.25 inch minimum embedment into the inside face of the parapet nailer and properly sealed for watertight protection. In lieu of conductor connectors that have prongs, it is recommended that mechanically attached looped connectors be installed (see Figure 4).



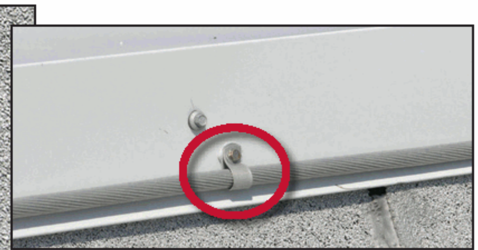


Figure 4. This conductor was attached to the coping with a looped connector (above). However, a gasket was not installed between the connector and the coping. Also, because the connector screws were too short to engage the wood nailer, the screws pulled out and the conductor was displaced in some areas (figure at left).

Attachment to built-up, modified bitumen and single-ply membranes: For built-up and modified bitumen membranes, attach air terminal base plates with asphalt roof cement. For single-ply membranes, attach air terminal base plates with pourable sealer (type recommended by the membrane manufacturer).

In lieu of attaching conductors with conductor connectors, it is recommended that conductors be attached with strips of membrane installed by the roofing contractor. For built-up and modified bitumen membranes, use strips of modified bitumen cap sheet, approximately 9-inch wide minimum. If strips are torch-applied, avoid overheating the conductors. For single-ply membranes, use self-adhering flashing strips, approximately 9" wide minimum. Start the strips approximately 3 inches from either side of the air terminal base plates. Place strips that are approximately 3' long, followed by a gap of approximately 3 inches (see Figure 5).

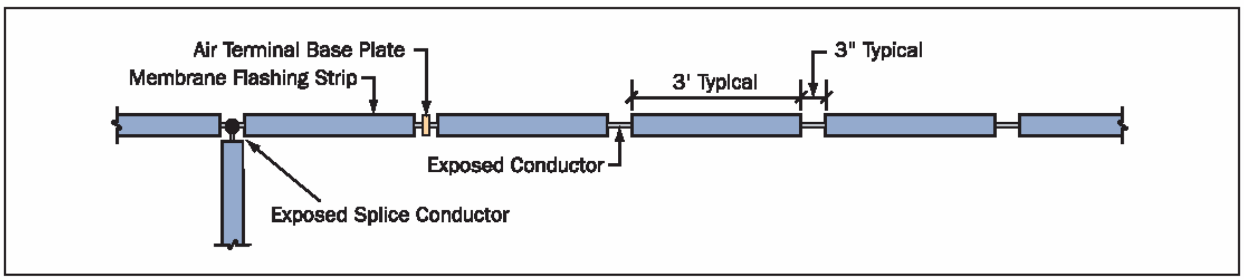


Figure 5. Plan showing conductor attachment.

Note: As an option to securing the conductors with stripping plies, conductor connectors that do not rely on prongs (such as the one shown in Figure 6) could be used. However, because the magnitude of the dynamic loads induced by the conductor are unknown and because of the lack of data on the resistance provided by adhesively-attached connectors, attachment with stripping plies is the preferred option because the stripping plies shield the conductor from the wind.

If adhesive-applied conductor connectors are used, it is recommended that they be spaced more closely than the 3 foot spacing required by NFPA 780 and UL 96A. Depending upon wind loads, spacings in the range of 6 to 12 inches on center may be needed in the corner regions of the roof, with spacings in the range of 12 to 18 inches on center at roof perimeters (see ASCE 7 for size of corner regions).

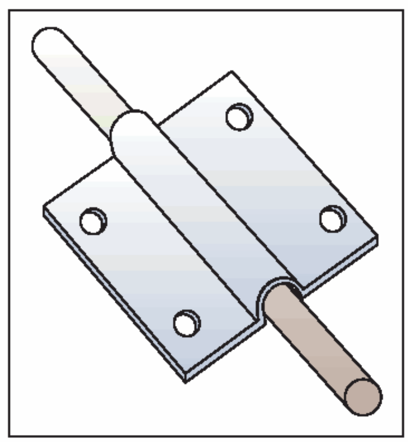


Figure 6. Adhesively-attached conductor connector that does not use prongs.

Figure 7. A failed prong-type splice connector. If conductors become detached from the roof, they are likely to pull from pronged splice connectors.

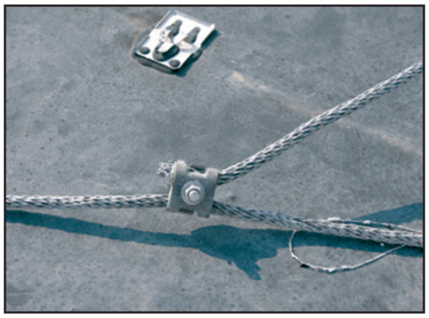


Figure 8. To avoid free ends of connectors being whipped around by wind, bolted splice connectors are recommended because they provide a more reliable connection.

Mechanically Attached Single-Ply Membranes: It is recommended that conductors be placed parallel and within 8 inches of membrane fastener rows. Where the conductor falls between or is perpendicular to membrane fastener rows, install an additional row of membrane fasteners where the conductor will be located and install a membrane cover-strip over the membrane fasteners. Place the conductor over the cover-strip and secure the conductor as recommended above.

Note: By following the above recommendations, additional rows of membrane fasteners beyond those needed to attach the membrane may be needed to accommodate layout of the conductors. The additional membrane fasteners and cover-strip should be coordinated with and installed by the roofing contractor.

Standing Seam Metal Roofs: It is recommended that pre-manufactured mechanically attached clips that are commonly used to attach various items to roof panels be used. After anchoring the clips to the panel ribs, the air terminal base plates and conductor connectors are anchored to the panel clips. In lieu of conductor connectors that have prongs, it is recommended that mechanically attached looped connectors be installed.

Conductor Splice Connectors: In lieu of pronged splice connectors (see Figure 7), bolted splice connectors are recommended (see Figure 8). It is recommended that strips of flashing membrane (as recommended above) be placed approximately 3 inches from either side of the splice connector to minimize conductor movement and avoid the possibility of the conductors from becoming disconnected. To allow for observation during maintenance inspections, do not cover the connectors.

Periodic Inspection and Maintenance: Each spring, it is recommended that the lightning protection system be inspected to verify that connectors are still attached to the roof surface and still engage the conductors. Also check to ensure that splice connectors are still secure. Inspections are also recommended after high wind events.

Strengthening Attachment of Existing Systems: On critically important buildings that use adhesively-attached connectors and pronged splice connectors, it is recommended that attachment modifications based on the Construction Guidance be made in order to provide more reliable securement.

Designing for Flood Levels Above the BFE

FEMA

HURRICANE KATRINA RECOVERY ADVISORY

Purpose: To recommend design and construction practices that reduce the likelihood of flood damage in the event that flood levels exceed the Base Flood Elevation (BFE).

Key Issues

- BFEs are established at a flood level, including wave effects, that has a 1-percent chance of being equaled or exceeded in any given year, also known as the 100-year flood or base flood. Floods more severe and less frequent than the 1-percent flood can occur in any year.
- Flood levels during some recent storms have exceeded BFEs depicted on the Flood Insurance Rate Maps (FIRMs), sometimes by several feet (see Figure 1). In many communities, flooding extended inland, well beyond the 100-year floodplain (Special Flood Hazard Area (SFHA)) shown on the FIRM (see Figure 2).
- Flood damage increases rapidly once the elevation of the flood extends above the lowest floor of a building, especially in areas subject to coastal waves. In a V Zone, a coastal flood with a wave crest 3 to 4 feet above the bottom of the floor beam (approximately 1 to 2 feet above the walking surface of the floor) will be sufficient to substantially damage or destroy most light-framed residential and commercial construction (see Figure 4).
- There are design and construction practices that can eliminate or minimize damage to buildings when flood levels exceed the BFE. The most common approach is to add freeboard to the design (i.e., to elevate the building higher than required by the FIRM).

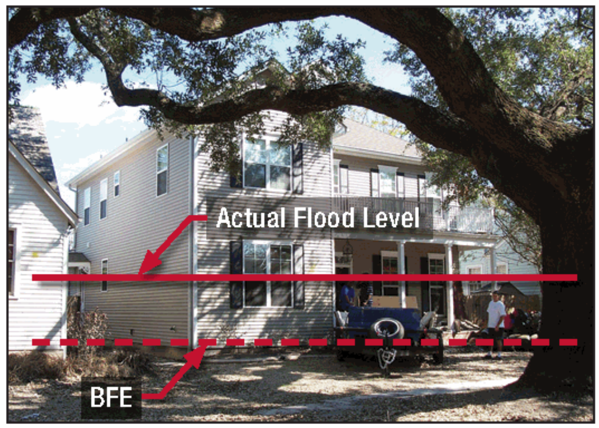
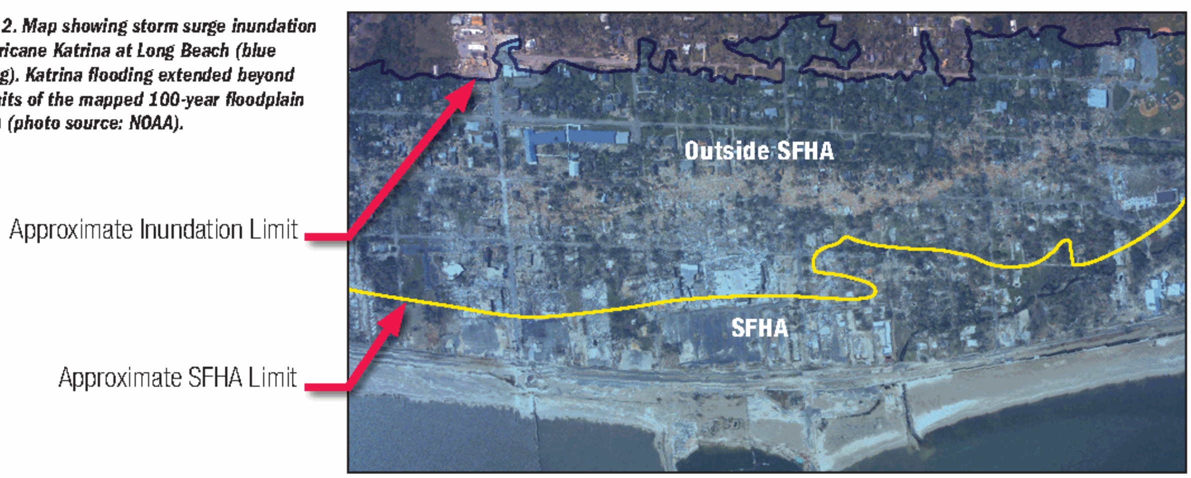


Figure 1. Levee failures and overtopping during Hurricanes Katrina and Rita (2005) resulted in flood levels (solid red line) several feet above the BFE (dashed red line) over large portions of the greater New Orleans area.

Figure 2. Map showing storm surge inundation by Hurricane Katrina at Long Beach (blue shading). Katrina flooding extended beyond the limits of the mapped 100-year floodplain (SFHA) (photo source: NOAA).



- There are other benefits of designing for flood levels above the BFE: reduced building damage and maintenance: longer building life; reduced flood insurance premiums; reduced displacement and dislocation of building occupants after floods (and need for temporary shelter and assistance); reduced job loss; and increased retention of tax base.

Flood Insurance Rate Maps and Flood Risk

Hurricanes Ivan (2004) and Katrina (2005) have demonstrated that constructing a building to the minimum National Flood Insurance Program (NFIP) requirements – or constructing a building outside the SFHA shown on the FIRMs – is no guarantee that the building will not be damaged by flooding. This is due to two factors: 1) flooding more severe than the base flood occurs, and 2) some FIRMs, particularly older FIRMs, may no longer depict the true base flood level and SFHA boundary.

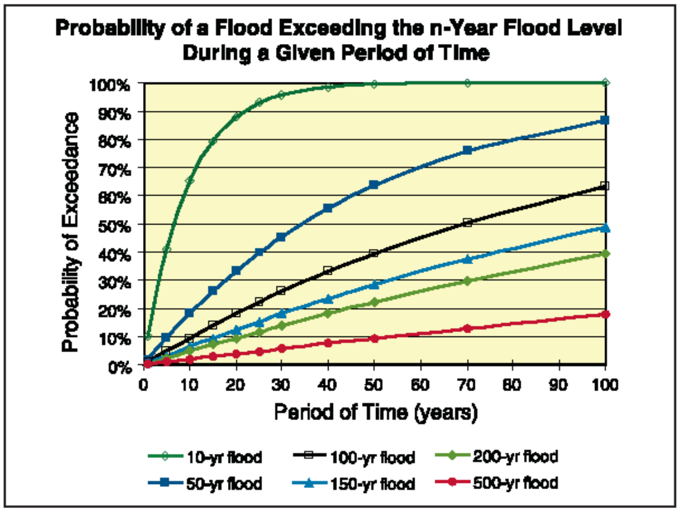


Figure 3. Probability that a flood will exceed the n-year flood level over a given period of time (Note: this analysis assumes no shoreline erosion, and no increase in sea level or storm frequency/severity over time).

The black line in Figure 3 shows the probability that the level of the flood will exceed the 100-year flood level during time periods between 1 year and 100 years; there is an 18-percent chance that the 100-year flood level will be exceeded in 20 years, a 39-percent chance it will be exceeded in 50 years, and a 51-percent chance it will be exceeded in 70 years. As the time period increases, the likelihood that the 100-year flood will be exceeded also increases.

Figure 3 also shows the probabilities that floods of other severities will be exceeded. For example, taking a 30-year time period where there is a 26-percent chance that the 100-year flood level will be exceeded, there is an 18-percent chance that the 150-year flood will be exceeded, a 14-percent chance that the 200-year flood will be exceeded, and a 6-percent chance that a flood more severe than the 500-year flood will occur.

FIRMs depict the limits of flooding, flood elevations, and flood hazard zones during the base flood. As seen in Figure 3, buildings elevated only to the BFEs shown on the FIRMs have a significant chance of being flooded over a period of decades. Users should also be aware that the flood limits, flood elevations, and flood hazard zones shown on the FIRM reflect ground elevations, development, and flood conditions at the time of the Flood Insurance Study (FIS).[1]

Consequences of Flood Levels Exceeding the BFE

Buildings are designed to resist most environmental hazards (e.g., wind, seismic, snow, etc.), but are generally designed to avoid flooding by elevating the building above the anticipated flood elevation. The difference in design approach is a result of the sudden onset of damage when a flood exceeds the lowest floor elevation of a building. Unlike wind – where exposure to a wind speed slightly above the design speed does not generally lead to severe building damage – occurrence of a flood level even a few inches above the lowest floor elevation generally leads to significant flood damage, therefore, the recommendation to add freeboard.

This is especially true in cases where waves accompany coastal flooding. Figure 4 illustrates the expected flood damage (expressed as a percent of a building's pre-damage market value) versus flood depth above the bottom of the lowest

FIRMs do not account for the following:

- Shoreline erosion, wetland loss, subsidence, and relative sea level rise
- Upland development or topographic changes
- Degradation or settlement of levees and floodwalls
- Changes in storm climatology (frequency and severity)
- The effects of multiple storm events

Thus, what was once an accurate depiction of the 100-year floodplain and flood elevations may no longer be so.

[1] Sections 7.8.1.3 and 7.9 of FEMA's *Coastal Construction Manual* (FEMA 55, 2000 ed.) provide guidance on evaluating a FIRM to determine whether it still provides an accurate depiction of base flood conditions, or whether it is obsolete.

horizontal structural member supporting the lowest floor (e.g., bottom of the floor beam), for a V Zone building and for a riverine A Zone building.[2]

One striking difference between the two curves is that a V Zone flood depth (wave crest elevation) 3 to 4 feet above the bottom of the floor beam (or approximately 1 to 2 feet above the top of the floor) is sufficient to cause substantial (>50 percent) damage to a building. In contrast, A Zone riverine flooding (without waves and high velocity) can submerge a structure without causing substantial damage. This difference in building damage is a direct result of the energy contained in coastal waves striking buildings – something obvious to those who saw the wave damage that Hurricane Katrina caused in Mississippi and Louisiana (see Figure 5).

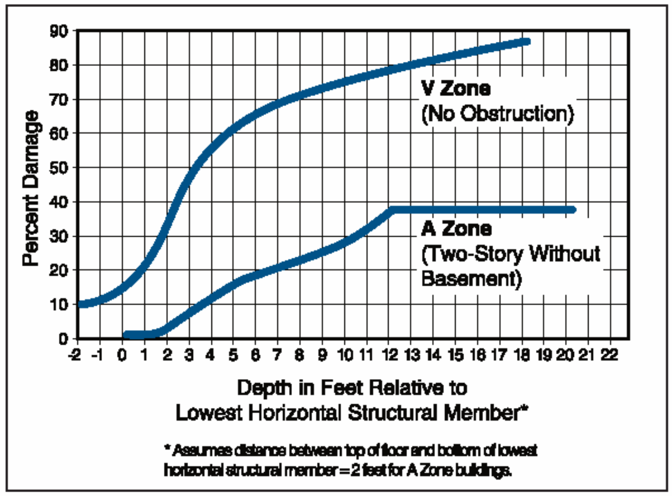


Figure 4. Flood depth versus building damage curves for V Zones and riverine A Zones (Source: FEMA 55, Coastal Construction Manual).

Figure 5. Hurricane Katrina damage to buildings in coastal Mississippi. The upper left, upper right, and lower left photos are of buildings that were close to the Gulf shoreline and subjected to storm surge above the floor and large waves striking the building walls. The lower right photo is of a building almost 1 mile from the Gulf, and subjected to storm surge flooding only.

[2] Since the normal floor reference for A Zone buildings is the top of the lowest floor, the A Zone curve was shifted for comparison with the V Zone curve.

In cases where buildings are situated behind levees, a levee failure can result in rapid flooding of the area. Buildings near a levee breach may be exposed to high velocity flows, and damages to those buildings will likely be characterized by the V Zone damage curve in Figure 4. Damages to buildings farther away from the breach will be a result of inundation by floodwaters, and will likely resemble the A Zone curve in Figure 4.

General Recommendations

The goal of this Advisory is to provide methods to minimize damage to buildings in the event that coastal flood levels rise above the BFE. Achieving this goal will require adherence to one or more of the following general recommendations:

- **In all areas where flooding is a concern**, inside and outside the SFHA, **elevate the lowest floor so that the bottom of the lowest horizontal structural member is at or above the Design Flood Elevation** (DFE). Do not place the top of the lowest floor at the DFE, since this guarantees flood damage to wood floor systems, wood floors, floor coverings, and lower walls during the design flood, and may lead to mold/contamination damage (see Figure 6).
- **In flood Zones V and A**, use a DFE that results in **freeboard** (elevate the lowest floor above the BFE) (see Figure 7).
- In flood Zones V and A, **calculate design loads and conditions** (hydrostatic loads, hydrodynamic loads, wave loads, floating debris loads, and erosion and scour) under the assumption that the flood level will exceed the BFE.
- In an **A Zone subject to waves and erosion** (i.e., a Coastal A Zone), use a pile or column foundation (see Figure 7).
- Outside the SFHA (in **flood Zones B, C, and X**), **adopt flood-resistant design and construction practices** if historical evidence or a review of the available flood data shows the building could be damaged by a flood more severe than the base flood (see Figure 8).
- **Design and construct buildings using the latest model building code, ASCE 7-05** *Minimum Design Loads for Buildings and Other Structures* and **ASCE 24-05** *Standard for Flood Resistant Design and Construction*.
- **Follow the recommendations in FEMA 499**, *Home Builder's Guide to Coastal Construction Technical Fact Sheets* Series (available at http://www.fema.gov/rebuild/mat/mat_fema499.shtm).
- **Use the pre-engineered foundations shown in FEMA 550**, *Recommended Residential Construction for the Gulf Coast: Building on Strong and Safe Foundations*).

Figure 6. Other concerns when flood levels rise above the lowest floor are mold and biological/chemical contamination. These may render an otherwise repairable building unrepairable, or will at least make the cleanup, restoration, and repairs much more expensive and time-consuming.

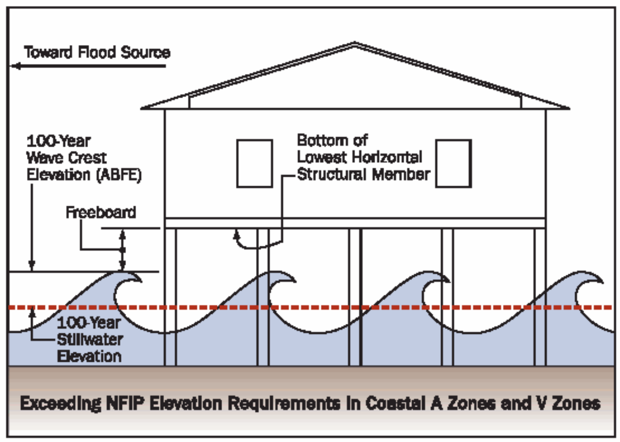


Figure 7. Recommended construction in Coastal A Zones and V Zones.

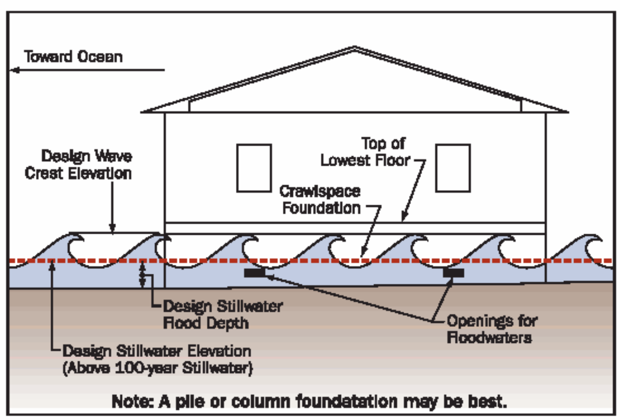


Figure 8. Recommended construction in Zones B, C, and X.

- Use **strong connections between the foundation and the elevated building** to prevent the building from floating or washing off the foundation, in the event that flood levels do rise above the lowest floor.
- Use **flood damage resistant building materials and methods** above the lowest floor. For example, consider using drainable, dryable interior wall assemblies (see Figure 9). This allows interior walls to be opened up and dried after a flood above the lowest floor, minimizing damage to the structure. For cavity and mass wall assemblies, the methods and materials in Figures 10 and 11 are recommended.

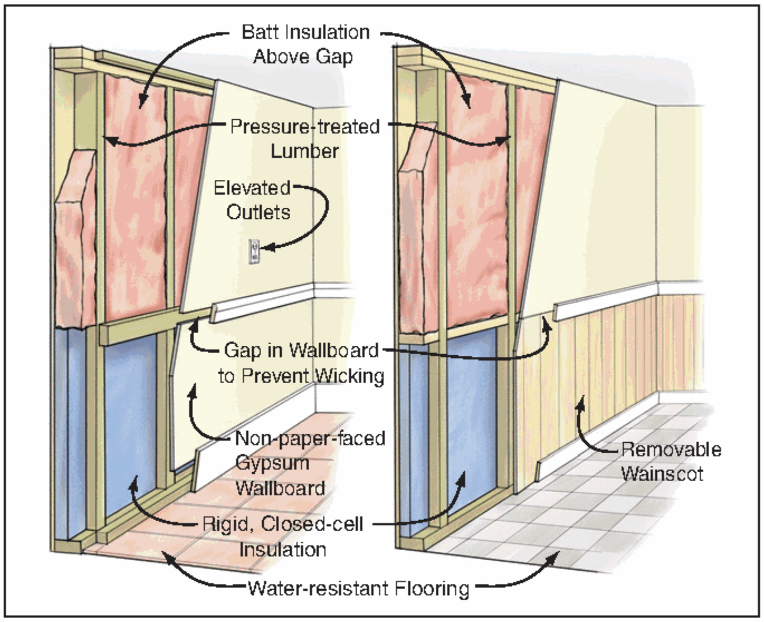


Figure 9. Recommended wet floodproofing techniques for interior wall construction. The following flood damage resistant materials and methods will prevent wicking and limit flood damage: 1) construct walls with horizontal gaps in wallboard; 2) use non-paper-faced gypsum wallboard below gap, painted with latex paint; 3) use rigid, closed-cell insulation in lower portion of walls; 4) use water-resistant flooring with waterproof adhesive; and 5) use pressure treated wood framing (Source: LSU AgCenter and Coastal Contractor Magazine).

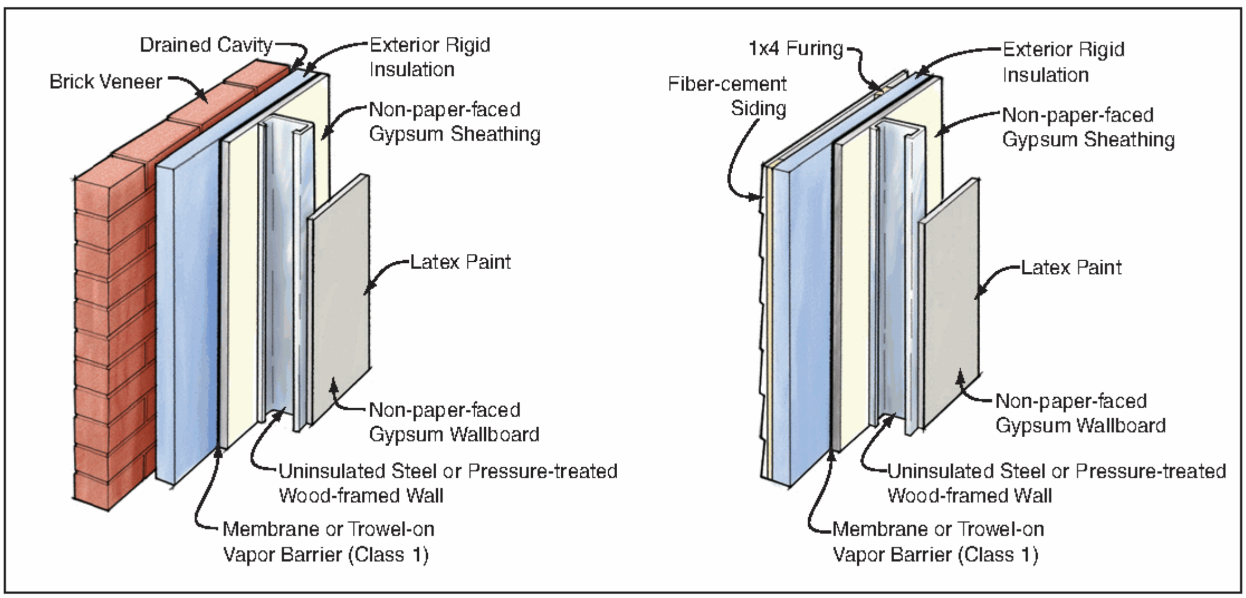


Figure 10. Recommended flood-resistant exterior cavity wall construction. The following materials and methods will limit flood damage to exterior cavity walls: 1) use brick veneer or fiber-cement siding, with non-paper-faced gypsum sheathing (vinyl siding is also flood-resistant but is less resistant to wind damage); 2) provide cavity for drainage; 3) use rigid, closed-cell insulation; 4) use steel or pressure treated wood studs and framing; and 5) use non-paper-faced gypsum wallboard painted with latex paint (Source: Coastal Contractor Magazine and Building Science Corporation).

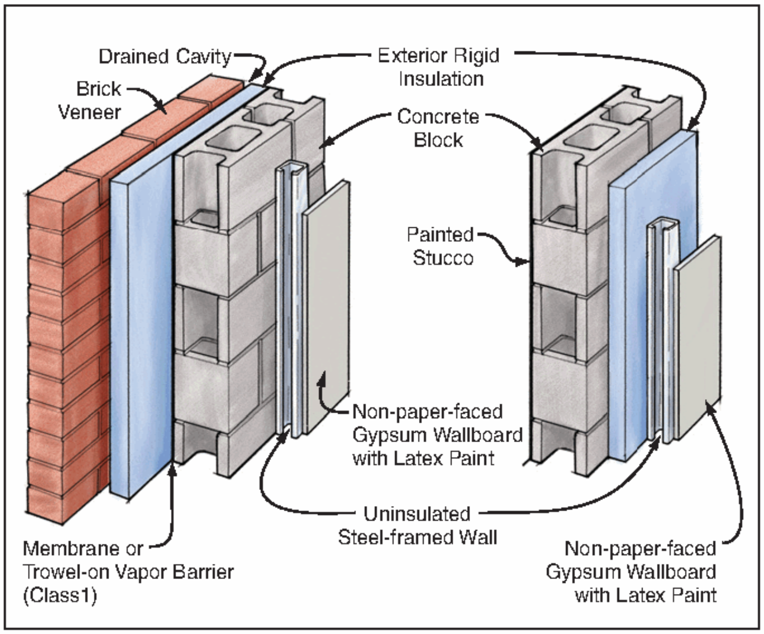


Figure 11. Recommended flood-resistant exterior mass wall construction. The following materials and methods will limit flood damage to exterior mass walls: 1) use concrete masonry with stucco or brick veneer (provide drainage cavity if brick veneer is used); 2) use rigid, closed-cell insulation; 3) use steel framing; and 4) use non-paper-faced gypsum wallboard painted with latex paint (Source: Coastal Contractor Magazine and Building Science Corporation).

- **New and replacement manufactured homes should be installed in accordance with the provisions of the 2005 edition of NEPA 225,** *Model Manufactured Home Installation Standard* (http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=225&cookie%5Ftest=1). The standard provides flood, wind, and seismic resistant installation procedures. It also calls for elevating A Zone manufactured homes with the bottom of the main chassis frame beam at or above the BFE, not with the top of the floor at the BFE.

How High Above the BFE Should a Building be Elevated?

Ultimately, the building elevation will depend on several factors, all of which must be considered before a final determination is made:

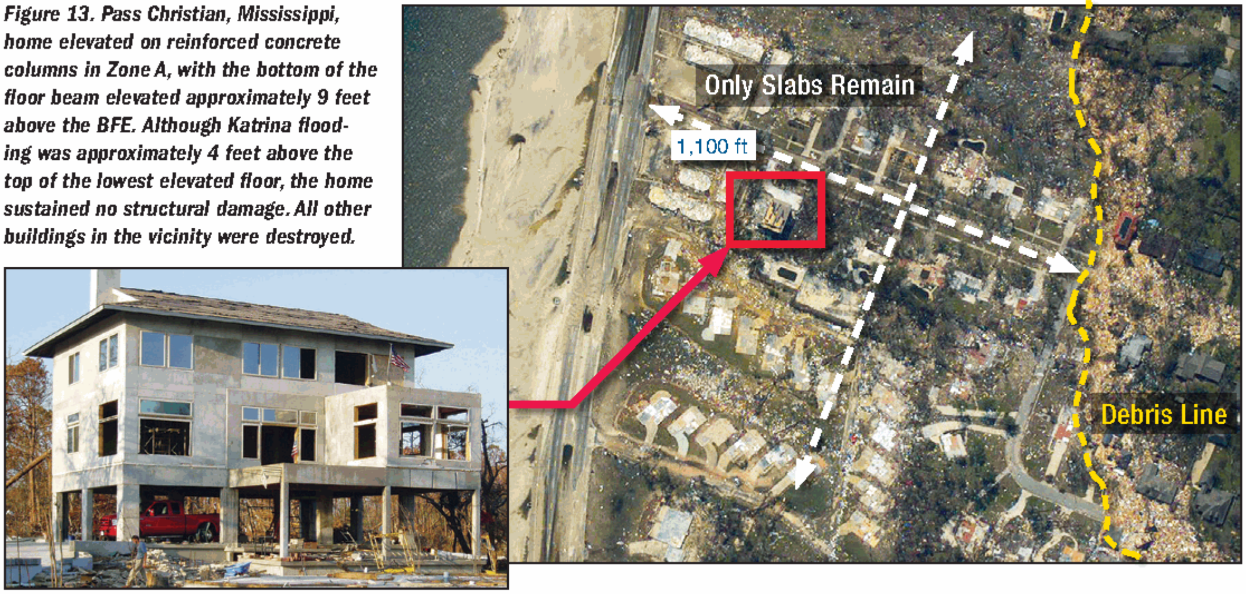
- **The accuracy of the BFE shown on the FIRM:** If the BFE is suspect, it is probably best to elevate several feet above the BFE; if the BFE is deemed accurate, it may only be necessary to elevate a couple of feet above the BFE.
- **Availability of Advisory Base Flood Elevations (ABFEs):** ABFEs have been produced for coastal areas following Hurricanes Ivan, Katrina, and Rita. These elevations are intended to be interim recommendations until new FISs can be completed. Some communities have adopted ABFEs, but not all (see the Hurricane Katrina Recovery Advisory posted at http://www.fema.gov/pdf/rebuild/mat/reconst_guidance.pdf).
- **Future conditions:** Since the FIRM reflects conditions at the time of the FIS, some owners or jurisdictions may wish to consider future conditions (such as sea level rise, wetland loss, shoreline erosion, increased storm frequency/intensity, and levee settlement/failure) when they decide how high to elevate.
- **State or local requirements:** The state or local jurisdiction may require a minimum freeboard through its floodplain management regulations.
- **Building code requirements:** The International Building Code (IBC) requires buildings be designed and constructed in accordance with ASCE 24 (*Standard for Flood Resistant Design and Construction*). ASCE 24 requires between 0 and 2 feet of freeboard, depending on the building importance and the edition of ASCE 24 referenced.[3]
- **Critical and essential facilities:** Given the importance of these facilities, some of which must remain operational during a hurricane, they should be elevated higher than most commercial and residential buildings.

[3] The 1998 edition of ASCE 24 is referenced by the 2003 edition of the IBC, and requires between 0 and 1 feet of freeboard. The 2005 edition of ASCE 24 is referenced by the 2006 edition of the IBC, and requires between 0 and 2 feet of freeboard.

- **Building owner tolerance for damage, displacement, and downtime:** Some building owners may wish to avoid building damage and disruption, and may choose to elevate far above the BFE (see Figures 12 and 13).

Figure 12. Ocean Springs, Mississippi, home elevated approximately 14 feet above the BFE. Katrina flooding was 4 feet below the elevated floor (photo taken after the storm surge had dropped several feet. Courtesy of Ocean Springs, Mississippi, fire chief).

Figure 13. Pass Christian, Mississippi, home elevated on reinforced concrete columns in Zone A, with the bottom of the floor beam elevated approximately 9 feet above the BFE. Although Katrina flooding was approximately 4 feet above the top of the lowest elevated floor, the home sustained no structural damage. All other buildings in the vicinity were destroyed.



The *Hurricane Katrina Summary Report on Building Performance* (FEMA 548) recommends that critical and essential facilities be elevated to the 500-year flood elevation or based on the requirements of ASCE 24-05, whichever is higher. This recommendation may also be appropriate for residential and commercial structures, as well.

The 500-year elevation can be approximated as 1.5 times the 500-year stillwater depth (500-year stillwater elevation minus the ground elevation) added to the ground elevation. This procedure is similar to the procedure used to calculate ABFEs, but with a different stillwater level.

> If the 500-year stillwater elevation (feet North American Vertical Datum of 1988 [NAVD] or feet National Geodetic Vertical Datum of 1929 [NGVD]) is not available, a rule of thumb can be used to approximate it as 1.25 times the 100-year stillwater elevation (feet NAVD or feet NGVD).

Coastal A Zones

The Coastal A Zone is the area where wave heights between 1.5 and 3.0 feet are expected during the base flood. It is recommended that buildings in this area, with a few exceptions, be designed and constructed similar to V Zone buildings. See the Hurricane Katrina Recovery Advisory at http://www.fema.gov/pdf/rebuild/mat/coastal_a_zones.pdf for details.

Other Considerations

As previously stated, in addition to reduced building damage, there are other reasons to design for flood levels above the BFE:

- Reduced building maintenance and longer building life
- Reduced flood insurance premiums
- Reduced displacement and dislocation of building occupants after floods (and need for temporary shelter and assistance)
- Reduced job loss
- Increased retention of tax base

Until flooded, many homeowners and communities don't think about these benefits. However, one of the most persuasive (to homeowners) arguments for elevating homes above the BFE is the reduction in annual flood insurance premiums. In most cases, flood premiums can be cut in half by elevating a home 2 feet above the BFE, saving several hundred dollars per year in A Zones, and $2,000 or more per year in V Zones. In V Zones, savings continue to increase with added freeboard.

Flood Insurance Premium Reductions Can Be Significant

Example 1: V Zone building, supported on piles or piers, no below-BFE enclosure or obstruction. $250,000 building coverage, $100,000 contents coverage.		**Example 2:** A Zone building, slab or crawlspace foundation (no basement). $200,000 building coverage, $75,000 contents coverage.	
Floor Elevation above BFE	**Reduction in Annual Flood Premium***	**Floor Elevation above BFE**	**Reduction in Annual Flood Premium***
1 foot	25%	1 foot	39%
2 feet	50%	2 feet	48%
3 feet	62%	3 feet	48%
4 feet	67%	4 feet	48%

* Compared to flood premium with lowest floor at BFE

References

ASCE. 2005. *Minimum Design Loads for Buildings and Other Structures*. ASCE 7-05.

ASCE. 2005. *Standard for Flood Resistant Design and Construction*. ASCE 24-05.

Building Science Corporation. 2006. (relevant articles and publications are available at http://www.buildingscience.com).

Coastal Contractor. July 2006. *Low Country Rx: Wet Floodproofing. Drainable, dryable assemblies made with water-tolerant materials help speed recovery from deeper than-expected floods*, by Ted Cushman. (available at http://www.coastalcontractor.net/cgi-bin/issue.pl?issue=9).

FEMA. 2000. *Coastal Construction Manual*. FEMA-55 (ordering information at http://www.fema.gov/pdf/plan/prevent/nhp/nhp_fema55.pdf).

FEMA. 2005. *Home Builder's Guide to Coastal Construction Fact Sheets* Series. FEMA 499 (available at http://www.fema.gov/rebuild/mat/mat_fema499.shtm).

FEMA. 2006. *Hurricane Katrina Summary Report*. FEMA-548 (available at http://www.fema.gov/pdf/rebuild/mat/fema548/548_SumRprt0329fnl.pdf).

FEMA. 2006. *Recommended Residential Construction for the Gulf Coast, Building on Strong and Safe Foundations*. FEMA-550.

LSU AgCenter. 1999. *Wet Floodproofing. Reducing Damage from Floods*. Publication 2771. (available at http://www.louisianafloods.org/NR/rdonlyres/2AEAF3E7-F068-40E6-A4CD-C4B6901F4307/26120/pub2771Wet6.pdf).

NFPA. 2005. *Model Manufactured Home Installation Standard*. NFPA 225. (available at http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=225&cookie%5Ftest=1).

SP8091

60

Date Submitted	12/14/2018	**Section**	1401	**Proponent**	Cheryl Harris
Chapter	14	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

8163

Summary of Modification

Modification adds Surface and Subsurface Landscape Irrigation Systems connected to either potable or nonpotable water supplies and modifies the current Chapter 14 numbering system to integrate into the new section. Current code addresses subsurface irrigation connected to nonpotable water supply.

Rationale

Chapter 14 of the Plumbing Code was added during the last cycle direct from ICC Green Construction. However, it only addressed subsurface landscape irrigation systems connected to nonpotable water sources. The majority of Florida's landscape/turf irrigation is done by surface systems and subsurface systems connected to both potable and non potable water sources not from on-site reuse systems. Without addressing all types of irrigation systems the code now in place intended to encourage water conservation does little to conserve or protect the quality of Florida's water. The most widely used method of irrigation not addressed in code uses approximately 40% of Florida's water. Properly designed and installed irrigation systems will save and improve the quality of Florida's limited water resources.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Minimal except jurisdictions w/o local ordinance requiring permits. Unknown how many jurisdictions do not have commercial or residential irrigation requirements. Backflow device inspection is required so costs for adding inspection at same time for irrigation could be recovered by permit fees.

Impact to building and property owners relative to cost of compliance with code

Irrigation system is optional. If system is installed it should be done in accordance to a standard that conserves water supply and quality. Offset to any extra cost would be in the savings of consumers water bills and cost to the public to find new water sources.

Impact to industry relative to the cost of compliance with code

No impact to the irrigation industry relative to compliance with code.

Impact to small business relative to the cost of compliance with code

No impact to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Conservation of Florida's water supply and quality through proper installation of irrigation systems is critical to the health and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens code by adding a standard for design and installation of irrigation systems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Modification does not discriminate.

Does not degrade the effectiveness of the code

Modification does not degrade but to the contrary improves the effectiveness of the code.

Alternate Language

1st Comment Period History

8091-A2

Proponent Eberhard Roeder **Submitted** 2/18/2019 **Attachments** Yes

Rationale

The proposed alternate language achieves the objective of the Florida Irrigation Society to include irrigation language in Chapter 14. It clarifies that onsite sewage treatment and disposal systems and their drainfields are regulated by Chapter 64E-6, Florida Administrative Code. This will avoid conflicts between Plumbing Code and Florida Onsite Sewage Statutes. The proposed alternate language deletes the language that my proposed modification 8384 aimed to delete as well. Several smaller edits for clarity are also included. The proposed alternate language was the result of discussions with Ms. Harris of the Florida Irrigation Society, the author of this modification 8091.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Proposal simplifies enforcement by clarifying that there is a single jurisdiction over onsite sewage treatment and disposal systems. Graywater systems are included in the definition of “onsite sewage treatment and disposal system” per 381.0065(2)(k) Fl. Statutes. No impact on local entities.

Impact to building and property owners relative to cost of compliance with code

Simplifies compliance with code by avoiding conflicts with Department of Health regulations. No impact on building and property owners, the existing requirements remain the same.

Impact to industry relative to the cost of compliance with code

Simplifies compliance with code by avoiding conflicts with Department of Health regulations. No impact, the existing requirements remain the same.

Impact to Small Business relative to the cost of compliance with code

No impact to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Sanitary wastewater, including of graywater, disposal protects public health and the environment, and a clear code helps to achieve that. Application of Florida’s onsite sewage regulations provides uniformity and protection.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed modification makes the code clearer by avoiding conflict with another state regulation, namely 64E-6, Florida Administrative Code, which provides at least equivalent methods.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed modification does not discriminate in this manner.

Does not degrade the effectiveness of the code

By making the building code and the onsite sewage treatment code more consistent with each other the code system overall will become more effective.

Alternate Language

1st Comment Period History

8091-A1

Proponent Cheryl Harris **Submitted** 2/18/2019 **Attachments** Yes

Rationale

After reviewing the Modification number SP8384 submitted by the Florida Department of Health, the Florida Irrigation Society agrees with the rationale of completely eliminating the content of Chapter 14 as it was published in the 2017 Florida Building Code Plumbing. This change would eliminate a potential conflict between Florida Building Code and the Florida Administrative Code that is already in effect governing subsurface irrigation systems. However, we suggest alternate language for Chapter 14 and the scope in Section 1401 to cover irrigation systems EXCEPT for systems connected to on-site sewage treatment and disposal systems and add wording for design and installation of all other irrigation systems. There were also minor changes in wording in the following for grammar, correction of definition, correction of Agency Title: 1401.5.9, 1401.12.1.2, 1401.13.7, 1401.14.1.5 and 1401.14.1.6. from the original submittal.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The alternate language clarifies that that the Department of Health/FAC has jurisdiction over subsurface connection to onsite wastewater treatment and sewage treatment reuse systems for irrigation purposes.

Impact to building and property owners relative to cost of compliance with code

There would be no change in cost to comply as current Florida Administrative Code is in place and would continue to prevail.

Impact to industry relative to the cost of compliance with code

There would be no change in cost to comply as current Florida Administrative Code is in place and would continue to prevail.

Impact to Small Business relative to the cost of compliance with code

No impact to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Clarifies that the Department of Health has jurisdiction over onsite wastewater and sewage treatment water reuse systems.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

CHAPTER14
LANDSCAPE IRRIGATION SY
SECTION 1401
GENERAL

1401.1Scope.
The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ turf and land ~~reuse~~ systems.
Exception: All Turf and Landscape irrigation systems serving as drainfields for onsite sewage treatment and disposa Onsite Sewage Treatment and Disposal Systems.

~~SECTION 1402~~
~~Subsurface Landscape Irrigation Systems Connected to Nor~~

-
~~**1402.1 Scope.**~~
~~The provisions of Section 1402 shall govern the materials, design, construction and installation of subsurface landscape irriga~~
-
~~**1402.2 1402.2Materials.**~~
~~Above-ground drain, waste and vent piping for subsurface landscape irrigation systems connected to NonPotabale On-site landscape irrigation, underground building drainage and vent pipe shall conform to one of the standards listed in Table 7~~
~~**1401.3 1402.3Tests.**~~
~~Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.~~
~~**1401.4 1402.4Inspections.**~~
~~Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code*,~~
~~**1401.5 1402.5Disinfection.**~~
~~Disinfection shall not be required for on-site nonpotable water reuse for subsurface landscape irrigation systems.~~
~~**1401.6 1402.6Coloring.**~~
~~On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~SECTION1402~~
~~SYSTEM DESIGN AND SIZ~~

~~**1402.1 1402.7Sizing.**~~
~~The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface i irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on equation:~~

~~**where:**~~
~~***A* = Number of occupants:**~~
~~**Residential – Number of occupants shall be determined by the actual number of occupants, but not less than two**~~
~~**Commercial – Number of occupants shall be determined by the *Florida Building Code, Building*.**~~
~~***B* = Estimated flow demands for each occupant:**~~
~~**Residential – 25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per d**~~
~~**Commercial – Based on type of fixture or water use records minus the discharge of fixtures other than those discl**~~
~~***C* = Estimated gray water discharge based on the total number of occupants.**~~
~~**1402.2 1402.8Percolation tests.**~~
~~The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability e~~
~~**1402.2.1 1402.8.1Percolation tests and procedures.**~~
~~At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to where necessary, depending on system design.~~
~~**1402.2.1.1 1402.8.1.1Percolation test hole.**~~
~~The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inc pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be c~~
~~**1402.2.1.2 1402.8.1.2Test procedure, sandy soils.**~~

~~The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests ir procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test s above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute in minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (15 be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be us in accordance with Section 1303.7.1.3.~~

~~1402.2.1.3 1402.8.1.3Test procedure, other soils.~~

~~The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole sl or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a p (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a p nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the lim away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.~~

~~1402.2.1.4 1402.8.1.4Mechanical test equipment.~~

~~Mechanical percolation test equipment shall be of an *approved* type.~~

~~1402.2.2 1402.8.2Permeability evaluation.~~

~~Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluat evaluating the soil.~~

~~1402.3 1402.9Subsurface landscape irrigation site location.~~

~~The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be lo 1402.3 1402.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. S lots.~~

~~TABLE 1402.3 1402.9~~
~~LOCATION OF SUBSURFACE IRRIGA~~

~~ELEMENT~~	~~Storage tank (feet)~~
~~Buildings~~	~~5~~
~~Lot line adjoining private property~~	~~5~~
~~Water wells~~	~~50~~
~~Streams and lakes~~	~~50~~
~~Seepage pits~~	~~5~~
~~Septic tanks~~	~~0~~
~~Water service~~	~~5~~
~~Public water main~~	~~10~~

~~For SI: 1 foot = 304.8 mm.~~

~~SECTION14031~~
~~INSTALLATION~~

~~14031.1 1402.10Installation.~~

~~Absorption systems shall be installed in accordance with Sections 14031.1.1 1402.10.1 through 14031.1.5 1402.10.1.5 to~~

~~14031.1.1 1402.10.1Absorption area.~~

~~The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loa estimated gray water discharge divided by the design-loading rate from Table 14031.1.1 1402.10.1.~~

~~TABLE 14031.1.1 1402.10.1~~
~~DESIGN LOADING RATE~~

~~PERCOLATION RATE(minutes per inch)~~	~~DESI~~
~~0 to less than 10~~	
~~10 to less than 30~~	
~~30 to less than 45~~	

~~45 to 60~~

~~For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².~~

-

~~14031.1.2 1402.10.1.2 Seepage trench excavations.~~

~~Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width~~ ~~area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pi~~ ~~*length.*~~

-

~~14031.1.3 1402.10.1.3 Seepage bed excavations.~~

~~Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The~~ ~~Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 fee~~ ~~the sidewall or headwall.~~

~~14031.1.4 1402.10.1.4 Excavation and construction.~~

~~The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the s~~ ~~compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the dept~~ ~~excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation botto~~ ~~removed.~~

~~14031.1.5 1402.10.1.5 Aggregate and backfill.~~

~~Not less than 6 inches in depth of aggregate, ranging in size from ½ to 2½ inches (12.7 mm to 64 mm), shall be laid into~~ ~~not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with *appro*~~ ~~paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above t~~

-

-

-

~~14031.2 1402.11Distribution piping.~~

~~Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 14031.2 14~~ ~~original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches~~

~~TABLE 14031.2 1402.11~~
~~DISTRIBUTION PIPE~~

~~MATERIAL~~
~~Polyethylene (PE) plastic pipe~~
~~Polyvinyl chloride (PVC) plastic pipe~~
~~Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core~~

~~For SI: 1 inch=25.4 mm.~~

~~14031.2.1Joints.~~

~~Joints in distribution pipe shall be made in accordance with Section 705 of this code.~~

-

~~SECTION 14031~~
~~Surface and Subsurface Landscape Irri~~

-

~~14031.1 Scope.~~

~~The provisions of Section 14031 shall govern the materials, design, construction and installation of turf and~~ ~~permanent above ground or subsurface sprinkler or microsprinkler equipment that move water through variou~~

140~~3~~1.1.2 This section shall apply to all irrigation systems used on residential and commercial landscape are

140~~3~~1.1.3 This section shall apply to all new irrigation systems and any new work to existing irrigation system

Exception. This section shall not apply to irrigation systems for golf courses, nurseries, greenhouses, or agricultural production systems.

140~~3~~1.1.4 Nothing contained in this section shall be deemed to require any irrigation system or part there modified to meet the standards of this code.

140~~3~~1.2 Permits.

140~~3~~1.2.1 A permit shall be required for new installation of landscape irrigation systems and for repairs or mo on invoice value.

140~~3~~1.2.2 No permit shall be required for general maintenance or repairs which do not change the structure material based on invoice value. -

140~~3~~1.3 Preconstruction submittals.

140~~3~~1.3.1 Plans or drawings.

140~~3~~1.3.1.1 Single-family residence. Design drawings or shop drawings, where required, shall be provided shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and include all improveme licensed landscape architect.

140~~3~~1.3.1.2 Commercial, industrial, municipal and multiple-family. Professionally designed drawings pric drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all im specifications which list all aspects of equipment and assembly there of, water source, water meter and/or location, design operating pressure and flow rate per zone, precipitation rate per zone, locations of pipe, specifications shall be prepared in accordance with Section 107 of the Florida Building Code, Building.

140~~3~~1.4 Definitions. The following definitions are exclusive to this section of the code.

ABS Pipe. Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limite (see ASTM D 1788).

Air Release Valve. A valve which will automatically release to the atmosphere accumulated small pockets of a Air release valves are normally required at all summits of mainline and submain pipelines in an irrigation syste

Anti-Siphon Device. A safety device used to prevent back-flow of irrigation water to the water source by bac

Application Rate. The average rate at which water is applied by an irrigation system, sometimes also called

Application uniformity. Irrigation application uniformity (also known as distribution uniformity) describes how

Arc. The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc wou

Atmospheric Vacuum Breaker (AVB). An anti-siphon backflow device which uses a floating seat to allow an

Automatic Control Valve. A valve in a sprinkler system which is activated by an automatic controller by way o

Automatic System. An irrigation system which operates following a preset program entered into an automati

Backflow Prevention Device. An approved safety device used to prevent pollution or contamination of the ir

Belled (Pipe). Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inser

Block (of sprinklers). A group of sprinklers controlled by one valve. Also called zones or subunits.

Block System. An irrigation system in which several groups of sprinklers are controlled by one valve for each

Bubbler Irrigation. The application of water to the soil surface or a container as a small stream or fountain. E
less than 60 gph.

Check Valve. A valve which permits water to flow in one direction only.

Chemical Water Treatment. The addition of chemicals to water to make it acceptable for use in irrigation sys

Chemigation. The application of water soluble chemicals by mixing or injecting with the water applied througl

Contractor. Any person who engages in the fabrication and installation of any type of irrigation system on a c

Control Lines. Hydraulic or electrical lines which carry signals to open and close the valves from the controlle

Controller. The timing mechanism and its mounting box. The controller signals the automatic valves to open

Coverage. Refers to the way water is applied to an area.

Cycle. Refers to one complete run of a controller through all programmed controller stations.

Demand (or irrigation demand). Refers to the irrigation requirements of the irrigated area. Demand primarily

Design Area. The specific land area to which water is to be applied by an irrigation system.

Design Emission Uniformity. An estimate of the uniformity of water application with an irrigation system.

Design Pressure. The pressure at which the irrigation system or certain components are designed to operate
entrance to the system if there is no pump, and a zone design pressure is the average operating pressure of a

Direct Burial Wire. Plastic-coated single-strand copper wire for use as control line for electric valves.

Discharge Rate. The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting devi
pumping system or from a reduced pressure assembly or relief valve.

Double Check Valve. An approved assembly of two single, independently-acting check valves with test ports

Drain Valve. A valve used to drain water from a line. The valve may be manually or automatically operated.

Drip Irrigation. The precise low-rate application of water to or beneath the soil surface near or directly into the p
drops, in the range of 0.5 to 2.0 gph.

Effluent water. Also referred to as reclaimed ~~or gray water~~ is wastewater which has been treated per Florida

Emitters. Devices which are used to control the discharge of irrigation water from lateral pipes. This term is p

Fertigation. The application of soluble fertilizers with the water applied through an irrigation system.

Filtration System. The assembly of physical components used to remove suspended solids from irrigation wa
screens, media filters, and centrifugal force units (vortex sand separators).

Flexible Swing Joint. A flexible connection between the lateral pipe and the sprinkler which allows the sprink

Flow Meters. Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typical

Gauge (Wire). Standard specification for wire size. The larger the gauge number, the smaller the wire diamet

Head. A sprinkler head. Sometimes used interchangeably with and in conjunction with "Sprinkler."

Infiltration Rate. The rate of water flow across the surface of the soil and into the soil profile. Units are usuall

Irrigation. Application of water by artificial means, that is, means other than natural precipitation. Irrigation is environmental control including crop cooling and freeze protection.

Irrigation Water Requirement or Irrigation Requirement. The quantity of water that is required for crop pro

Landscape. Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground crops grown and harvested for monetary return.

Lateral. The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header

Line-Source Emitters. Lateral pipelines which are porous or contain closely-spaced perforations so that wate widely-spaced points along the pipeline length.

Looped System. A piping system which allows more than one path for water to flow from the supply to the e

Low Volume Sprinklers. Sprinkler heads that emit less than .5 gallons per minute.

Mainline. A pipeline which carries water from the control station to submains or to manifolds or header pipeli

Manifold. The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. A

Manual System. A system in which control valves are manually operated rather than operated by automatic

Matched Precipitation. An equal distribution of water over a given area or zone.

Meter Box. A concrete or plastic box buried flush to grade which houses flow (water) meters or other compor

Microirrigation. The frequent application of small quantities of water directly on or below the soil surface, u along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, in irrigation.

Overlap. The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a

PE Pipe. Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black fo

Potable Water. Water which is suitable in quality for human consumption and meets the requirements of the

Pressure Relief Valve. A valve which will open and discharge to atmosphere when the pressure in a pipeline

Pressure Vacuum Breaker. A backflow prevention device which includes a spring-loaded check valve and a the water source.

Pumping Station. The pump or pumps that provide water to an irrigation system, together with all of the ne controls, safety devices, shelters and fences.

PVC Pipe. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure

Rain Shut off Device. A calibrated device that is designed to detect rainfall and override the irrigation cycle c

Reduced Pressure Principle Backflow Preventer (RPZD) (also known as Reduced Pressure Zone Devi supplies from contamination.

Riser. A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

Runoff. The result of excess water applied either naturally (precipitation) or mechanically (irrigation) that exce

Sleeve. A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

Spacing. The distance between sprinklers or other emitters.

Spray Irrigation. The micro irrigation application of water to the soil or plant surface by low flow rate sprays c

Sprinkler. The sprinkler head. Sometimes called “Head.”

Supply (Water Source). The origin of the water used in the irrigation system.

Swing Joint. A ridged connection between the lateral pipe and the sprinkler, utilizing multiple elbows and nip

Tubing. Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE c

1403~~3~~1.4 DESIGN CRITERIA

1403~~3~~1.4.1 Design defined. Within the scope of this code, irrigation system design is defined as the science

1403~~3~~1.4.2 Water supply.

1403~~3~~1.4.2.1 The water source shall be adequate from the stand-point of volume, flow rate, pressure, and qu demands, if any, both at the time the system is designed and for the expected life of the system.

1403~~3~~1.4.2.2 If the water source is effluent, it shall meet the advanced waste treatment standard as set fort controlling governmental agency.

1403~~3~~1.4.3 Application uniformity.

1403~~3~~1.4.3.1 Sprinkler irrigation systems shall be designed with the appropriate uniformity for the type of plants types of plants as one group without regard to their individual water requirements shall be avoided.

1403~~3~~1.4.3.2 Sprinkler head spacing, type and nozzle selection that achieves the highest application uniformity

140~~3~~1.4.3.3 Application rates which avoid runoff and permit uniform water infiltration into the soil shall be util winds and sun exposure shall be considered when application rates are specified. Different types of sprinklers rotor heads, shall not be combined on the same zone or circuit.

140~~3~~1.4 System zoning. The irrigation system shall be divided into zones based on consideration of the foll

140~~3~~1.4.1 Available flow rate.

140~~3~~1.4.2 Cultural use of the area.

140~~3~~1.4.3 Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

140~~3~~1.4.4 Type of sprinkler, i.e., sprinklers with matching precipitation rates.

140~~3~~1.4.5 Soil characteristics and slope.

140~~3~~1.4.6 Sun exposure.

140~~3~~1.5 Sprinkler/emitter spacing and selection.

140~~3~~1.5.1 Sprinkler/Emitter spacing shall be determined considering the irrigation requirements, hydraulic ch sidewalks, buildings, and public access areas.

140~~3~~1.5.2 All pop-up spray head bodies in turf areas shall be no less than 6” in height for St. Augustine, Zoys Paspalum.

140~~3~~1.5.3 Sprinklers shall be located in accordance with manufacturer’s specifications in each irrigated zone

140~~3~~1.5.4 Single row head spacing shall only occur when an additional row will cause saturated soils at the to

140~~3~~1.5.5 All heads shall not exceed 50% of manufacturer’s specified diameters of coverage.

140~~3~~1.5.6 Water conservation shall be taken into consideration by minimizing irrigation of non-vegetated area

140~~3~~1.5.7 Microirrigation systems shall be designed using the Emission Uniformity concept. Microirrigation percent of the root zone for shrubs and trees.

140~~3~~1.5.8 Microirrigation or low volume heads shall be required in all areas to be irrigated that are less than 4

140~~3~~1.5.9 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point w from contamination from a ~~PD~~ main or lateral break.

140~~3~~1.5.10 Each plant shall have an adequate number and size (gph) of microirrigation devices, properly plac

140~~3~~1.6 Pipelines. Pipelines shall be sized to limit pressure variations so that the working pressure at all poin Velocities shall not exceed 5 feet (1524 mm) per second.

140~~3~~1.7 Wells.

140~~3~~1.7.1 Well diameters, depths and location shall correspond to the irrigation system demand and in com

140~~3~~1.8 Pumps.

140~~3~~1.8.1 Pump and motor combinations shall be capable of satisfying the total system demand without inva

140~~3~~1.8.2 Pumps shall be positioned with respect to the water surface in order to ensure that the net positiv

140~~3~~1.8.3 The pumping system shall be protected against the effects of the interruption of water flow.

140~~3~~1.9 Control valves.

140~~3~~1.9.1 Control valve size shall be based on the flow rate through the valve. Friction loss through the valve 10 percent of the static mainline head.

140~~3~~1.9.2 Control systems using hydraulic communication between controller and valve(s) shall comply wi and valve, both horizontally and vertically (elevation change).

140~~3~~1.9.3 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifi the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control systems.

140~~3~~1.9.4 Manually operated control valves shall be located so that they can be operated without wetting tl

140~~3~~1.9.5 In ground valves shall be located away from large tree and palm root zones.

14031.9.6 A manual shut off valve shall be required to be installed close to the point of connection but do minimize water loss when the system is shut off for repairs or emergencies.

140~~3~~1.9.7 An automatic shut-off valve or master valve (normally closed) is required on all systems with a cc
weeping valves, or stuck on valves to just the time the system is operating automatically.

140~~3~~1.10 Automatic irrigation controller. Automatic irrigation controllers shall conform to UL 1310 and ha
the irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sens
by Florida Statutes, Section 373.62.

140~~3~~1.11 Chemical injection.

140~~3~~1.11.1 Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any oth
recommendations.

140~~3~~1.11.2 Injection systems shall be located downstream of the applicable backflow prevention devices
Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

140~~3~~1.11.3 If an irrigation water supply is also used for human consumption, an air gap separation or an ap
compliance with ASSE 1013 and Section 14031.12.

140~~3~~1.12 Backflow prevention methods. Backflow prevention assemblies at all cross connections with a
applicable codes. In the event of conflicting regulations the assembly type shall be provided which gives the l

140~~3~~1.12.1 Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida
Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.

140~~3~~1.12.1.1 For municipal water supplies, chemical injection equipment must be separated from the water s
that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment shall cor
pressure.

140~~3~~1.12.1.2 For other water supplies, Florida State law, EPA regulations, or other applicable local codes s
Vacuum Breaker shall be required.

SECTION 14031.13 REFERENCED STANDARDS
The standards referenced below are exclusive to this section.

140~~3~~1.13.1 American Society of Agricultural Engineers (ASAE) Standards:

ASAE S330.1: Procedure for sprinkler distribution testing for research purposes.

ASAE S376.1: Design, installation, and performance of underground thermoplastic irrigation pipelines.

ASAE S397.1: Electrical service and equipment for irrigation.

ASAE S435: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

ASAE S398.1: Procedure for sprinkler testing and performance reporting.

ASAE S339: Uniform classification for water hardness.

ASAE S394: Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural ir

ASAE EP400.1: Designing and constructing irrigation wells.

ASAE EP405: Design, installation, and performance of trickle irrigation systems.

ASAE EP409: Safety devices for applying liquid chemicals through irrigation systems.

1403~~3~~1.13.2 ASTM International Standards:

ASTM D 2241: Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

ASTM D 2239: Specification for polyethylene (PE) plastic pipe (SDR-PR).

ASTM D 2466: Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (C

ASTM D 2855: Standard recommended practice for making solvent cemented joints with polyvinyl chloride pi

ASTM D 3139: Specification for joints for plastic pressure pipes using flexible elastomeric seals.

ASTM F 477: Specification for elastomeric seals (gaskets for joining plastic pipe).

1403~~3~~1.13.3 American Water Works Association (AWWA) standards:

AWWA C-900: PVC pipe standards and specifications

1403~~3~~1.13.4 American Society of Sanitary Engineers (ASSE) Standards:

ASSE 1001: Pipe applied atmospheric type vacuum breakers.

ASSE 1013: Reduced pressure principle backflow preventers.

ASSE 1015: Double check valve backflow preventers.

ASSE 1020: Vacuum breakers, anti-siphon, pressure type backflow preventers.

ASSE 1024: Dual check valve backflow preventers.

1403~~3~~1.13.5 Hydraulic Institute Standards, 14th Edition

140~~3~~1.13.6 Standards and Specifications for Turf and Landscape Irrigation Systems Florida Irrigatior

140~~3~~1.13.7 ~~Soil Conservation Service (SCS)~~ Natural Resources Conservation Service (NRCS) Field Of

~~SCS~~ NRCS Code 430-DD: Irrigation water conveyance, underground, plastic pipeline.

~~SCS~~ NRCS Code 430-EE: Irrigation water conveyance. Low pressure, underground, plastic pipeline.

~~SCS~~ NRCS Code 430-FF: Irrigation water conveyance, steel pipeline.

~~SCS~~ NRCS Code 441-1: Irrigation system, trickle.

~~SCS~~ NRCS Code 442: Irrigation system sprinkler.

~~SCS~~ NRCS Code 449: Irrigation water management.

~~SCS~~ NRCS Code 533: Pumping plant for water control.

~~SCS~~ NRCS Code 642: Well.

140~~3~~1.13.8. Underwriters Laboratories (UL) 333 Pfingsten Road, Northbrook, IL 60062-296 Standards

UL 486C-1995 Splicing Wire Connectors

UL 969-2013 Standard for Marking and Labeling Systems

UL 1310-2011 Standard for Class 2 Power Units

Section 140~~3~~1.14 MATERIALS
The materials referenced below are exclusive to this section.

140~~3~~1.14.1 PVC pipe and fittings.

140~~3~~1.14.1.1 PVC pipe shall comply with one of the following standards ASTM D 1785, ASTM D 2241, AW\ required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by eith

140~~3~~1.14.1.2 All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as se

140~~3~~1.14.1.3. Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D

140~~3~~1.14.1.4. PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

140~~3~~1.14.1.5. PVC flexible pipe ~~should~~ shall be pressure rated as described in ASTM D 2740 with standard

14031.14.1.6. PVC cement ~~should~~ shall meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

140~~3~~1.14.2 Ductile iron pipe and fittings.

140~~3~~1.14.2.1 Gasket fittings for iron pipe shall be of materials and type compatible with the piping material b

140~~3~~1.14.3. Steel pipe and fittings.

140~~3~~1.14.3.1. All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in a

140~~3~~1.14.3.2 Threaded fittings for steel pipe shall be Schedule 40 Malleable Iron.

140~~3~~1.14.4 Polyethylene pipe.

14031.14.4.1 Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in

140~~3~~1.14.4.2 Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

140~~3~~1.14.4.3 Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

140~~3~~1.14.5 Sprinklers, spray heads, and emitters.

140~~3~~1.14.5.1 Units and nozzles shall be selected in accordance with the size of the area and the type of pl without excessive overspray. Intentional direct spray onto walkways, buildings, roadways, and driveways is pr

140~~3~~1.14.5.2 Equipment shall be used that is protected from contamination and damage by use of seals, s

140~~3~~1.14.5.3 Riser-mounted sprinklers shall be supported to minimize movement of the riser resulting from t

140~~3~~1.14.5.4 Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection be prevent equipment damage.

140~~3~~1.14,5.5 Check valves shall be installed on any sprinkler where low point drainage occurs.

140~~3~~1.14.5.6 The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstruc height for Bermuda, Centapede and Seashore Paspalum.

140~~3~~1.14.5.7 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point contamination from a PVC main or lateral break.

140~~3~~1.14.5.8 All microirrigation zones shall have adequate pressure regulation installed at the zone valve or devices meet the manufacturer's performance standards.

140~~3~~1.14.5.9 Each plant shall have a adequate number and size(gph) of microirrigation devices, properly pla

140~~3~~1.14.5.10 All tubing shall be secured to prevent movement in accordance with manufacturer's specifican

140~~3~~1.14.6 Valves.

140~~3~~1.14.6.1 Valves shall have a maximum working pressure rating equal to or greater than the maximum be waived for low mainline pressure systems [30 psi (207 kPa) or less].
-

140~~3~~1.14.6.2 Only valves that are constructed of materials designed for use with the water and soil conditic will not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.

140~~3~~1.14.7 Valve boxes.

140~~3~~1.14.7.1 Valve boxes shall be constructed to withstand traffic loads common to the area in which they a without excavation.

140~~3~~1.14.7.2. Each valve box shall be permanently labeled in accordance with UL 969 to identify its content

140~~3~~1.14.8 Low voltage wiring.

140~~3~~1.14.8.1 All low voltage wire which is directly buried shall be labeled for direct burial wire. Wire not lab THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed w

140~~3~~1.14.8.2 The size of the electrical control wire shall be in accordance with the valve manufacturer's specif the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be us

140~~3~~1.14.8.3 Connections shall be made using devices conforming to UL 486 specifically designed for direc

140~~3~~1.14.9 Irrigation controllers.

140~~3~~1.14.9.1 All irrigation controllers shall conform to UL 1310 and the provisions of the National Electric C Solid state controls shall be equipped with surge suppressors on the primary and secondary wiring, except sir

140~~3~~1.14.9.2 The controller housing or enclosure shall protect the controller from the hazards of the environ

140~~3~~1.14.9.3 The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance obstructions, and above the height of the sprinkler coverage. Soil moisture sensors and ET sensors shall b Section 373.62.

140~~3~~1.14.10 Pumps and wells.

140~~3~~1.14.10.1 Irrigation pump electrical control systems shall conform to the NEC and local building codes.

140~~3~~1.14.10.2 The pumping system shall be protected from the hazards of the environment in which it is ins

140~~3~~1.14.10.3 Use electric motors with a nominal horsepower rating greater than the maximum horsepower of at least 1.15.

140~~3~~1.14.10.4 Casings for drilled wells shall be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Or casings shall conform to ASTM A 589.

140~~3~~1.14.11 Chemical injection equipment.

140~~3~~1.14.11.1 Chemical injection equipment shall be constructed of materials capable of withstanding the po for those chemicals for which it was intended as stated by the injection equipment manufacturer.

140~~3~~1.14.12 Filters and strainers.

140~~3~~1.14.12.1 Filtration equipment and strainers constructed of materials resistant to the potential corrosive passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufactu

Section 140~~3~~1.15 INSTALLATION

140~~3~~1.15.1 Pipe installation.

140~~3~~1.15.1.1 Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehi of a property. Depths of cover shall meet or exceed NRCS Code 430-DD, Water Conveyance, as follows:

140~~3~~1.15.1.1.1 Vehicle traffic areas.

Pipe Size (inches)

Depth of Cover (inches)

½ – 2 ½

18 - 24

3 - 5

24 - 30

6 and larger

30 - 36

140~~3~~1.15.1.1.2 All areas except vehicle traffic:

Pipe Size (inches)

Depth of Cover (inches)

½ – 1 ½

6

2 - 3

12

4 - 6

18

More than 6

24

140~~3~~1.15.1.2 All pipe joints and connections shall be made according to manufacturer's specifications. All sol

140~~3~~1.15.1.3 Minimum clearances shall be maintained between irrigation lines and other utilities. In no ca onsite sewage treatment and disposal systems, refer to Rule 64E-6.005(2)(b) of the Florida Administrative Co

140~~3~~1.15.1.4 Thrust blocks shall be used on all gasketed PVC systems. They must be formed against a solic constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outsi 376.1.

140~~3~~1.15.1.5 The trench bottom shall be uniform, free of debris, and of sufficient width to properly place pi backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-ir be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking

140~~3~~1.15.1.6. Pipe sleeves shall be used to protect pipes or wires installed under pavement or roadways. F
wire bundle shall be used under the paving or roadway and extending a minimum of 3 feet beyond the pav
sleeves shall be Sch 40. Proper backfill and compaction procedures shall be followed.

140~~3~~1.15.2 Control valve installation.

140~~3~~1.15.2.1 Valve installation shall allow enough clearance for proper operation and maintenance. Where v
extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches
cover in traffic areas. The valve box shall be installed to minimize the effect of soil intrusion within the valve bo
valve is installed under each sprinkler, then the valve box may be omitted.

140~~3~~1.15.2.2 Valve boxes shall be installed so that they do not rest on the pipe and the box cover does not c
the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscap

140~~3~~1.15.2.3. Quick coupling valves shall be installed on swing joints or flexible pipe with the top of the valve

140~~3~~1.15.2.4 Any above-ground manually-operated valves on nonpotable water systems shall be adequately
systems that utilize nonpotable water supplies shall not be permitted.

140~~3~~1.15.3 Sprinkler installation.

140~~3~~1.15.3.1. On flat landscaped areas, sprinklers shall be installed plumb. In areas where they are installed
be adjusted to avoid unnecessary discharge on roads, pavements and structures.

140~~3~~1.15.3.2. There shall be a minimum separation of 4 inches (102 mm) between sprinklers and pavemen
and buildings and other vertical structures. Piping shall be thoroughly flushed before installation of sprinkle
polyethylene (PE) nipples or flexible pipe. Polyethylene (PE) nipples shall not be used in maintenance ea
mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be stabilized.

140~~3~~1.15.4 Pump installation.

140~~3~~1.15.4.1 Pumps shall be installed in accordance with the manufacturer's specifications. Pumps shall be
on the pipe and fittings. Pipe and fittings shall be supported to avoid placing undue strain on the pump. Steel

140~~3~~1.15.4.2 Pumps shall be installed in a manner to avoid loss of prime. Suction line shall be installed to
pipe sizes shall be designed to avoid causing air pockets and cavitation.

140~~3~~1.15.4.3 Pumps shall be located to facilitate service and ease of removal. Appropriate fittings shall be enclosure shall be provide of adequate size and strength, with proper ventilation, to protect the pump from the

140~~3~~1.15.5 Low voltage wire installation.

140~~3~~1.15.5.1 Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (305 r be provided at each connection to allow for thermal expansion/shrinkage. As a minimum, a 12-inch (305 mı valves shall have 24 inches (610 mm) minimum free wire.

140~~3~~1.15.5.2 All above-ground wire runs and wire entries into buildings shall be installed in electrical condui common wires) shall be provided. Connections shall be made using devices conforming to UL 486C specifica

Exception: When wiring above ground manifolds from the valve to the ground immediately beneath it, no cor

140~~3~~1.15.6 Hydraulic control tubing installation

140~~3~~1.15.6.1. For hydraulic control systems, a water supply shall be used that is filtered and free of deleterious A backflow prevention device shall be installed where the hydraulic control system is connected to potable wa

140~~3~~1.15.6.2 Tubing shall be installed in trenches and spaced so that it will not rub against pipe, fittings, o diameter loop at all turns and connections A minimum depth of cover of 12 inches (305 mm) shall be providec

140~~3~~1.15.6.3 Tubing shall be connected with couplings and collars according to Manufacturer's specificatio expel entrapped air and tested for leaks prior to installation.

140~~3~~1.15.6.4 Exposed tubing shall be installed in a protective conduit manufactured from Schedule 40 UV pr

140~~3~~1.16 As-Built Drawings.

140~~3~~1.16.1 An As-Built drawing shall be required of all irrigation systems installed on commercial and resider

140~~3~~1.16.1.1 Location, type, pressure and maximum flow available of all water sources.

140~~3~~1.16.1.2 Location, type and size of all components including sprinklers, microirrigation, main and later start relays, backflow devices, pumps, wells, etc.

140~~3~~1.16.1.3 The flow rate, application rate (inches per hour), and the operating pressure for the sprinklers

140~~3~~1.16.1.4 The name, address, phone, email, professional license or certification number of the installatio

140~~3~~1.16.1.5 Date of installation.

CHAPTER14

LANDSCAPE IRRIGATION SYST

~~SECTION 1401~~

GENERAL

1401.1Scope.

The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ turf and lands ~~reuse~~ systems.

~~**Exception: Landscape irrigation systems connected to onsite sewage by Chapter 64E-6, Florida Administrative Code, Standards for Onsite**~~

Turf and Landscape irrigation systems serving as drainfields for onsite sewage treatment and disposal systems shall be regulated by Systems.

~~**SECTION 1402**~~

~~**Subsurface Landscape Irrigation Systems Connected to NonP**~~

~~**1402.1 Scope.**~~

~~The provisions of Section 1402 shall govern the materials, design, construction and installation of subsurface landscape irrigation systems~~

~~**1402.2 1402.2Materials.**~~

~~**Above-ground drain, waste and vent piping for subsurface landscape irrigation systems connected standards listed in Table 702.1. Subsurface landscape irrigation, underground building drainage and v**~~

~~**1401.3 1402.3Tests.**~~

~~Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.~~

~~**1401.4 1402.4Inspections.**~~

~~Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code,*~~

~~**1401.5 1402.5Disinfection.**~~

~~**Disinfection shall not be required for on-site nonpotable water reuse for subsurface landsc**~~

~~**1401.6 1402.6Coloring.**~~

~~On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~**SECTION1402**~~

~~**SYSTEM DESIGN AND SIZING**~~

~~**1402.1 1402.7Sizing.**~~

~~The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irr irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based following equation:~~

~~**where:**~~

~~*A* **= Number of occupants:**~~

~~***Residential — Number of occupants shall be determined by the actual number of occupants, but not less than two occu***~~

~~**Commercial — Number of occupants shall be determined by the** *Florida Building Code, Building*.~~

~~*B = Estimated flow demands for each occupant:*~~

~~**Residential — 25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per da**~~

~~**Commercial — Based on type of fixture or water use records minus the discharge of fixtures other than those disch**~~

~~*C*~~ **= Estimated gray water discharge based on the total number of occupants.**

~~**1402.2 1402.8Percolation tests.**~~

~~**The permeability of the soil in the proposed absorption system shall be determined by percolation test**~~

~~**1402.2.1 1402.8.1Percolation tests and procedures.**~~

~~**At least three percolation tests in each system area shall be conducted. The holes shall be spaced ur**~~
~~**More percolation tests shall be made where necessary, depending on system design.**~~

~~**1402.2.1.1 1402.8.1.1Percolation test hole.**~~

~~**The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension o**~~
~~**shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall l**~~
~~**mm) of gravel or coarse sand.**~~

~~**1402.2.1.2 1402.8.1.2Test procedure, sandy soils.**~~

~~The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in~~
~~procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test sh~~
~~above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute inte~~
~~minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152~~
~~be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be usec~~
~~in accordance with Section 1303.7.1.3.~~

~~**1402.2.1.3 1402.8.1.3Test procedure, other soils.**~~

~~**The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be mair**~~
~~**necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be rem**~~
~~**more than 30 hours. Immediately after the soil swelling period, the measurements for determining the**~~
~~**shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coa**~~
~~**measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do**~~
~~observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gra~~
~~not be made during the three measurement periods except to the limits of the last measured water level drop. When the firs~~
~~measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any~~
~~period shall be used in calculating the percolation rate.~~

~~**1402.2.1.4 1402.8.1.4Mechanical test equipment.**~~

~~Mechanical percolation test equipment shall be of an *approved* **type.**~~

~~**1402.2.2 1402.8.2Permeability evaluation.**~~

~~**Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accept**~~
~~**1402.2.1.1 1402.8.1.1 for evaluating the soil.**~~

~~**1402.3 1402.9Subsurface landscape irrigation site location.**~~

~~The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well o~~
~~so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be loc~~
~~1402.3 1402.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Su~~
~~lots.~~

~~**TABLE 1402.3 1402.9**~~
~~**LOCATION OF SUBSURFACE IRRIGAT**~~

~~**ELEMENT**~~	~~**Storage tank (feet)**~~
~~Buildings~~	~~5~~
~~Lot line adjoining private property~~	~~5~~
~~Water wells~~	~~50~~
~~Streams and lakes~~	~~50~~
~~Seepage pits~~	~~5~~
~~Septic tanks~~	~~0~~
~~Water service~~	~~5~~
~~Public water main~~	~~10~~

~~For SI: 1 foot = 304.8 mm.~~

~~**SECTION14031**~~
~~**INSTALLATION**~~

~~**14031.1 1402.10Installation.**~~

~~**Absorption systems shall be installed in accordance with Sections 14031.1.1 1402.10.1 through 14031.1.5 1402.10.1.**~~

~~**14031.1.1 1402.10.1Absorption area.**~~

~~The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loadi estimated gray water discharge divided by the design-loading rate from Table 14031.1.1 1402.10.1.~~

~~**TABLE 14031.1.1 1402.10.1**~~
~~**DESIGN LOADING RATE**~~

~~**PERCOLATION RATE(minutes per inch)**~~	~~**DESIG**~~
~~0 to less than 10~~	
~~10 to less than 30~~	
~~30 to less than 45~~	
~~45 to 60~~	

~~For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m^2.~~

-

~~14031.1.2 1402.10.1.2 Seepage trench excavations.~~

~~**Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom c trenches shall be not greater than 100 feet (30 480 mm) in**~~ ~~*developed length*.~~

-

~~**14031.1.3 1402.10.1.3 Seepage bed excavations.**~~

~~**Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one dis using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced nc greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.**~~

~~**14031.1.4 1402.10.1.4 Excavation and construction.**~~

~~The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soi compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation botton removed.~~

~~**14031.1.5 1402.10.1.5 Aggregate and backfill.**~~

~~Not less than 6 inches in depth of aggregate, ranging in size from $^1/_2$ to $2^1/_2$~~ ~~**inches (12.7 mm to 64 mm), shall aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top c synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building pap (229 mm) of soil backfill shall be provided above the covering.**~~

-

-

-

~~**14031.2 1402.11Distribution piping.**~~

~~Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 14031.2 140 original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (~~

~~**TABLE 14031.2 1402.11**~~
~~**DISTRIBUTION PIPE**~~

~~**MATERIAL**~~
~~Polyethylene (PE) plastic pipe~~
~~Polyvinyl chloride (PVC) plastic pipe~~
~~Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core or c~~

~~For SI: 1 inch=25.4 mm.~~

~~**14031.2.1Joints.**~~

~~**Joints in distribution pipe shall be made in accordance with Section 705 of this code.**~~

~~**SECTION 14031**~~
~~**Surface and Subsurface Landscape Irrig**~~

-

~~14031.1 Scope.~~

~~The provisions of Section 14031 shall govern the materials, design, construction and installation of turf and landsca~~
~~above ground or subsurface sprinkler or microsprinkler equipment that move water through various means of me~~

140~~3~~1~~.1.2~~ This section shall apply to all irrigation systems used on residential and commercial landsca

140~~3~~1.1.3 This section shall apply to all new irrigation systems and any new work to existing irrigation systems.

Exception. This section shall not apply to irrigation systems for golf courses,
nurseries, greenhouses, or agricultural production systems.

-

140~~3~~1~~.1.4~~ Nothing contained in this section shall be deemed to require any irrigation system or part tl altered or modified to meet the standards of this code.

140~~3~~1~~.2 Permits~~.

140~~3~~1~~.2.1~~ A permit shall be required for new installation of landscape irrigation systems and for repairs material based on invoice value.

140~~3~~1.2.2 ~~No permit shall be required for general maintenance or repairs which do not change the struc labor and material based on invoice value.~~

140~~3~~1.3 Preconstruction submittals.

140~~3~~1~~.3.1 Plans or drawings~~.

140~~3~~1~~.3.1.1 Single-family residence~~. Design drawings or shop drawings, where required, shall be pro Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and i or irrigation contractor or licensed landscape architect.

140~~3~~1.3.1.2 Commercial, industrial, municipal and multiple-family. Professionally designed drawings prior Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, inc revisions, legend, specifications which list all aspects of equipment and assembly there of, water so pump station size, pump station location, design operating pressure and flow rate per zone, precipitat gate valves, sensors, etc. The plans and specifications shall be prepared in accordance with Section 1

-

140~~3~~1.4 Definitions. The following definitions are exclusive to this section of the code.

ABS Pipe. Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limited use in 1788).

Air Release Valve. A valve which will automatically release to the atmosphere accumulated small pockets of air from valves are normally required at all summits of mainline and submain pipelines in an irrigation system.

Anti-Siphon Device. A safety device used to prevent back-flow of irrigation water to the water source by back-siphonage

Application Rate. The average rate at which water is applied by an irrigation system, sometimes also called precipitation

Application uniformity. Irrigation application uniformity (also known as distribution uniformity) describes how evenly

Arc. The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc would be a quar

Atmospheric Vacuum Breaker (AVB). An anti-siphon backflow device which uses a floating seat to allow an air break tc

Automatic Control Valve. A valve in a sprinkler system which is activated by an automatic controller by way of hydraul

Automatic System. An irrigation system which operates following a preset program entered into an automatic controller.

Backflow Prevention Device. An approved safety device used to prevent pollution or contamination of the irrigation wat

Belled (Pipe). Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inserted into it dur

Block (of sprinklers). A group of sprinklers controlled by one valve. Also called zones or subunits.

Block System. An irrigation system in which several groups of sprinklers are controlled by one valve for each group.

Bubbler Irrigation. The application of water to the soil surface or a container as a small stream or fountain. Bubbler emit

Check Valve. A valve which permits water to flow in one direction only.

Chemical Water Treatment. The addition of chemicals to water to make it acceptable for use in irrigation systems

Chemigation. The application of water soluble chemicals by mixing or injecting with the water applied through an irrigat

Contractor. Any person who engages in the fabrication and installation of any type of irrigation system on a contractual l

Control Lines. Hydraulic or electrical lines which carry signals to open and close the valves from the controller to the aut

Controller. The timing mechanism and its mounting box. The controller signals the automatic valves to open and close oı

Coverage. Refers to the way water is applied to an area.

Cycle. Refers to one complete run of a controller through all programmed controller stations.

Demand (or irrigation demand). Refers to the irrigation requirements of the irrigated area. Demand primarily depends o

Design Area. The specific land area to which water is to be applied by an irrigation system.

Design Emission Uniformity. An estimate of the uniformity of water application with an irrigation system.

Design Pressure. The pressure at which the irrigation system or certain components are designed to operate. The irrigatio
if there is no pump, and a zone design pressure is the average operating pressure of all emitters within that zone.

Direct Burial Wire. Plastic-coated single-strand copper wire for use as control line for electric valves.

Discharge Rate. The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting device, or a unit l
from a reduced pressure assembly or relief valve.

Double Check Valve. An approved assembly of two single, independently-acting check valves with test ports to permit iı

Drain Valve. A valve used to drain water from a line. The valve may be manually or automatically operated.

Drip Irrigation~~. The precise low-rate application of water to or beneath the soil surface near or directly into the plant roc~~
~~range of 0.5 to 2.0 gph.~~

Effluent water. **Also referred to as reclaimed** ~~or gray water~~ is wastewater which has been treated per Florida Statut

Emitters. Devices which are used to control the discharge of irrigation water from lateral pipes. This term is primarily use

Fertigation. The application of soluble fertilizers with the water applied through an irrigation system.

Filtration System. The assembly of physical components used to remove suspended solids from irrigation water. These in and centrifugal force units (vortex sand separators).

Flexible Swing Joint. A flexible connection between the lateral pipe and the sprinkler which allows the sprinkler to move

Flow Meters. Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typically in gpm)

Gauge (Wire). Standard specification for wire size. The larger the gauge number, the smaller the wire diameter.

Head. A sprinkler head. Sometimes used interchangeably with and in conjunction with "Sprinkler."

Infiltration Rate. The rate of water flow across the surface of the soil and into the soil profile. Units are usually inches/hr

Irrigation. Application of water by artificial means, that is, means other than natural precipitation. Irrigation is practice control including crop cooling and freeze protection.

Irrigation Water Requirement or Irrigation Requirement. The quantity of water that is required for crop production, e

Landscape. Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground covers, and harvested for monetary return.

Lateral. The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header pipeline d

Line-Source Emitters. Lateral pipelines which are porous or contain closely-spaced perforations so that water is discharge along the pipeline length.

Looped System. A piping system which allows more than one path for water to flow from the supply to the emitters or sp

Low Volume Sprinklers. Sprinkler heads that emit less than .5 gallons per minute.

Mainline. A pipeline which carries water from the control station to submains or to manifolds or header pipelines of the v

Manifold. The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. Also someti

Manual System. A system in which control valves are manually operated rather than operated by automatic controls.

Matched Precipitation. An equal distribution of water over a given area or zone.

Meter Box. A concrete or plastic box buried flush to grade which houses flow (water) meters or other components.

Microirrigation. The frequent application of small quantities of water directly on or below the soil surface, usually as delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, including drip, subsurface, bubbl

Overlap. The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a percentage of

PE Pipe. Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black for resistance

Potable Water. Water which is suitable in quality for human consumption and meets the requirements of the Health Auth

Pressure Relief Valve. A valve which will open and discharge to atmosphere when the pressure in a pipeline or pressure

Pressure Vacuum Breaker. A backflow prevention device which includes a spring-loaded check valve and a spring-load

Pumping Station. The pump or pumps that provide water to an irrigation system, together with all of the necessary acces shelters and fences.

PVC Pipe. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure rated for wa

Rain Shut off Device. A calibrated device that is designed to detect rainfall and override the irrigation cycle of the sprink

Reduced Pressure Principle Backflow Preventer (RPZD) (also known as Reduced Pressure Zone Device RPZ or contamination.

Riser. A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

Runoff. The result of excess water applied either naturally (precipitation) or mechanically (irrigation) that exceeds the abs

Sleeve. A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

Spacing. The distance between sprinklers or other emitters.

Spray Irrigation. The micro irrigation application of water to the soil or plant surface by low flow rate sprays or mists.

Sprinkler. The sprinkler head. Sometimes called "Head."

Supply (Water Source). The origin of the water used in the irrigation system.

Swing Joint. A ridged connection between the lateral pipe and the sprinkler, utilizing multiple elbows and nipples, which

Tubing. Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE or

-

140~~3~~1.4 DESIGN CRITERIA

-

140~~3~~1.4.1 Design defined. Within the scope of this code, irrigation system design is defined as the sc system

-

140~~3~~1.4.2 Water supply.

-

140~~3~~1.4.2.1 The water source shall be adequate from the stand-point of volume, flow rate, pressure, and as other demands, if any, both at the time the system is designed and for the expected life of the syste

-

140~~3~~1.4.2.2 If the water source is effluent, it shall meet the advanced waste treatment standard as set f by the controlling governmental agency.

-

140~~3~~1.4.3 Application uniformity.

-

140~~3~~1~~.4.3.1~~ Sprinkler irrigation systems shall be designed with the appropriate uniformity for the type watering of different types of plants as one group without regard to their individual water requirements

140~~3~~1~~.4.3.2~~ Sprinkler head spacing, type and nozzle selection that achieves the highest application uni

140~~3~~1~~.4.3.3~~ Application rates which avoid runoff and permit uniform water infiltration into the soil shal and prevailing winds and sun exposure shall be considered when application rates are specified. Diffe rotor heads, bubbler heads vs rotor heads, shall not be combined on the same zone or circuit.

140~~3~~1.4 System zoning. The irrigation system shall be divided into zones based on consideration of the

-

140~~3~~1.4.1 Available flow rate.

-

140~~3~~1.4.2 Cultural use of the area.

-

140~~3~~1.4.3 Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

-

140~~3~~1.4.4 Type of sprinkler, i.e., sprinklers with matching precipitation rates.

-

140~~3~~1.4.5 Soil characteristics and slope.

-

140~~3~~1.4.6 Sun exposure.

-

140~~3~~1.5 Sprinkler/emitter spacing and selection.

-

140~~3~~1.5.1 Sprinkler/Emitter spacing shall be determined considering the irrigation requirements, hydrau plant growth, sidewalks, buildings, and public access areas.

-

140~~3~~1.5.2 All pop-up spray head bodies in turf areas shall be no less than 6” in height for St. Augustine, Zoysia and Bahi

-

140~~3~~1.5.3 Sprinklers shall be located in accordance with manufacturer’s specifications in each irrigated

-

140~~3~~1.5.4 Single row head spacing shall only occur when an additional row will cause saturated soils at

-

140~~3~~1.5.5 All heads shall not exceed 50% of manufacturer’s specified diameters of coverage.

-

140~~3~~1~~.5.6~~ Water conservation shall be taken into consideration by minimizing irrigation of non-vegetate

140~~3~~1.5.7 Microirrigation systems shall be designed using the Emission Uniformity concept. Microirriga and 50 percent of the root zone for shrubs and trees.

-

140~~3~~1.5.8 Microirrigation or low volume heads shall be required in all areas to be irrigated that are less

-

140~~3~~1.5.9 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point wh from contamination from a ~~PD~~ **main or lateral break.**

-

140~~3~~1.5.10 Each plant shall have an adequate number and size (gph) of microirrigation devices, properl

-

140~~3~~1.6 Pipelines. Pipelines shall be sized to limit pressure variations so that the working pressure at all points i Velocities shall not exceed 5 feet (1524 mm) per second.

-

140~~3~~1.7 Wells.

-

140~~3~~1.7.1 Well diameters, depths and location shall correspond to the irrigation system demand and ir regulations.

-

140~~3~~1.8 Pumps.

-

140~~3~~1.8.1 Pump and motor combinations shall be capable of satisfying the total system demand witho between zones.

-

140~~3~~1.8.2 Pumps shall be positioned with respect to the water surface in order to ensure that the net p achieved.

-

140~~3~~1.8.3 The pumping system shall be protected against the effects of the interruption of water flow.

-

140~~3~~1.9 Control valves.

-

140~~3~~1.9.1 Control valve size shall be based on the flow rate through the valve. Friction loss through shall not exceed 10 percent of the static mainline head.

-

140~~3~~1.9.2 Control systems using hydraulic communication between controller and valve(s) shall compl controller and valve, both horizontally and vertically (elevation change).

-

14031.9.3 The size of the electrical control wire shall be in accordance with the valve manufacturer's sp considering the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand cont systems.

-

14031.9.4 Manually operated control valves shall be located so that they can be operated without wet

-

14031.9.5 In ground valves shall be located away from large tree and palm root zones.

~~14031.9.6~~ **A manual shut off valve shall be required to be installed close to the point of connection bu device) to minimize water loss when the system is shut off for repairs or emergencies.**

14031.9.7 An automatic shut-off valve or master valve (normally closed) is required on all systems with line leaks, weeping valves, or stuck on valves to just the time the system is operating automatically.

-

14031.10 Automatic irrigation controller. Automatic irrigation controllers shall conform to UL 1310 and have a irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sensor by Florida Statutes, Section 373.62.

-

14031.11 Chemical injection.

-

14031.11.1 Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or manufacturers' recommendations.

-

14031.11.2 Injection systems shall be located downstream of the applicable backflow prevention Environmental Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

-

14031.11.3 If an irrigation water supply is also used for human consumption, an air gap separation or a required in compliance with ASSE 1013 and Section 14031.12.

-

14031.12 Backflow prevention methods. Backflow prevention assemblies at all cross connections with a other applicable codes. In the event of conflicting regulations the assembly type shall be provided whi

-

14031.12.1 Irrigation systems into which chemicals are injected shall conform to Florida state law (F Pesticide Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the

-

14031.12.1.1 For municipal water supplies, chemical injection equipment must be separated from the wa assembly that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equi siphonage and back-pressure.

-

14031.12.1.2 For other water supplies, Florida State law, EPA regulations, or other applicable local codes s Vacuum Breaker **shall be required.**

SECTION 14031.13 REFERENCED STANDARDS
The standards referenced below are exclusive to this section.

-

140~~3~~1.13.1 American Society of Agricultural Engineers (ASAE) Standards:

ASAE S330.1: Procedure for sprinkler distribution testing for research purposes.

ASAE S376.1: Design, installation, and performance of underground thermoplastic irrigation pipelines.

ASAE S397.1: Electrical service and equipment for irrigation.

ASAE S435: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

ASAE S398.1: Procedure for sprinkler testing and performance reporting.

ASAE S339: Uniform classification for water hardness.

ASAE S394: Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural irri

ASAE EP400.1: Designing and constructing irrigation wells.

ASAE EP405: Design, installation, and performance of trickle irrigation systems.

ASAE EP409: Safety devices for applying liquid chemicals through irrigation systems.

-

140~~3~~1.13.2 ASTM International Standards:

ASTM D 2241: Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

ASTM D 2239: Specification for polyethylene (PE) plastic pipe (SDR-PR).

ASTM D 2466: Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (CP

ASTM D 2855: Standard recommended practice for making solvent cemented joints with polyvinyl chloride pipe

ASTM D 3139: Specification for joints for plastic pressure pipes using flexible elastomeric seals.

ASTM F 477: Specification for elastomeric seals (gaskets for joining plastic pipe).

-

140~~3~~1.13.3 American Water Works Association (AWWA) standards:

AWWA C-900: PVC pipe standards and specifications

-

140~~3~~1.13.4 American Society of Sanitary Engineers (ASSE) Standards:

ASSE 1001: Pipe applied atmospheric type vacuum breakers.

ASSE 1013: Reduced pressure principle backflow preventers.

ASSE 1015: Double check valve backflow preventers.

ASSE 1020: Vacuum breakers, anti-siphon, pressure type backflow preventers.

ASSE 1024: Dual check valve backflow preventers.

-

140~~3~~1.13.5 Hydraulic Institute Standards, 14th Edition

-

140~~3~~1.13.6 Standards and Specifications for Turf and Landscape Irrigation Systems Florida Irrigation S

-
-

140~~3~~1.13.~~7 Soil Conservation Service (SCS)~~ Natural Resources Conservation Service (NRCS) Field Office T

~~SCS~~NRCS Code 430-DD: Irrigation water conveyance, underground, plastic pipeline.

~~SCS~~NRCS Code 430-EE: Irrigation water conveyance. Low pressure, underground, plastic pipeline.

~~SCS~~ NRCS Code 430-FF: Irrigation water conveyance, steel pipeline.

~~SCS~~NRCS Code 441-1: Irrigation system, trickle.

~~SCS~~ NRCS Code 442: Irrigation system sprinkler.

~~SCS~~ NRCS Code 449: Irrigation water management.

~~SCS~~ NRCS Code 533: Pumping plant for water control.

~~SCS~~ NRCS -**Code 642: Well.**

140~~3~~1.13.8. Underwriters Laboratories (UL) 333 Pfingsten Road, Northbrook, IL 60062-296 Standards
UL 486C-1995 Splicing Wire Connectors

UL 969-2013 Standard for Marking and Labeling Systems

UL 1310-2011 Standard for Class 2 Power Units

-
Section 140~~3~~1.14 MATERIALS
The materials referenced below are exclusive to this section.

-

140~~3~~1.14.1 PVC pipe and fittings.

-

140~~3~~1.14.1.1 PVC pipe shall comply with one of the following standards ASTM D 1785, ASTM D 224
thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for nor

-

140~~3~~1.14.1.2 All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 a

-

__140~~3~~1.~~14.1.3.~~ Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in AS__

140~~3~~1.14.1.4. PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 4

-

140~~3~~1.14.1.5. PVC flexible pipe ~~should~~shall ~~be pressure rated as described in ASTM D 2740 with standard out~~

-

14031.14.1.6. PVC cement ~~should~~ shall **meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.**

-

140~~3~~1.14.2 Ductile iron pipe and fittings.

-

140~~3~~1.14.2.1 Gasket fittings for iron pipe shall be of materials and type compatible with the piping mat

-

140~~3~~1.14.3. Steel pipe and fittings.

-

__140~~3~~1.~~14.3.1.~~ All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or blac__

140~~3~~1.14.3.2 Threaded fittings for steel pipe shall be Schedule 40 Malleable Iron.

-

140~~3~~1.14.4 Polyethylene pipe.

14031.14.4.1 ~~Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 k~~

140~~3~~1.14.4.2 Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-

-

140~~3~~1.14.4.3 Use fittings manufactured specifically for the type and dimensions of polyethylene pipe us

-

140~~3~~1.14.5 Sprinklers, spray heads, and emitters.

-

140~~3~~1.14.5.1 Units and nozzles shall be selected in accordance with the size of the area and the type o to water without excessive overspray. Intentional direct spray onto walkways, buildings, roadways, an

-

140~~3~~1.14.5.2 Equipment shall be used that is protected from contamination and damage by use of seal

-

140~~3~~1.14.5.3 Riser-mounted sprinklers shall be supported to minimize movement of the riser resulting

-

140~~3~~1.14.5.4 Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection and to prevent equipment damage.

-

140~~3~~1.14,5.5 Check valves shall be installed on any sprinkler where low point drainage occurs.

-

140~~3~~1.14.5.6 The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstr and 4" height for Bermuda, Centapede and Seashore Paspalum.

-

140~~3~~1.14.5.7 All microirrigation zones shall have adequate filtration installed at the zone valve or at the devices from contamination from a PVC main or lateral break.

-

140~~3~~1.14.5.8 All microirrigation zones shall have adequate pressure regulation installed at the zone val all emission devices meet the manufacturer's performance standards.

-

140~~3~~1.14.5.9 Each plant shall have a adequate number and size(gph) of microirrigation devices, proper

-

140~~3~~1.14.5.10 All tubing shall be secured to prevent movement in accordance with manufacturer's specificantic

-

140~~3~~1.14.6 Valves.

-

~~140~~~~3~~1.14.6.1 Valves shall have a maximum working pressure rating equal to or greater than the m requirement shall be waived for low mainline pressure systems [30 psi (207 kPa) or less].

-

140~~3~~1.14.6.2 Only valves that are constructed of materials designed for use with the water and soil c materials that will not be deteriorated by chemicals injected into the system shall be used on all chemi

-

140~~3~~1.14.7 Valve boxes.

-

140~~3~~1.14.7.1 Valve boxes shall be constructed to withstand traffic loads common to the area in whic enclosed valves without excavation.

-

140~~3~~1.14.7.2. Each valve box shall be permanently labeled in accordance with UL 969 to identify its co

-

140~~3~~1.14.8 Low voltage wiring.

-

140~~3~~1.14.8.1 All low voltage wire which is directly buried shall be labeled for direct burial wire. Wire listed TWN or THHN type wire as described in the NEC. All wire traveling under any hardscape or road

-

140~~3~~1.14.8.2 The size of the electrical control wire shall be in accordance with the valve manufactur length, considering the number of solenoids operating, on the circuit. Minimum of # 14 AWG single s residential systems.

-

140~~3~~1.14.8.3 Connections shall be made using devices conforming to UL 486 specifically designed for

-

140~~3~~1.14.9 Irrigation controllers.

-

140~~3~~1.14.9.1 All irrigation controllers shall conform to UL 1310 and the provisions of the National El specifications. Solid state controls shall be equipped with surge suppressors on the primary and secon

-

140~~3~~1.14.9.2 The controller housing or enclosure shall protect the controller from the hazards of the en

-

140~~3~~1~~.14.9.3~~ The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) cl other overhead obstructions, and above the height of the sprinkler coverage. Soil moisture senso specifications and Florida Statutes, Section 373.62.

140~~3~~1.14.10 Pumps and wells.

-

140~~3~~1.14.10.1 Irrigation pump electrical control systems shall conform to the NEC and local building co

-

140~~3~~1.14.10.2 The pumping system shall be protected from the hazards of the environment in which it

-

140~~3~~1.14.10.3 Use electric motors with a nominal horsepower rating greater than the maximum horsep service factor of at least 1.15.

-

140~~3~~1.14.10.4 Casings for drilled wells shall be steel, reinforced plastic mortar, plastic, or fiberglass pip 642. Steel casings shall conform to ASTM A 589.

-

140~~3~~1.14.11 Chemical injection equipment.

-

140~~3~~1.14.11.1 Chemical injection equipment shall be constructed of materials capable of withstanding be used only for those chemicals for which it was intended as stated by the injection equipment manuf

-

140~~3~~1.14.12 Filters and strainers.

-

140~~3~~1.14.12.1 Filtration equipment and strainers constructed of materials resistant to the potential cor prevent the passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance

-

Section 140~~3~~1.15 INSTALLATION

-

140~~3~~1.15.1 Pipe installation.

-

140~~3~~1.15.1.1 Pipe shall be installed at sufficient depth below ground to protect it from hazards such a maintenance of a property. Depths of cover shall meet or exceed NRCS Code 430-DD, Water Conveyan

-

140~~3~~1.15.1.1.1 Vehicle traffic areas.

Pipe Size (inches)

Depth of Cover (inches)

½ – 2 ½

18 - 24

3 - 5

24 - 30

6 and larger

30 - 36

-

140~~3~~1.15.1.1.2 All areas except vehicle traffic:

Pipe Size (inches)

Depth of Cover (inches)

½ – 1 ½

6

2 - 3

12

4 - 6

18

More than 6

24

-

140~~3~~1.15.1.2 All pipe joints and connections shall be made according to manufacturer's specifications.
2855.

-

14031.15.1.3 Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shal
treatment and disposal systems, refer to Rule 64E-6.005(2)(b) of the Florida Administrative Code.

-

14031.15.1.4 Thrust blocks shall be used on all gasketed PVC systems. They must be formed against They shall be constructed of concrete, and the space between the pipe and trench shall be filled to th accordance with ASAE S-376.1.

-

14031.15.1.5 The trench bottom shall be uniform, free of debris, and of sufficient width to properly pla be used to backfill the pipe trench. However, the initial backfill material shall be free from rocks or st content of the material shall be such that the required degree of compaction can be obtained with the I the pipe to final grade.

-

14031.15.1.6. Pipe sleeves shall be used to protect pipes or wires installed under pavement or road diameter of the wire bundle shall be used under the paving or roadway and extending a minimum of Transportation (FDOT). Pipe sleeves shall be Sch 40. Proper backfill and compaction procedures shall

-

14031.15.2 Control valve installation.

-

14031.15.2.1 Valve installation shall allow enough clearance for proper operation and maintenance. V box with cover extending from grade to the body of the valve. The top of the valve body should have a r and 18 inches (457 mm) of cover in traffic areas. The valve box shall be installed to minimize the effect or other approved material. If an automatic valve is installed under each sprinkler, then the valve box n

-

14031.15.2.2 Valve boxes shall be installed so that they do not rest on the pipe and the box cover does be flush with the ground surface and do not present a tripping hazard or interfere with routine mainten

-

14031.15.2.3. Quick coupling valves shall be installed on swing joints or flexible pipe with the top of th

-

14031.15.2.4 Any above-ground manually-operated valves on nonpotable water systems shall be adequ on irrigation systems that utilize nonpotable water supplies shall not be permitted.

-

14031.15.3 Sprinkler installation.

-

14031.15.3.1. On flat landscaped areas, sprinklers shall be installed plumb. In areas where they are i Sprinklers shall be adjusted to avoid unnecessary discharge on roads, pavements and structures.

-

14031.15.3.2. There shall be a minimum separation of 4 inches (102 mm) between sprinklers and pavement. and buildings and other vertical structures. Piping shall be thoroughly flushed before installation of sprinkler polyethylene (PE) nipples or flexible pipe. Polyethylene (PE) nipples shall not be used in maintenance equ mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be stabilized.

-

140~~3~~1.15.4 Pump installation.

-

140~~3~~1.15.4.1 Pumps shall be installed in accordance with the manufacturer's specifications. Pumps sh
or distortion on the pipe and fittings. Pipe and fittings shall be supported to avoid placing undue strain

-

140~~3~~1.15.4.2 Pumps shall be installed in a manner to avoid loss of prime. Suction line shall be installec
in suction pipe sizes shall be designed to avoid causing air pockets and cavitation.

-

140~~3~~1.15.4.3 Pumps shall be located to facilitate service and ease of removal. Appropriate fittings
disconnected. An enclosure shall be provide of adequate size and strength, with proper ventilation, to

-

140~~3~~1.15.5 Low voltage wire installation.

-

140~~3~~1.15.5.1 Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (3
wire shall be provided at each connection to allow for thermal expansion/shrinkage. As a minimum, a 12-
Terminations at valves shall have 24 inches (610 mm) minimum free wire.

-

140~~3~~1.15.5.2 All above-ground wire runs and wire entries into buildings shall be installed in electrical conduit. Commo
shall be provided. Connections shall be made using devices conforming to UL 486C specifically designed for direct buria

Exception: When wiring above ground manifolds from the valve to the ground immediately beneath it, n

-

140~~3~~1.15.6 Hydraulic control tubing installation

-

140~~3~~1~~.15.6.1~~. For hydraulic control systems, a water supply shall be used that is filtered and free of dele
specifications. A backflow prevention device shall be installed where the hydraulic control system is c

140~~3~~1.15.6.2 Tubing shall be installed in trenches and spaced so that it will not rub against pipe, fitting
(305 mm) diameter loop at all turns and connections A minimum depth of cover of 12 inches (305 mm)

-

140~~3~~1.15.6.3 Tubing shall be connected with couplings and collars according to Manufacturer's speci
with water to expel entrapped air and tested for leaks prior to installation.

-

140~~3~~1.15.6.4 Exposed tubing shall be installed in a protective conduit manufactured from Schedule 40 U

-

140~~31~~.16 As-Built Drawings.

140~~3~~1~~.16.1~~ An As-Built drawing shall be required of all irrigation systems installed on commercial and r

140~~3~~1.16.1.1 Location, type, pressure and maximum flow available of all water sources.

-

140~~3~~1.16.1.2 Location, type and size of all components including sprinklers, microirrigation, main controllers, pump start relays, backflow devices, pumps, wells, etc.

-

140~~3~~1.16.1.3 The flow rate, application rate (inches per hour), and the operating pressure for the sprin

-

140~~3~~1.16.1.4 The name, address, phone, email, professional license or certification number of the inst

-

~~**1403**~~**1.16.1.5** Date of installation.

-

CHAPTER14
~~SUBSURFACE~~ LANDSCAPE IRRIGATION SYSTEMS
SECTION 1401
GENERAL

1401.1Scope.
The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ landscape irrigation systems connected to <u>either potable or</u> nonpotable water ~~from~~ ~~on-site~~ ~~water~~ ~~reuse~~ systems.

<u>SECTION 1402</u>
<u>Subsurface Landscape Irrigation Systems Connected to NonPotable On-site Water Reuse Systems</u>

<u>1402.1 Scope.</u>
<u>The provisions of Section 1402 shall govern the materials, design, construction and installation of subsurface landscape irrigation systems connected to nonpotable water from on-site water reuse systems.</u>

~~1402.2~~ <u>1402.2</u>Materials.
Above-ground drain, waste and vent piping for subsurface landscape irrigation systems <u>connected to NonPotabale On-site Water Reuse Systems</u> shall conform to one of the standards listed in Table 702.1. Subsurface landscape irrigation, underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

~~1401.3~~ <u>1402.3</u>Tests.
Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.

~~1401.4~~ <u>1402.4</u>Inspections.
Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code, Building*.

~~1401.5~~ <u>1402.5</u>Disinfection.
Disinfection shall not be required for on-site nonpotable water reuse for subsurface landscape irrigation systems.

~~1401.6~~ <u>1402.6</u>Coloring.
On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.

~~SECTION1402~~
~~SYSTEM DESIGN AND SIZING~~

~~1402.1~~ <u>1402.7</u>Sizing.
The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irrigation system. Where gray water collection piping is connected to subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on the type of fixtures connected. The gray water discharge shall be calculated by the following equation:

The linked image cannot be displaye...

(Equation 14-1)

where:

***A* = Number of occupants:**

Residential—Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.

Commercial—Number of occupants shall be determined by the *Florida Building Code, Building*.

***B* = Estimated flow demands for each occupant:**

Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.

Commercial—Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.

***C* = Estimated gray water discharge based on the total number of occupants.**

~~1402.2~~ <u>1402.8</u>Percolation tests.

The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

~~1402.2.1~~ 1402.8.1 Percolation tests and procedures.

At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

~~1402.2.1.1~~ 1402.8.1.1 Percolation test hole.

The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

~~1402.2.1.2~~ 1402.8.1.2 Test procedure, sandy soils.

The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 1303.7.1.3.

~~1402.2.1.3~~ 1402.8.1.3 Test procedure, other soils.

The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than $^1/_{16}$ inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

~~1402.2.1.4~~ 1402.8.1.4 Mechanical test equipment.

Mechanical percolation test equipment shall be of an *approved* type.

~~1402.2.2~~ 1402.8.2 Permeability evaluation.

Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section ~~1402.2.1.1~~ 1402.8.1.1 for evaluating the soil.

~~1402.3~~ 1402.9 Subsurface landscape irrigation site location.

The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table ~~1402.3~~ 1402.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

TABLE ~~1402.3~~ 1402.9
LOCATION OF SUBSURFACE IRRIGATION SYSTEM

ELEMENT	Storage tank (feet)

Buildings	5
Lot line adjoining private property	5
Water wells	50
Streams and lakes	50
Seepage pits	5
Septic tanks	0
Water service	5
Public water main	10

For SI: 1 foot = 304.8 mm.

~~SECTION1403~~
~~INSTALLATION~~

~~1403.1~~ 1402.10Installation.

Absorption systems shall be installed in accordance with Sections ~~1403.1.1~~ 1402.10.1 through ~~1403.1.5~~ 1402.10.1.5 to provide landscape irrigation without surfacing of water.

~~1403.1.1~~ 1402.10.1Absorption area.

The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table ~~1403.1.1~~ 1402.10.1.

TABLE ~~1403.1.1~~ 1402.10.1
DESIGN LOADING RATE

PERCOLATION RATE(minutes per inch)	DESIG
0 to less than 10	
10 to less than 30	
30 to less than 45	
45 to 60	

For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².

~~1403.1.2~~ 1402.10.1.2 Seepage trench excavations.

Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be not greater than 100 feet (30 480 mm) in *developed length*.

~~1403.1.3~~ 1402.10.1.3 Seepage bed excavations.

Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.

~~1403.1.4~~ 1402.10.1.4 Excavation and construction.

The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

~~1403.1.5~~ 1402.10.1.5 Aggregate and backfill.

Not less than 6 inches in depth of aggregate, ranging in size from $^1/_2$ to $2^1/_2$ inches (12.7 mm to 64 mm), shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with *approved* synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above the covering.

~~1403.2~~ 1402.11 Distribution piping.

Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table ~~1403.2~~ 1402.11. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

TABLE ~~1403.2~~ 1402.11
DISTRIBUTION PIPE

MATERIAL
Polyethylene (PE) plastic pipe
Polyvinyl chloride (PVC) plastic pipe
Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core or (

For SI: 1 inch=25.4 mm.

1403.2.1 Joints.

Joints in distribution pipe shall be made in accordance with Section 705 of this code.

SECTION 1403
Surface and Subsurface Landscape Irrigation Systems

-

1403.1 Scope.

The provisions ofSection 1403 shall govern the materials, design, construction and installation of turf and landscape irrigation systems that apply potable or nonpotable water by means of permanent above ground or subsurface sprinkler or microsprinkler equipment that move water through various means of mechanical pressure.

-

1403.1.2 This section shall apply to all irrigation systems used on residential and commercial landscape areas.

-

1403.1.3 This section shall apply to all new irrigation systems and any new work to existing irrigation systems.

-

Exemption. This section shall not apply to irrigation systems for golf courses, nurseries, greenhouses, or agricultural production systems.

-

-

1403.1.4 Nothing contained in this section shall be deemed to require any irrigation system or part thereof, which existed prior to the establishment of this code, to be changed altered or modified to meet the standards of this code.

-

1403.2 Permits.

-

1403.2.1 A permit shall be required for new installation of landscape irrigation systems and for repairs or modifications to the system design that exceed $1000.00 in labor and material based on invoice value.

-

1403.2.2 No permit shall be required for general maintenance or repairs which do not change the structure or alter the system and the value of which does not exceed $1000.00 in labor and material based on invoice value. -

-

1403.3 Preconstruction submittals.

-

1403.3.1 Plans or drawings.

-

1403.3.1.1 Single-family residence. Design drawings or shop drawings, where required, shall be provided for the installation of irrigation systems prior to start of construction. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and include all improvements. Drawings shall be prepared by a licensed plumbing or irrigation contractor or licensed landscape architect.

-

1403.3.1.2 Commercial, industrial, municipal and multiple-family. Professionally designed drawings prior to start of construction shall be provided for landscape irrigation systems. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all improvements, and shall include but not be limited to: date, scale, revisions, legend, specifications which list all aspects of equipment and assembly there of, water source, water meter and/or point of connection, backflow prevention devices, pump station size, pump station location, design operating pressure and flow rate per zone, precipitation rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, gate valves,senors, etc. The plans and specifications shall be prepared in accordance with Section 107 of the Florida Building Code, Building.

-

1403.4 Definitions. The following definitions are exclusive to this section of the code.

-

ABS Pipe. Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limited use in present day irrigation systems. Solvent weld fittings are used with this pipe (see ASTM D 1788).

-

Air Release Valve. A valve which will automatically release to the atmosphere accumulated small pockets of air from a pressurized pipeline. A small orifice is used to release air at low flow rates. Air release valves are normally required at all summits of mainline and submain pipelines in an irrigation system.

-

Anti-Siphon Device. A safety device used to prevent back-flow of irrigation water to the water source by back-siphonage.

-

Application Rate. The average rate at which water is applied by an irrigation system, sometimes also called precipitation rate. Units are typically inches/hr or mm/hr.

-

Application uniformity. Irrigation application uniformity (also known as distribution uniformity) describes how evenly water is distributed within an irrigation zone.

-

Arc. The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc would be a quarter-circle sprinkler.

-

Atmospheric Vacuum Breaker (AVB). An anti-siphon backflow device which uses a floating seat to allow an air break to interrupt the vacuum effect on water flow.

-

Automatic Control Valve. A valve in a sprinkler system which is activated by an automatic controller by way of hydraulic or electrical control lines and controls a single device or multiple devices.

-

Automatic System. An irrigation system which operates following a preset program entered into an automatic controller.

-

Backflow Prevention Device. An approved safety device used to prevent pollution or contamination of the irrigation water supply due to backflow from the irrigation system.

-

Belled (Pipe). Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inserted into it during the assembly of a pipeline.

-

Block (of sprinklers). A group of sprinklers controlled by one valve. Also called zones or subunits.

-

Block System. An irrigation system in which several groups of sprinklers are controlled by one valve for each group.

-

Bubbler Irrigation. The application of water to the soil surface or a container as a small stream or fountain. Bubbler emitter discharge rates generally range from 0.5 to 2 gpm but are generally less than 60 gph.

-

Check Valve. A valve which permits water to flow in one direction only.

-

Chemical Water Treatment. The addition of chemicals to water to make it acceptable for use in irrigation systems

-

Chemigation. The application of water soluble chemicals by mixing or injecting with the water applied through an irrigation system.

-

Contractor. Any person who engages in the fabrication and installation of any type of irrigation system on a contractual basis in accordance with all stipulations receiving compensation.

-

Control Lines. Hydraulic or electrical lines which carry signals to open and close the valves from the controller to the automatic valves.

-

Controller. The timing mechanism and its mounting box. The controller signals the automatic valves to open and close on a pre-set program or based on sensor readings.

-

Coverage. Refers to the way water is applied to an area.

-

Cycle. Refers to one complete run of a controller through all programmed controller stations.

-

Demand (or irrigation demand). Refers to the irrigation requirements of the irrigated area. Demand primarily depends on the type of crop, stage of growth, and climatic factors.

-

Design Area. The specific land area to which water is to be applied by an irrigation system.

-

Design Emission Uniformity. An estimate of the uniformity of water application with an irrigation system.

-

Design Pressure. The pressure at which the irrigation system or certain components are designed to operate. The irrigation system design pressure is that measured at the pump discharge or entrance to the system if there is no pump, and a zone design pressure is the average operating pressure of all emitters within that zone.

-

Direct Burial Wire. Plastic-coated single-strand copper wire for use as control line for electric valves.

-

Discharge Rate. The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting device, or a unit length of line-source micro irrigation tubing. Also, the flow rate from a pumping system or from a reduced pressure assembly or relief valve.

-

Double Check Valve. An approved assembly of two single, independently-acting check valves with test ports to permit independent testing of each check valve.

-

Drain Valve. A valve used to drain water from a line. The valve may be manually or automatically operated.

-

Drip Irrigation. The precise low-rate application of water to or beneath the soil surface near or directly into the plant root zone. Applications normally occur as small streams, discrete or continuous drops, in the range of 0.5 to 2.0 gph.

-

Effluent water. Also referred to as reclaimed or gray water is wastewater which has been treated per Florida Statute, §403.086 and is suitable for use as a water supply for irrigation systems.

-

Emitters. Devices which are used to control the discharge of irrigation water from lateral pipes. This term is primarily used to refer to the low flow rate devices used in micro irrigation systems.

-

Fertigation. The application of soluble fertilizers with the water applied through an irrigation system.

-

Filtration System. The assembly of physical components used to remove suspended solids from irrigation water. These include both pressure and gravity type devices, such as settling basins, screens, media filters, and centrifugal force units (vortex sand separators).

-

Flexible Swing Joint. A flexible connection between the lateral pipe and the sprinkler which allows the sprinkler to move when force is applied to it.

-

Flow Meters. Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typically in gpm), and to provide data on system usage.

Gauge (Wire). Standard specification for wire size. The larger the gauge number, the smaller the wire diameter.

Head. A sprinkler head. Sometimes used interchangeably with and in conjunction with "Sprinkler."

Infiltration Rate. The rate of water flow across the surface of the soil and into the soil profile. Units are usually inches/hr.

Irrigation. Application of water by artificial means, that is, means other than natural precipitation. Irrigation is practiced to supply crop water requirements, leach salts, apply chemicals, and for environmental control including crop cooling and freeze protection.

Irrigation Water Requirement or Irrigation Requirement. The quantity of water that is required for crop production, exclusive of effective rainfall.

Landscape. Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground covers, flowers, shrubs, trees, and similar plant materials as opposed to agricultural crops grown and harvested for monetary return.

Lateral. The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header pipeline downstream of the control valve.

Line-Source Emitters. Lateral pipelines which are porous or contain closely-spaced perforations so that water is discharged as a continuous band or in overlapping patterns rather than discrete widely-spaced points along the pipeline length.

Looped System. A piping system which allows more than one path for water to flow from the supply to the emitters or sprinklers.

Low Volume Sprinklers. Sprinkler heads that emit less than .5 gallons per minute.

Mainline. A pipeline which carries water from the control station to submains or to manifolds or header pipelines of the water distribution system.

Manifold. The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. Also sometimes called a header pipeline.

Manual System. A system in which control valves are manually operated rather than operated by automatic controls.

Matched Precipitation. An equal distribution of water over a given area or zone.

Meter Box. A concrete or plastic box buried flush to grade which houses flow (water) meters or other components.

Microirrigation. The frequent application of small quantities of water directly on or below the soil surface, usually as discrete drops, tiny streams, or miniature sprays through emitters placed along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, including drip, subsurface, bubbler, and spray irrigation. Previously known as trickle irrigation.

Overlap. The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a percentage of the diameter of coverage.

PE Pipe. Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black for resistance to degradation by ultraviolet radiation.

Potable Water. Water which is suitable in quality for human consumption and meets the requirements of the Health Authority having jurisdiction.

Pressure Relief Valve. A valve which will open and discharge to atmosphere when the pressure in a pipeline or pressure vessel exceeds a pre-set point to relieve the high-pressure condition.

Pressure Vacuum Breaker. A backflow prevention device which includes a spring-loaded check valve and a spring-loaded vacuum breaker to prevent the backflow of irrigation system water to the water source.

Pumping Station. The pump or pumps that provide water to an irrigation system, together with all of the necessary accessories such as bases or foundations, sumps, screens, valves, motor controls, safety devices, shelters and fences.

PVC Pipe. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure rated for water. Manufactured in accordance with AWWA C-900 or ASTM D-2241.

Rain Shut off Device. A calibrated device that is designed to detect rainfall and override the irrigation cycle of the sprinkler system when a predetermined amount of rain fall has occurred.

Reduced Pressure Principle Backflow Preventer (RPZD) (also known as Reduced Pressure Zone Device RPZ or RPZ Valve). A type of backflow prevention device used to protect water supplies from contamination.

Riser. A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

Runoff. The result of excess water applied either naturally (precipitation) or mechanically (irrigation) that exceeds the absorption rate of the soil, moving to an area of a lower elevation.

Sleeve. A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

Spacing. The distance between sprinklers or other emitters.

Spray Irrigation. The micro irrigation application of water to the soil or plant surface by low flow rate sprays or mists.

Sprinkler. The sprinkler head. Sometimes called “Head.”

Supply (Water Source). The origin of the water used in the irrigation system.

Swing Joint. A ridged connection between the lateral pipe and the sprinkler, utilizing multiple elbows and nipples, which allows the sprinkler to move when force is applied to it.

Tubing. Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE or PVC.

1403.4 DESIGN CRITERIA

1403.4.1 Design defined. Within the scope of this code, irrigation system design is defined as the science and art of properly selecting and applying all components within the system

1403.4.2 Water supply.

1403.4.2.1 The water source shall be adequate from the stand-point of volume, flow rate, pressure, and quality to meet the irrigation requirements of the area to be irrigated, as well as other demands, if any, both at the time the system is designed and for the expected life of the system.

1403.4.2.2 If the water source is effluent, it shall meet the advanced waste treatment standard as set forth in Florida Statute §403.086(4) as well as any other standard as set forth by the controlling governmental agency.

-
1403.4.3 Application uniformity.

-
1403.4.3.1 Sprinkler irrigation systems shall be designed with the appropriate uniformity for the type of plants being grown and the type of soil found in that area. The general watering of different types of plants as one group without regard to their individual water requirements shall be avoided.

-
1403.4.3.2 Sprinkler head spacing, type and nozzle selection that achieves the highest application uniformity shall be utilized.

-
1403.4.3.3 Application rates which avoid runoff and permit uniform water infiltration into the soil shall be utilized. Land slope, soil hydraulic properties, vegetative ground cover, and prevailing winds and sun exposure shall be considered when application rates are specified. Different types of sprinklers with different application rates, i.e., spray heads vs. rotor heads, bubbler heads vs rotor heads, shall not be combined on the same zone or circuit.

-
1403.4 System zoning. The irrigation system shall be divided into zones based on consideration of the following hydrozoning practices.

-
1403.4.1 Available flow rate.

-
1403.4.2 Cultural use of the area.

-
1403.4.3 Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

-
1403.4.4 Type of sprinkler, i.e., sprinklers with matching precipitation rates.

-
1403.4.5 Soil characteristics and slope.

-
1403.4.6 Sun exposure.

-
1403.5 Sprinkler/emitter spacing and selection.

-
1403.5.1 Sprinkler/Emitter spacing shall be determined considering the irrigation requirements, hydraulic characteristics of the soil and device, and water quality with its effect on plant growth, sidewalks, buildings, and public access areas.

-
1403.5.2 All pop-up spray head bodies in turf areas shall be no less than 6” in height for St. Augustine, Zoysia and Bahia and no less than 4” in height for Bermuda, Centapede and Seashore Paspalum.

-
1403.5.3 Sprinklers shall be located in accordance with manufacturer’s specifications in each irrigated zone area for a matched precipitation rate objective.

-
1403.5.4 Single row head spacing shall only occur when an additional row will cause saturated soils at the toe of a slope or other inefficiencies.

-
1403.5.5 All heads shall not exceed 50% of manufacturer’s specified diameters of coverage.

-
1403.5.6 Water conservation shall be taken into consideration by minimizing irrigation of non-vegetated areas.

-
1403.5.7 Microirrigation systems shall be designed using the Emission Uniformity concept. Microirrigation emitters shall be spaced to wet 100 percent of the root zone in turf areas and 50 percent of the root zone for shrubs and trees.

-
1403.5.8 Microirrigation or low volume heads shall be required in all areas to be irrigated that are less than 4 feet in any direction from the emitter or nozzle.

-

1403.5.9 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to supply pipelines to protect the emission devices from contamination from a PD main or lateral break.

1403.5.10 Each plant shall have an adequate number and size (gph) of microirrigation devices, properly placed, to meet the plant water requirements for no rainfall.

1403.6 Pipelines. Pipelines shall be sized to limit pressure variations so that the working pressure at all points in the irrigation system will be in the range required for uniform water application. Velocities shall not exceed 5 feet (1524 mm) per second.

1403.7 Wells.

1403.7.1 Well diameters, depths and location shall correspond to the irrigation system demand and in compliance to all applicable state, regulatory agencies and local codes and regulations.

1403.8 Pumps.

1403.8.1 Pump and motor combinations shall be capable of satisfying the total system demand without invading the service factor of the motor except during start-up and between zones.

1403.8.2 Pumps shall be positioned with respect to the water surface in order to ensure that the net positive suction head required (NPSHr) for proper pump operation is achieved.

1403.8.3 The pumping system shall be protected against the effects of the interruption of water flow.

1403.9 Control valves.

1403.9.1 Control valve size shall be based on the flow rate through the valve. Friction loss through the valve, an approved air gap separation, or a reduced pressure assembly shall not exceed 10 percent of the static mainline head.

1403.9.2 Control systems using hydraulic communication between controller and valve(s) shall comply with the manufacturer's recommendations for maximum distance between controller and valve, both horizontally and vertically (elevation change).

1403.9.3 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifications; based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except individual, single lot residential systems.

1403.9.4 Manually operated control valves shall be located so that they can be operated without wetting the operator.

1403.9.5 In ground valves shall be located away from large tree and palm root zones.

1403.9.6 A manual shut off valve shall be required to be installed close to the point of connection but downstream from any backflow device (or/unless included in the backflow device) to minimize water loss when the system is shut off for repairs or emergencies.

1403.9.7 An automatic shut-off valve or master valve (normally closed) is required on all systems with a constantly pressurized mainline to confine the water loss from minor main line leaks, weeping valves, or stuck on valves to just the time the system is operating automatically.

1403.10 Automatic irrigation controller. Automatic irrigation controllers shall conform to UL 1310 and have an adequate number of stations and power output per station to accommodate the irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sensors to override the irrigation cycle when adequate rainfall has occurred, as required by Florida Statutes, Section 373.62.

1403.11 Chemical injection.

1403.11.1 Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any other injected substance will be located and sized according to the manufacturers' recommendations.

1403.11.2 Injection systems shall be located downstream of the applicable backflow prevention devices as required by Florida Statutes, Section 487.021 and 487.055; the Environmental Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

1403.11.3 If an irrigation water supply is also used for human consumption, an air gap separation or an approved reduced pressure principal backflow prevention device shall be required in compliance with ASSE 1013 and Section 1403.12.

1403.12 Backflow prevention methods. Backflow prevention assemblies at all cross connections with all water supplies shall be provided in accordance with county, municipal or other applicable codes. In the event of conflicting regulations the assembly type shall be provided which gives the highest degree of protection.

1403.12.1 Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida Statutes 487.021 and 487.055) and Environmental Protection Agency Pesticide Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.

1403.12.1.1 For municipal water supplies, chemical injection equipment must be separated from the water supply by an approved air gap separation or a reduced pressure principle assembly that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment shall comply with ASSE 1013 to protect the water supply from back-siphonage and back-pressure.

1403.12.1.2 For other water supplies, Florida State law, EPA regulations, or other applicable local codes shall be followed. In the absence of legal guidelines at minimum a PVB shall be required.

SECTION 1403.13 REFERENCED STANDARDS
The standards referenced below are exclusive to this section.

1403.13.1 American Society of Agricultural Engineers (ASAE) Standards:

ASAE S330.1: Procedure for sprinkler distribution testing for research purposes.

ASAE S376.1: Design, installation, and performance of underground thermoplastic irrigation pipelines.

ASAE S397.1: Electrical service and equipment for irrigation.

ASAE S435: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

ASAE S398.1: Procedure for sprinkler testing and performance reporting.

ASAE S339: Uniform classification for water hardness.

ASAE S394: Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural irrigation system.

ASAE EP400.1: Designing and constructing irrigation wells.

ASAE EP405: Design, installation, and performance of trickle irrigation systems.

ASAE EP409: Safety devices for applying liquid chemicals through irrigation systems.

1403.13.2 ASTM International Standards:

ASTM D 2241: Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

ASTM D 2239: Specification for polyethylene (PE) plastic pipe (SDR-PR).

ASTM D 2466: Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 40.

ASTM D 2855: Standard recommended practice for making solvent cemented joints with polyvinyl chloride pipe and fittings.

ASTM D 3139: Specification for joints for plastic pressure pipes using flexible elastomeric seals.

ASTM F 477: Specification for elastomeric seals (gaskets for joining plastic pipe).

1403.13.3 American Water Works Association (AWWA) standards:

AWWA C-900: PVC pipe standards and specifications

1403.13.4 American Society of Sanitary Engineers (ASSE) Standards:

ASSE 1001: Pipe applied atmospheric type vacuum breakers.

ASSE 1013: Reduced pressure principle backflow preventers.

ASSE 1015: Double check valve backflow preventers.

ASSE 1020: Vacuum breakers, anti-siphon, pressure type backflow preventers.

ASSE 1024: Dual check valve backflow preventers.

1403.13.5 Hydraulic Institute Standards, 14th Edition

1403.13.6 Standards and Specifications for Turf and Landscape Irrigation Systems Florida Irrigation Society (FIS) Standards

1403.13.7 Soil Conservation Service (SCS) Field Office Technical Guide, Section IV-A — Cropland Codes:

SCS Code 430-DD: Irrigation water conveyance, underground, plastic pipeline.

SCS Code 430-EE: Irrigation water conveyance. Low pressure, underground, plastic pipeline.

SCS Code 430-FF: Irrigation water conveyance, steel pipeline.

SOS Code 441-1: Irrigation system, trickle.

SCS Code 442: Irrigation system sprinkler.

SCS Code 449: Irrigation water management.

SCS Code 533: Pumping plant for water control.

SCS Code 642: Well.

-

1403.13.8. Underwriters Laboratories (UL) 333 Pfingsten Road, Northbrook, IL 60062-296 Standards

UL 486C-1995 Splicing Wire Connectors

-

UL 969-2013 Standard for Marking and Labeling Systems

-

UL 1310-2011 Standard for Class 2 Power Units

-

-

Section 1403.14 MATERIALS
The materials referenced below are exclusive to this section.

-

1403.14.1 PVC pipe and fittings.

-

1403.14.1.1 PVC pipe shall comply with one of the following standards ASTM D 1785, ASTM D 2241, AWWA C-900, or AWWA C-905. SDR-PR pipe shall have a minimum wall thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.

-

1403.14.1.2 All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set forth in ASTM D 2466.

-

1403.14.1.3. Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D 2464.

-

1403.14.1.4. PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

-

1403.14.1.5. PVC flexible pipe should be pressure rated as described in ASTM D 2740 with standard outside diameters compatible with PVC IPS solvent-weld fittings.

-

1403.14.1.6. PVC cement should meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

-

1403.14.2 Ductile iron pipe and fittings.

-

1403.14.2.1 Gasket fittings for iron pipe shall be of materials and type compatible with the piping material being used.

-

1403.14.3. Steel pipe and fittings.

-

1403.14.3.1. All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in accordance with ASTM 53.

-

1403.14.3.2 Threaded fittings for steel pipe shall be Schedule 40 Malleable Iron.

-

1403.14.4 Polyethylene pipe.

-

1403.14.4.1 Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in accordance with ASTM D 2239.

-

140314.4.2 Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

-

1403.14.4.3 Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

-

1403.14.5 Sprinklers, spray heads, and emitters.

-

1403.14.5.1 Units and nozzles shall be selected in accordance with the size of the area and the type of plant material being irrigated. Sprinklers shall fit the area they are intended to water without excessive overspray. Intentional direct spray onto walkways, buildings, roadways, and driveways is prohibited.

1403.14.5.2 Equipment shall be used that is protected from contamination and damage by use of seals, screens, and springs where site conditions present a potential for damage.

1403.14.5.3 Riser-mounted sprinklers shall be supported to minimize movement of the riser resulting from the action of the sprinkler.

1403.14.5.4 Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection between the sprinkler and lateral pipeline to allow movement in any direction and to prevent equipment damage.

1403.14,5.5 Check valves shall be installed on any sprinkler where low point drainage occurs.

1403.14.5.6 The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstructed by the turf grass blades: 6" height for St. Augustine, Zoysia and Bahia and 4" height for Bermuda, Centapede and Seashore Paspalum.

1403.14.5.7 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to PVC pipe to protect the emission devices from contamination from a PVC main or lateral break.

1403.14.5.8 All microirrigation zones shall have adequate pressure regulation installed at the zone valve or at the point where the drip tubing is attached to the PVC to ensure that all emission devices meet the manufacturer's performance standards.

1403.14.5.9 Each plant shall have a adequate number and size(gph) of microirrigation devices, properly placed to meet the plant water requirements for no rainfall.

1403.14.5.10 All tubing shall be secured to prevent movement in accordance with manufacturer's specificantion.

1403.14.6 Valves.

1403.14.6.1 Valves shall have a maximum working pressure rating equal to or greater than the maximum pressure of the system, but not less than 125 psi (861 kPa). This requirement shall be waived for low mainline pressure systems [30 psi (207 kPa) or less].

1403.14.6.2 Only valves that are constructed of materials designed for use with the water and soil conditions of the installation shall be used. Valves that are constructed from materials that will not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.

1403.14.7 Valve boxes.

1403.14.7.1 Valve boxes shall be constructed to withstand traffic loads common to the area in which they are installed. They should be sized to allow manual operation of the enclosed valves without excavation.

1403.14.7.2. Each valve box shall be permanently labeled in accordance with UL 969 to identify its contents.

1403.14.8 Low voltage wiring.

1403.14.8.1 All low voltage wire which is directly buried shall be labeled for direct burial wire. Wire not labeled for direct burial shall be installed in watertight conduits, and be listed TWN or THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed within a conduit and sleeve.

1403.14.8.2 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifications, based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except single lot individual residential systems.

1403.14.8.3 Connections shall be made using devices conforming to UL 486 specifically designed for direct burial. All splices shall be enclosed within a valve box.

1403.14.9 Irrigation controllers.

1403.14.9.1 All irrigation controllers shall conform to UL 1310 and the provisions of the National Electric Code (NEC) and be grounded in accordance with the manufacturer's specifications. Solid state controls shall be equipped with surge suppressors on the primary and secondary wiring, except single lot residential systems.

1403.14.9.2 The controller housing or enclosure shall protect the controller from the hazards of the environment in which it is installed.

1403.14.9.3 The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance from other outdoor equipment, free and clear of any tree canopy or other overhead obstructions, and above the height of the sprinkler coverage. Soil moisture sensors and ET sensors shall be installed in accordance with manufacturer's specifications and Florida Statutes, Section 373.62.

1403.14.10 Pumps and wells.

1403.14.10.1 Irrigation pump electrical control systems shall conform to the NEC and local building codes.

1403.14.10.2 The pumping system shall be protected from the hazards of the environment in which it is installed.

1403.14.10.3 Use electric motors with a nominal horsepower rating greater than the maximum horsepower requirement of the pump during normal operation. Motor shall have a service factor of at least 1.15.

1403.14.10.4 Casings for drilled wells shall be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Only steel pipe casings shall be used in driven wells. See SCS code FL-642. Steel casings shall conform to ASTM A 589.

1403.14.11 Chemical injection equipment.

1403.14.11.1 Chemical injection equipment shall be constructed of materials capable of withstanding the potential corrosive effects of the chemicals being used. Equipment shall be used only for those chemicals for which it was intended as stated by the injection equipment manufacturer.

1403.14.12 Filters and strainers.

1403.14.12.1 Filtration equipment and strainers constructed of materials resistant to the potential corrosive and erosive effects of the water shall be used. They shall be sized to prevent the passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufacturer's recommendations.

Section 1403.15 INSTALLATION

1403.15.1 Pipe installation.

1403.15.1.1 Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicular traffic or routine occurrences which occur in the normal use and maintenance of a property. Depths of cover shall meet or exceed SCS Code 430-DD, Water Conveyance, as follows:

1403.15.1.1.1 Vehicle traffic areas.

Pipe Size (inches)

Depth of Cover (inches)

-
½ – 2 ½

-
18 - 24

-
3 - 5

-
24 - 30

-
6 and larger

-
30 - 36

-

-

-
1403.15.1.1.2 All areas except vehicle traffic:

-

-
Pipe Size (inches)

-
Depth of Cover (inches)

-
½ – 1 ½

-
6

-
2 - 3

-
12

-
4 - 6

-
18

-
More than 6

-
24

-
1403.15.1.2 All pipe joints and connections shall be made according to manufacturer's specifications. All solvent-weld connections shall be performed in accordance with ASTM D 2855.

-
1403.15.1.3 Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shall one irrigation pipe rest upon another.

-
1403.15.1.4 Thrust blocks shall be used on all gasketed PVC systems. They must be formed against a solid, hand-excavated trench wall undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outside diameter of the pipe. Thrust blocks shall be sized in accordance with ASAE S-376.1.

-
1403.15.1.5 The trench bottom shall be uniform, free of debris, and of sufficient width to properly place pipe and support it over its entire length. Native excavated material may be used to backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-inch in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking or mounding shall not be used to bring the pipe to final grade.

-
1403.15.1.6. Pipe sleeves shall be used to protect pipes or wires installed under pavement or roadways. Pipe sleeves two pipe sizes larger than the carrier pipe or twice the diameter of the wire bundle shall be used under the paving or roadway and extending a minimum of 3 feet beyond the paved area or as required by the Florida

Department of Transportation (FDOT). Pipe sleeves shall be Sch 40. Proper backfill and compaction procedures shall be followed.

1403.15.2 Control valve installation.

1403.15.2.1 Valve installation shall allow enough clearance for proper operation and maintenance. Where valves are installed underground, they shall be provided with a valve box with cover extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches (152 mm) of cover in nontraffic and noncultivated areas and 18 inches (457 mm) of cover in traffic areas. The valve box shall be installed to minimize the effect of soil intrusion within the valve box with the use of filter fabric, pea gravel, or other approved material. If an automatic valve is installed under each sprinkler, then the valve box may be omitted.

1403.15.2.2 Valve boxes shall be installed so that they do not rest on the pipe and the box cover does not conflict with the valve stem or interfere with valve operation. They shall be flush with the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscape.

1403.15.2.3. Quick coupling valves shall be installed on swing joints or flexible pipe with the top of the valve at ground level.

1403.15.2.4 Any above-ground manually-operated valves on nonpotable water systems shall be adequately identified with distinctive purple colored paint. Hose bibb connections on irrigation systems that utilize nonpotable water supplies shall not be permitted.

1403.15.3 Sprinkler installation.

1403.15.3.1. On flat landscaped areas, sprinklers shall be installed plumb. In areas where they are installed on slopes, sprinklers may be tilted as required to prevent erosion. Sprinklers shall be adjusted to avoid unnecessary discharge on roads, pavements and structures.

1403.15.3.2. There shall be a minimum separation of 4 inches (102 mm) between sprinklers and pavement. There shall be a minimum separation of 12 inches (305 mm) between sprinklers and buildings and other vertical structures. Piping shall be thoroughly flushed before installation of sprinkler nozzles. Surface mounted and pop-up heads shall be installed on swing joints, polyethylene (PE) nipples or flexible pipe. Polyethylene (PE) nipples shall not be used in maintenance equipment traffic areas or alongside roadways and driveways. Above-ground (riser mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be stabilized.

1403.15.4 Pump installation.

1403.15.4.1 Pumps shall be installed in accordance with the manufacturer's specifications. Pumps shall be set plumb and secure to a firm concrete base. There shall be no strain or distortion on the pipe and fittings. Pipe and fittings shall be supported to avoid placing undue strain on the pump. Steel pipe shall be used on pumps 5 horsepower (hp) or larger.

1403.15.4.2 Pumps shall be installed in a manner to avoid loss of prime. Suction line shall be installed to prevent the accumulation of air pockets. All connections and reductions in suction pipe sizes shall be designed to avoid causing air pockets and cavitation.

1403.15.4.3 Pumps shall be located to facilitate service and ease of removal. Appropriate fittings shall be provided to allow the pump to readily be primed, serviced, and disconnected. An enclosure shall be provide of adequate size and strength, with proper ventilation, to protect the pump from the elements (except residential systems).

1403.15.5 Low voltage wire installation.

1403.15.5.1 Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (305 mm) where not installed directly under the mainline. A sufficient length of wire shall be provided at each connection to allow for thermal expansion/shrinkage. As a minimum, a 12-inch (305 mm) diameter loop shall be provided at all splices and connections. Terminations at valves shall have 24 inches (610 mm) minimum free wire.

1403.15.5.2 All above-ground wire runs and wire entries into buildings shall be installed in electrical conduit. Common wires with a different color than the power wires (white shall be used for common wires) shall be provided. Connections shall be made using devices conforming to UL 486C specifically designed for direct burial. All splices shall be enclosed within a valve box.

Exception: When wiring above ground manifolds from the valve to the ground immediately beneath it, no conduit is required.

1403.15.6 Hydraulic control tubing installation

1403.15.6.1. For hydraulic control systems, a water supply shall be used that is filtered and free of deleterious materials, as defined by the hydraulic control system manufacturer's specifications. A backflow prevention device shall be installed where the hydraulic control system is connected to potable water supplies.

1403.15.6.2 Tubing shall be installed in trenches and spaced so that it will not rub against pipe, fittings, or other objects that could score the tubing, and with a minimum 12-inch (305 mm) diameter loop at all turns and connections A minimum depth of cover of 12 inches (305 mm) shall be provided.

1403.15.6.3 Tubing shall be connected with couplings and collars according to Manufacturer's specifications. All splices shall be made in valve boxes. Tubing shall be prefilled with water to expel entrapped air and tested for leaks prior to installation.

1403.15.6.4 Exposed tubing shall be installed in a protective conduit manufactured from Schedule 40 UV protected PVC or electrical conduit.

1403.16 As-Built Drawings.

1403.16.1 An As-Built drawing shall be required of all irrigation systems installed on commercial and residential developments and shall contain the following information:

1403.16.1.1 Location, type, pressure and maximum flow available of all water sources.

1403.16.1.2 Location, type and size of all components including sprinklers, microirrigation, main and lateral piping, master valves, valves, moisture sensors, rain sensors, controllers, pump start relays, backflow devices, pumps, wells, etc.

1403.16.1.3 The flow rate, application rate (inches per hour), and the operating pressure for the sprinklers and micro irrigation within each zone.

1403.16.1.4 The name, address, phone, email, professional license or certification number of the installation contractor.

1403.16.1.5 Date of installation.

P8091 amended

Summary of Modification

Modification adds Surface and Subsurface Landscape Irrigation Systems connected to either potable or nonpotable water supplies and modifies the current Chapter 14 numbering system to integrate into the new section. Current code addresses subsurface irrigation connected to nonpotable water supply.

Text of Modification

CHAPTER14
LANDSCAPE IRRIGATION SYSTEMS
SECTION 1401
GENERAL

1401.1Scope.

The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ turf and landscape irrigation systems connected to either potable or nonpotable water ~~from on-site water reuse~~ systems.

Exception: Landscape irrigation systems connected to onsite sewage treatment and disposal systems shall be regulated by Chapter 64E-6, Florida Administrative Code, Standards for Onsite Sewage Treatment and Disposal Systems.

~~SECTION 1402~~
~~Subsurface Landscape Irrigation Systems Connected to NonPotable On-site Water Reuse Systems~~

~~1402.1 Scope.~~

~~The provisions of Section 1402 shall govern the materials, design, construction and installation of subsurface landscape irrigation systems connected to nonpotable water from on-site water reuse systems.~~

~~1402.2 1402.2Materials.~~

~~Above-ground drain, waste and vent piping for subsurface landscape irrigation systems connected to NonPotabale On-site Water Reuse Systems shall conform to one of the standards listed in Table 702.1. Subsurface landscape irrigation, underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.~~

~~1401.3 1402.3Tests.~~

~~Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.~~

~~1401.4 1402.4Inspections.~~

~~Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code, Building*.~~

~~1401.5 1402.5Disinfection.~~

~~Disinfection shall not be required for on site nonpotable water reuse for subsurface landscape irrigation systems.~~

~~1401.6 1402.6Coloring.~~

~~On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.~~

~~SECTION1402~~
~~SYSTEM DESIGN AND SIZING~~

~~1402.1 1402.7Sizing.~~

~~The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irrigation system. Where gray water collection piping is connected to subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on the type of fixtures connected. The gray water discharge shall be calculated by the following equation:~~

~~(Equation 14-1)~~

~~where:~~

~~*A* = Number of occupants:~~

~~Residential—Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.~~

~~Commercial—Number of occupants shall be determined by the *Florida Building Code, Building*.~~

~~*B* = Estimated flow demands for each occupant:~~

~~Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.~~

~~Commercial—Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.~~

~~*C* = Estimated gray water discharge based on the total number of occupants.~~

~~1402.2 1402.8Percolation tests.~~

~~The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.~~

~~1402.2.1 1402.8.1Percolation tests and procedures.~~

~~At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.~~

~~1402.2.1.1 1402.8.1.1Percolation test hole.~~

~~The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.~~

~~1402.2.1.2 1402.8.1.2Test procedure, sandy soils.~~

~~The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a~~

~~point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10 minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 1303.7.1.3.~~

~~1402.2.1.3 1402.8.1.3Test procedure, other soils.~~

~~The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4 hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30 minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than 1/16 inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.~~

~~1402.2.1.4 1402.8.1.4Mechanical test equipment.~~

~~Mechanical percolation test equipment shall be of an *approved* type.~~

~~1402.2.2 1402.8.2Permeability evaluation.~~

~~Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section 1402.2.1.1 1402.8.1.1 for evaluating the soil.~~

~~1402.3 1402.9Subsurface landscape irrigation site location.~~

~~The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table 1402.3 1402.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.~~

~~TABLE 1402.3 1402.9~~
~~LOCATION OF SUBSURFACE IRRIGATION SYSTEM~~

~~ELEMENT~~
~~Buildings~~
~~Lot line adjoining private property~~

~~Water wells~~

~~Streams and lakes~~

~~Seepage pits~~

~~Septic tanks~~

~~Water service~~

~~Public water main~~

~~For SI: 1 foot = 304.8 mm.~~

~~SECTION14031~~
~~INSTALLATION~~

~~14031.1 1402.10Installation.~~

~~Absorption systems shall be installed in accordance with Sections 14031.1.1 1402.10.1 through 14031.1.5 1402.10.1.5 to provide landscape irrigation without surfacing of water.~~

~~14031.1.1 1402.10.1Absorption area.~~

~~The total absorption area required shall be computed from the estimated daily gray water discharge and the design loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design loading rate from Table 14031.1.1 1402.10.1.~~

~~TABLE 14031.1.1 1402.10.1~~
~~DESIGN LOADING RATE~~

~~PERCOLATION RATE(minutes per inch)~~
~~0 to less than 10~~
~~10 to less than 30~~
~~30 to less than 45~~
~~45 to 60~~

~~For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².~~

~~14031.1.2 1402.10.1.2 Seepage trench excavations.~~

~~Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be not greater than 100 feet (30 480 mm) in *developed length*.~~

~~14031.1.3 1402.10.1.3 Seepage bed excavations.~~

~~Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.~~

~~14031.1.4 1402.10.1.4 Excavation and construction.~~

~~The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a~~

~~soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.~~

~~**14031.1.5 1402.10.1.5 Aggregate and backfill.**~~

~~Not less than 6 inches in depth of aggregate, ranging in size from ½ to 2½ inches (12.7 mm to 64 mm), shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with *approved* synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above the covering.~~

~~**14031.2 1402.11Distribution piping.**~~

~~Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 14031.2 1402.11. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).~~

~~**TABLE 14031.2 1402.11**~~
~~**DISTRIBUTION PIPE**~~

~~**MATERIA**~~
~~Polyethylene (PE) pl~~
~~Polyvinyl chloride (PVC~~
~~Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O~~

~~For SI: 1 inch=25.4 mm.~~

~~**14031.2.1Joints.**~~

~~Joints in distribution pipe shall be made in accordance with Section 705 of this code.~~

~~**SECTION 14031**~~

~~**Surface and Subsurface Landscape Irrigation Systems**~~

~~**14031.1 Scope.**~~

~~The provisions of Section 14031 shall govern the materials, design, construction and installation of turf and landscape irrigation systems that apply potable or nonpotable water by means of permanent above ground or subsurface sprinkler or microsprinkler equipment that move water through various means of mechanical pressure.~~

140~~3~~1.1.2 This section shall apply to all irrigation systems used on residential and commercial landscape areas.

140~~3~~1.1.3 This section shall apply to all new irrigation systems and any new work to existing irrigation systems.

> Exception. This section shall not apply to irrigation systems for golf courses, nurseries, greenhouses, or agricultural production systems.

140~~3~~1.1.4 Nothing contained in this section shall be deemed to require any irrigation system or part thereof, which existed prior to the establishment of this code, to be changed altered or modified to meet the standards of this code.

140~~3~~1.2 Permits.

140~~3~~1.2.1 A permit shall be required for new installation of landscape irrigation systems and for repairs or modifications to the system design that exceed $1000.00 in labor and material based on invoice value.

140~~3~~1.2.2 No permit shall be required for general maintenance or repairs which do not change the structure or alter the system and the value of which does not exceed $1000.00 in labor and material based on invoice value. -

140~~3~~1.3 Preconstruction submittals.

140~~3~~1.3.1 Plans or drawings.

140~~3~~1.3.1.1 Single-family residence. Design drawings or shop drawings, where required, shall be provided for the installation of irrigation systems prior to start of construction. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and include all improvements. Drawings shall be prepared by a licensed plumbing or irrigation contractor or licensed landscape architect.

140~~3~~1.3.1.2 Commercial, industrial, municipal and multiple-family. Professionally designed drawings prior to start of construction shall be provided for landscape irrigation systems. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all improvements, and shall include but not be limited to: date, scale, revisions, legend, specifications which list all aspects of equipment and assembly there of, water source, water meter and/or point of connection, backflow prevention devices, pump station size, pump station location, design operating pressure and flow rate per zone, precipitation rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, gate valves, sensors, etc. The plans and specifications shall be prepared in accordance with Section 107 of the Florida Building Code, Building.

140~~3~~1.4 Definitions. The following definitions are exclusive to this section of the code.

ABS Pipe. Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limited use in present day irrigation systems. Solvent weld fittings are used with this pipe (see ASTM D 1788).

Air Release Valve. A valve which will automatically release to the atmosphere accumulated small pockets of air from a pressurized pipeline. A small orifice is used to release air at low flow rates. Air release valves are normally required at all summits of mainline and submain pipelines in an irrigation system.

Anti-Siphon Device. A safety device used to prevent back-flow of irrigation water to the water source by back-siphonage.

Application Rate. The average rate at which water is applied by an irrigation system, sometimes also called precipitation rate. Units are typically inches/hr or mm/hr.

Application uniformity. Irrigation application uniformity (also known as distribution uniformity) describes how evenly water is distributed within an irrigation zone.

Arc. The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc would be a quarter-circle sprinkler.

Atmospheric Vacuum Breaker (AVB). An anti-siphon backflow device which uses a floating seat to allow an air break to interrupt the vacuum effect on water flow.

Automatic Control Valve. A valve in a sprinkler system which is activated by an automatic controller by way of hydraulic or electrical control lines and controls a single device or multiple devices.

Automatic System. An irrigation system which operates following a preset program entered into an automatic controller.

Backflow Prevention Device. An approved safety device used to prevent pollution or contamination of the irrigation water supply due to backflow from the irrigation system.

Belled (Pipe). Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inserted into it during the assembly of a pipeline.

Block (of sprinklers). A group of sprinklers controlled by one valve. Also called zones or subunits.

Block System. An irrigation system in which several groups of sprinklers are controlled by one valve for each group.

Bubbler Irrigation. The application of water to the soil surface or a container as a small stream or fountain. Bubbler emitter discharge rates generally range from 0.5 to 2 gpm but are generally less than 60 gph.

Check Valve. A valve which permits water to flow in one direction only.

Chemical Water Treatment. The addition of chemicals to water to make it acceptable for use in irrigation systems

Chemigation. The application of water soluble chemicals by mixing or injecting with the water applied through an irrigation system.

Contractor. Any person who engages in the fabrication and installation of any type of irrigation system on a contractual basis in accordance with all stipulations receiving compensation.

Control Lines. Hydraulic or electrical lines which carry signals to open and close the valves from the controller to the automatic valves.

Controller. The timing mechanism and its mounting box. The controller signals the automatic valves to open and close on a pre-set program or based on sensor readings.

Coverage. Refers to the way water is applied to an area.

Cycle. Refers to one complete run of a controller through all programmed controller stations.

Demand (or irrigation demand). Refers to the irrigation requirements of the irrigated area. Demand primarily depends on the type of crop, stage of growth, and climatic factors.

Design Area. The specific land area to which water is to be applied by an irrigation system.

Design Emission Uniformity. An estimate of the uniformity of water application with an irrigation system.

Design Pressure. The pressure at which the irrigation system or certain components are designed to operate. The irrigation system design pressure is that measured at the pump discharge or entrance to the system if there is no pump, and a zone design pressure is the average operating pressure of all emitters within that zone.

Direct Burial Wire. Plastic-coated single-strand copper wire for use as control line for electric valves.

Discharge Rate. The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting device, or a unit length of line-source micro irrigation tubing. Also, the flow rate from a pumping system or from a reduced pressure assembly or relief valve.

Double Check Valve. An approved assembly of two single, independently-acting check valves with test ports to permit independent testing of each check valve.

Drain Valve. A valve used to drain water from a line. The valve may be manually or automatically operated.

Drip Irrigation. The precise low-rate application of water to or beneath the soil surface near or directly into the plant root zone. Applications normally occur as small streams, discrete or continuous drops, in the range of 0.5 to 2.0 gph.

Effluent water. Also referred to as reclaimed ~~or gray water~~ is wastewater which has been treated per Florida Statute, §403.086 and is suitable for use as a water supply for irrigation systems.

Emitters. Devices which are used to control the discharge of irrigation water from lateral pipes. This term is primarily used to refer to the low flow rate devices used in micro irrigation systems.

Fertigation. The application of soluble fertilizers with the water applied through an irrigation system.

Filtration System. The assembly of physical components used to remove suspended solids from irrigation water. These include both pressure and gravity type devices, such as settling basins, screens, media filters, and centrifugal force units (vortex sand separators).

Flexible Swing Joint. A flexible connection between the lateral pipe and the sprinkler which allows the sprinkler to move when force is applied to it.

Flow Meters. Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typically in gpm), and to provide data on system usage.

Gauge (Wire). Standard specification for wire size. The larger the gauge number, the smaller the wire diameter.

Head. A sprinkler head. Sometimes used interchangeably with and in conjunction with "Sprinkler."

Infiltration Rate. The rate of water flow across the surface of the soil and into the soil profile. Units are usually inches/hr.

Irrigation. Application of water by artificial means, that is, means other than natural precipitation. Irrigation is practiced to supply crop water requirements, leach salts, apply chemicals, and for environmental control including crop cooling and freeze protection.

Irrigation Water Requirement or Irrigation Requirement. The quantity of water that is required for crop production, exclusive of effective rainfall.

Landscape. Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground covers, flowers, shrubs, trees, and similar plant materials as opposed to agricultural crops grown and harvested for monetary return.

Lateral. The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header pipeline downstream of the control valve.

Line-Source Emitters. Lateral pipelines which are porous or contain closely-spaced perforations so that water is discharged as a continuous band or in overlapping patterns rather than discrete widely-spaced points along the pipeline length.

Looped System. A piping system which allows more than one path for water to flow from the supply to the emitters or sprinklers.

Low Volume Sprinklers. Sprinkler heads that emit less than .5 gallons per minute.

Mainline. A pipeline which carries water from the control station to submains or to manifolds or header pipelines of the water distribution system.

Manifold. The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. Also sometimes called a header pipeline.

Manual System. A system in which control valves are manually operated rather than operated by automatic controls.

Matched Precipitation. An equal distribution of water over a given area or zone.

Meter Box. A concrete or plastic box buried flush to grade which houses flow (water) meters or other components.

Microirrigation. The frequent application of small quantities of water directly on or below the soil surface, usually as discrete drops, tiny streams, or miniature sprays through emitters placed along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, including drip, subsurface, bubbler, and spray irrigation. Previously known as trickle irrigation.

Overlap. The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a percentage of the diameter of coverage.

PE Pipe. Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black for resistance to degradation by ultraviolet radiation.

Potable Water. Water which is suitable in quality for human consumption and meets the requirements of the Health Authority having jurisdiction.

Pressure Relief Valve. A valve which will open and discharge to atmosphere when the pressure in a pipeline or pressure vessel exceeds a pre-set point to relieve the high-pressure condition.

Pressure Vacuum Breaker. A backflow prevention device which includes a spring-loaded check valve and a spring-loaded vacuum breaker to prevent the backflow of irrigation system water to the water source.

Pumping Station. The pump or pumps that provide water to an irrigation system, together with all of the necessary accessories such as bases or foundations, sumps, screens, valves, motor controls, safety devices, shelters and fences.

PVC Pipe. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure rated for water. Manufactured in accordance with AWWA C-900 or ASTM D-2241.

Rain Shut off Device. A calibrated device that is designed to detect rainfall and override the irrigation cycle of the sprinkler system when a predetermined amount of rain fall has occurred.

Reduced Pressure Principle Backflow Preventer (RPZD) (also known as Reduced Pressure Zone Device RPZ or RPZ Valve). A type of backflow prevention device used to protect water supplies from contamination.

Riser. A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

Runoff. The result of excess water applied either naturally (precipitation) or mechanically (irrigation) that exceeds the absorption rate of the soil, moving to an area of a lower elevation.

Sleeve. A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

Spacing. The distance between sprinklers or other emitters.

Spray Irrigation. The micro irrigation application of water to the soil or plant surface by low flow rate sprays or mists.

Sprinkler. The sprinkler head. Sometimes called “Head.”

Supply (Water Source). The origin of the water used in the irrigation system.

Swing Joint. A ridged connection between the lateral pipe and the sprinkler, utilizing multiple elbows and nipples, which allows the sprinkler to move when force is applied to it.

Tubing. Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE or PVC.

140~~3~~1.4 DESIGN CRITERIA

140~~3~~1.4.1 Design defined. Within the scope of this code, irrigation system design is defined as the science and art of properly selecting and applying all components within the system

140~~3~~1.4.2 Water supply.

140~~3~~1.4.2.1 The water source shall be adequate from the stand-point of volume, flow rate, pressure, and quality to meet the irrigation requirements of the area to be irrigated, as well as other demands, if any, both at the time the system is designed and for the expected life of the system.

140~~3~~1.4.2.2 If the water source is effluent, it shall meet the advanced waste treatment standard as set forth in Florida Statute §403.086(4) as well as any other standard as set forth by the controlling governmental agency.

140~~3~~1.4.3 Application uniformity.

140~~3~~1.4.3.1 Sprinkler irrigation systems shall be designed with the appropriate uniformity for the type of plants being grown and the type of soil found in that area. The general watering of different types of plants as one group without regard to their individual water requirements shall be avoided.

140~~3~~1.4.3.2 Sprinkler head spacing, type and nozzle selection that achieves the highest application uniformity shall be utilized.

140~~3~~1.4.3.3 Application rates which avoid runoff and permit uniform water infiltration into the soil shall be utilized. Land slope, soil hydraulic properties, vegetative ground cover, and prevailing winds and sun exposure shall be considered when application rates are specified. Different types of sprinklers with different application rates, i.e., spray heads vs. rotor heads, bubbler heads vs rotor heads, shall not be combined on the same zone or circuit.

140~~3~~1.4 System zoning. The irrigation system shall be divided into zones based on consideration of the following hydrozoning practices.

140~~3~~1.4.1 Available flow rate.

140~~3~~1.4.2 Cultural use of the area.

140~~3~~1.4.3 Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

140~~3~~1.4.4 Type of sprinkler, i.e., sprinklers with matching precipitation rates.

140~~3~~1.4.5 Soil characteristics and slope.

140~~3~~1.4.6 Sun exposure.

140~~3~~1.5 Sprinkler/emitter spacing and selection.

140~~3~~1.5.1 Sprinkler/Emitter spacing shall be determined considering the irrigation requirements, hydraulic characteristics of the soil and device, and water quality with its effect on plant growth, sidewalks, buildings, and public access areas.

140~~3~~1.5.2 All pop-up spray head bodies in turf areas shall be no less than 6” in height for St. Augustine, Zoysia and Bahia and no less than 4” in height for Bermuda, Centapede and Seashore Paspalum.

140~~3~~1.5.3 Sprinklers shall be located in accordance with manufacturer’s specifications in each irrigated zone area for a matched precipitation rate objective.

140~~3~~1.5.4 Single row head spacing shall only occur when an additional row will cause saturated soils at the toe of a slope or other inefficiencies.

140~~3~~1.5.5 All heads shall not exceed 50% of manufacturer’s specified diameters of coverage.

140~~3~~1.5.6 Water conservation shall be taken into consideration by minimizing irrigation of non-vegetated areas.

140~~3~~1.5.7 Microirrigation systems shall be designed using the Emission Uniformity concept. Microirrigation emitters shall be spaced to wet 100 percent of the root zone in turf areas and 50 percent of the root zone for shrubs and trees.

140~~3~~1.5.8 Microirrigation or low volume heads shall be required in all areas to be irrigated that are less than 4 feet in any direction from the emitter or nozzle.

140~~3~~1.5.9 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to supply pipelines to protect the emission devices from contamination from a ~~PD~~ main or lateral break.

140~~3~~1.5.10 Each plant shall have an adequate number and size (gph) of microirrigation devices, properly placed, to meet the plant water requirements for no rainfall.

140~~3~~1.6 Pipelines. Pipelines shall be sized to limit pressure variations so that the working pressure at all points in the irrigation system will be in the range required for uniform water application. Velocities shall not exceed 5 feet (1524 mm) per second.

140~~3~~1.7 Wells.

140~~3~~1.7.1 Well diameters, depths and location shall correspond to the irrigation system demand and in compliance to all applicable state, regulatory agencies and local codes and regulations.

140~~3~~1.8 Pumps.

140~~3~~1.8.1 Pump and motor combinations shall be capable of satisfying the total system demand without invading the service factor of the motor except during start-up and between zones.

140~~3~~1.8.2 Pumps shall be positioned with respect to the water surface in order to ensure that the net positive suction head required (NPSHr) for proper pump operation is achieved.

140~~3~~1.8.3 The pumping system shall be protected against the effects of the interruption of water flow.

140~~3~~1.9 Control valves.

140~~3~~1.9.1 Control valve size shall be based on the flow rate through the valve. Friction loss through the valve, an approved air gap separation, or a reduced pressure assembly shall not exceed 10 percent of the static mainline head.

140~~3~~1.9.2 Control systems using hydraulic communication between controller and valve(s) shall comply with the manufacturer's recommendations for maximum distance between controller and valve, both horizontally and vertically (elevation change).

140~~3~~1.9.3 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifications; based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except individual, single lot residential systems.

140~~3~~1.9.4 Manually operated control valves shall be located so that they can be operated without wetting the operator.

140~~3~~1.9.5 In ground valves shall be located away from large tree and palm root zones.

14031.9.6 A manual shut off valve shall be required to be installed close to the point of connection but downstream from any backflow device (or/unless included in the backflow device) to minimize water loss when the system is shut off for repairs or emergencies.

140~~3~~1.9.7 An automatic shut-off valve or master valve (normally closed) is required on all systems with a constantly pressurized mainline to confine the water loss from minor main line leaks, weeping valves, or stuck on valves to just the time the system is operating automatically.

140~~3~~1.10 Automatic irrigation controller. Automatic irrigation controllers shall conform to UL 1310 and have an adequate number of stations and power output per station to accommodate the irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sensors to override the irrigation cycle when adequate rainfall has occurred, as required by Florida Statutes, Section 373.62.

140~~3~~1.11 Chemical injection.

140~~3~~1.11.1 Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any other injected substance will be located and sized according to the manufacturers' recommendations.

140~~3~~1.11.2 Injection systems shall be located downstream of the applicable backflow prevention devices as required by Florida Statutes, Section 487.021 and 487.055; the Environmental Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

140~~3~~1.11.3 If an irrigation water supply is also used for human consumption, an air gap separation or an approved reduced pressure principal backflow prevention device shall be required in compliance with ASSE 1013 and Section 14031.12.

140~~3~~1.12 Backflow prevention methods. Backflow prevention assemblies at all cross connections with all water supplies shall be provided in accordance with county, municipal or other applicable codes. In the event of conflicting regulations the assembly type shall be provided which gives the highest degree of protection.

140~~3~~1.12.1 Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida Statutes 487.021 and 487.055) and Environmental Protection Agency Pesticide Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.

140~~3~~1.12.1.1 For municipal water supplies, chemical injection equipment must be separated from the water supply by an approved air gap separation or a reduced pressure principle assembly that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment shall comply with ASSE 1013 to protect the water supply from back-siphonage and back-pressure.

140~~3~~1.12.1.2 For other water supplies, Florida State law, EPA regulations, or other applicable local codes shall be followed. In the absence of legal guidelines, at minimum, a ~~PVD~~ Pressure Vacuum Breaker shall be required.

SECTION 14031.13 REFERENCED STANDARDS
The standards referenced below are exclusive to this section.

140~~3~~1.13.1 American Society of Agricultural Engineers (ASAE) Standards:

ASAE S330.1: Procedure for sprinkler distribution testing for research purposes.

ASAE S376.1: Design, installation, and performance of underground thermoplastic irrigation pipelines.

ASAE S397.1: Electrical service and equipment for irrigation.

ASAE S435: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

ASAE S398.1: Procedure for sprinkler testing and performance reporting.

ASAE S339: Uniform classification for water hardness.

ASAE S394: Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural irrigation system.

ASAE EP400.1: Designing and constructing irrigation wells.

ASAE EP405: Design, installation, and performance of trickle irrigation systems.

ASAE EP409: Safety devices for applying liquid chemicals through irrigation systems.

140~~3~~1.13.2 ASTM International Standards:

ASTM D 2241: Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

ASTM D 2239: Specification for polyethylene (PE) plastic pipe (SDR-PR).

ASTM D 2466: Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 40.

ASTM D 2855: Standard recommended practice for making solvent cemented joints with polyvinyl chloride pipe and fittings.

ASTM D 3139: Specification for joints for plastic pressure pipes using flexible elastomeric seals.

ASTM F 477: Specification for elastomeric seals (gaskets for joining plastic pipe).

140~~3~~1.13.3 American Water Works Association (AWWA) standards:

AWWA C-900: PVC pipe standards and specifications

140~~3~~1.13.4 American Society of Sanitary Engineers (ASSE) Standards:

ASSE 1001: Pipe applied atmospheric type vacuum breakers.

ASSE 1013: Reduced pressure principle backflow preventers.

ASSE 1015: Double check valve backflow preventers.

ASSE 1020: Vacuum breakers, anti-siphon, pressure type backflow preventers.

ASSE 1024: Dual check valve backflow preventers.

140~~3~~1.13.5 Hydraulic Institute Standards, 14th Edition

140~~3~~1.13.6 Standards and Specifications for Turf and Landscape Irrigation Systems Florida Irrigation Society (FIS) Standards

140~~3~~1.13.~~7 Soil Conservation Service (SCS)~~ Natural Resources Conservation Service (NRCS) Field Office Technical Guide, Section IV-A — Cropland Codes:

~~SCS~~ NRCS Code 430-DD: Irrigation water conveyance, underground, plastic pipeline.

~~SCS~~ NRCS Code 430-EE: Irrigation water conveyance. Low pressure, underground, plastic pipeline.

~~SCS~~ NRCS Code 430-FF: Irrigation water conveyance, steel pipeline.

~~SCS~~ NRCS Code 441-1: Irrigation system, trickle.

~~SCS~~ NRCS Code 442: Irrigation system sprinkler.

~~SCS~~ NRCS Code 449: Irrigation water management.

~~SCS~~ NRCS Code 533: Pumping plant for water control.

~~SCS~~ NRCS Code 642: Well.

140~~3~~1.13.8. Underwriters Laboratories (UL) 333 Pfingsten Road, Northbrook, IL 60062-296 Standards

UL 486C-1995 Splicing Wire Connectors

UL 969-2013 Standard for Marking and Labeling Systems

UL 1310-2011 Standard for Class 2 Power Units

Section 140~~3~~1.14 MATERIALS
The materials referenced below are exclusive to this section.

140~~3~~1.14.1 PVC pipe and fittings.

140~~3~~1.14.1.1 PVC pipe shall comply with one of the following standards ASTM D 1785, ASTM D 2241, AWWA C-900, or AWWA C-905. SDR-PR pipe shall have a minimum wall thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.

140~~3~~1.14.1.2 All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set forth in ASTM D 2466.

140~~3~~1.14.1.3. Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D 2464.

140~~3~~1.14.1.4. PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

140~~3~~1.14.1.5. PVC flexible pipe ~~should~~ shall be pressure rated as described in ASTM D 2740 with standard outside diameters compatible with PVC IPS solvent-weld fittings.

14031.14.1.6. PVC cement ~~should~~ shall meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

140~~3~~1.14.2 Ductile iron pipe and fittings.

140~~3~~1.14.2.1 Gasket fittings for iron pipe shall be of materials and type compatible with the piping material being used.

140~~3~~1.14.3. Steel pipe and fittings.

140~~3~~1.14.3.1. All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in accordance with ASTM 53.

140~~3~~1.14.3.2 Threaded fittings for steel pipe shall be Schedule 40 Malleable Iron.

140~~3~~1.14.4 Polyethylene pipe.

14031.14.4.1 Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in accordance with ASTM D 2239.

140~~3~~1.14.4.2 Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

140~~3~~1.14.4.3 Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

140~~3~~1.14.5 Sprinklers, spray heads, and emitters.

140~~3~~1.14.5.1 Units and nozzles shall be selected in accordance with the size of the area and the type of plant material being irrigated. Sprinklers shall fit the area they are intended to water without excessive overspray. Intentional direct spray onto walkways, buildings, roadways, and driveways is prohibited.

140~~3~~1.14.5.2 Equipment shall be used that is protected from contamination and damage by use of seals, screens, and springs where site conditions present a potential for damage.

140~~3~~1.14.5.3 Riser-mounted sprinklers shall be supported to minimize movement of the riser resulting from the action of the sprinkler.

140~~3~~1.14.5.4 Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection between the sprinkler and lateral pipeline to allow movement in any direction and to prevent equipment damage.

140~~3~~1.14,5.5 Check valves shall be installed on any sprinkler where low point drainage occurs.

140~~3~~1.14.5.6 The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstructed by the turf grass blades: 6" height for St. Augustine, Zoysia and Bahia and 4" height for Bermuda, Centapede and Seashore Paspalum.

140~~3~~1.14.5.7 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to PVC pipe to protect the emission devices from contamination from a PVC main or lateral break.

140~~3~~1.14.5.8 All microirrigation zones shall have adequate pressure regulation installed at the zone valve or at the point where the drip tubing is attached to the PVC to ensure that all emission devices meet the manufacturer's performance standards.

140~~3~~1.14.5.9 Each plant shall have a adequate number and size(gph) of microirrigation devices, properly placed to meet the plant water requirements for no rainfall.

140~~3~~1.14.5.10 All tubing shall be secured to prevent movement in accordance with manufacturer's specifica~~n~~tion.

140~~3~~1.14.6 Valves.

140~~3~~1.14.6.1 Valves shall have a maximum working pressure rating equal to or greater than the maximum pressure of the system, but not less than 125 psi (861 kPa). This requirement shall be waived for low mainline pressure systems [30 psi (207 kPa) or less].

140~~3~~1.14.6.2 Only valves that are constructed of materials designed for use with the water and soil conditions of the installation shall be used. Valves that are constructed from materials that will not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.

140~~3~~1.14.7 Valve boxes.

140~~3~~1.14.7.1 Valve boxes shall be constructed to withstand traffic loads common to the area in which they are installed. They should be sized to allow manual operation of the enclosed valves without excavation.

140~~3~~1.14.7.2. Each valve box shall be permanently labeled in accordance with UL 969 to identify its contents.

140~~3~~1.14.8 Low voltage wiring.

140~~3~~1.14.8.1 All low voltage wire which is directly buried shall be labeled for direct burial wire. Wire not labeled for direct burial shall be installed in watertight conduits, and be listed TWN or THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed within a conduit and sleeve.

140~~3~~1.14.8.2 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifications, based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except single lot individual residential systems.

140~~3~~1.14.8.3 Connections shall be made using devices conforming to UL 486 specifically designed for direct burial. All splices shall be enclosed within a valve box.

140~~3~~1.14.9 Irrigation controllers.

140~~3~~1.14.9.1 All irrigation controllers shall conform to UL 1310 and the provisions of the National Electric Code (NEC) and be grounded in accordance with the manufacturer's specifications. Solid state controls shall be equipped with surge suppressors on the primary and secondary wiring, except single lot residential systems.

140~~3~~1.14.9.2 The controller housing or enclosure shall protect the controller from the hazards of the environment in which it is installed.

140~~3~~1.14.9.3 The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance from other outdoor equipment, free and clear of any tree canopy or other overhead obstructions, and above the height of the sprinkler coverage. Soil moisture sensors and ET sensors shall be installed in accordance with manufacturer's specifications and Florida Statutes, Section 373.62.

140~~3~~1.14.10 Pumps and wells.

140~~3~~1.14.10.1 Irrigation pump electrical control systems shall conform to the NEC and local building codes.

140~~3~~1.14.10.2 The pumping system shall be protected from the hazards of the environment in which it is installed.

140~~3~~1.14.10.3 Use electric motors with a nominal horsepower rating greater than the maximum horsepower requirement of the pump during normal operation. Motor shall have a service factor of at least 1.15.

140~~3~~1.14.10.4 Casings for drilled wells shall be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Only steel pipe casings shall be used in driven wells. See NRCS code FL-642. Steel casings shall conform to ASTM A 589.

140~~3~~1.14.11 Chemical injection equipment.

140~~3~~1.14.11.1 Chemical injection equipment shall be constructed of materials capable of withstanding the potential corrosive effects of the chemicals being used. Equipment shall be used only for those chemicals for which it was intended as stated by the injection equipment manufacturer.

140~~3~~1.14.12 Filters and strainers.

140~~3~~1.14.12.1 Filtration equipment and strainers constructed of materials resistant to the potential corrosive and erosive effects of the water shall be used. They shall be sized to prevent the passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufacturer's recommendations.

Section 140~~3~~1.15 INSTALLATION

140~~3~~1.15.1 Pipe installation.

140~~3~~1.15.1.1 Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicular traffic or routine occurrences which occur in the normal use and maintenance of a property. Depths of cover shall meet or exceed NRCS Code 430-DD, Water Conveyance, as follows:

140~~3~~1.15.1.1.1 Vehicle traffic areas.

Pipe Size (inches)

Depth of Cover (inches)

½ – 2 ½

18 - 24

3 - 5

24 - 30

6 and larger

30 - 36

140~~3~~1.15.1.1.2 All areas except vehicle traffic:

Pipe Size (inches)

Depth of Cover (inches)

½ – 1 ½

6

2 - 3

12

4 - 6

18

More than 6

24

140~~3~~1.15.1.2 All pipe joints and connections shall be made according to manufacturer's specifications. All solvent-weld connections shall be performed in accordance with ASTM D 2855.

140~~3~~1.15.1.3 Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shall one irrigation pipe rest upon another.

140~~3~~1.15.1.4 Thrust blocks shall be used on all gasketed PVC systems. They must be formed against a solid, hand-excavated trench wall undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outside diameter of the pipe. Thrust blocks shall be sized in accordance with ASAE S-376.1.

140~~3~~1.15.1.5 The trench bottom shall be uniform, free of debris, and of sufficient width to properly place pipe and support it over its entire length. Native excavated material may be used to backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-inch in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking or mounding shall not be used to bring the pipe to final grade.

140~~3~~1.15.1.6. Pipe sleeves shall be used to protect pipes or wires installed under pavement or roadways. Pipe sleeves two pipe sizes larger than the carrier pipe or twice the diameter of the wire bundle shall be used under the paving or roadway and extending a minimum of 3 feet beyond the paved area or as required by the Florida Department of Transportation (FDOT). Pipe sleeves shall be Sch 40. Proper backfill and compaction procedures shall be followed.

140~~3~~1.15.2 Control valve installation.

140~~3~~1.15.2.1 Valve installation shall allow enough clearance for proper operation and maintenance. Where valves are installed underground, they shall be provided with a valve box with cover extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches (152 mm) of cover in nontraffic and noncultivated areas and 18 inches (457 mm) of cover in traffic areas. The valve box shall be installed to minimize the effect of soil intrusion within the valve box with the use of filter fabric, pea gravel, or other approved material. If an automatic valve is installed under each sprinkler, then the valve box may be omitted.

140~~3~~1.15.2.2 Valve boxes shall be installed so that they do not rest on the pipe and the box cover does not conflict with the valve stem or interfere with valve operation. They shall be flush with the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscape.

140~~3~~1.15.2.3. Quick coupling valves shall be installed on swing joints or flexible pipe with the top of the valve at ground level.

140~~3~~1.15.2.4 Any above-ground manually-operated valves on nonpotable water systems shall be adequately identified with distinctive purple colored paint. Hose bibb connections on irrigation systems that utilize nonpotable water supplies shall not be permitted.

140~~3~~1.15.3 Sprinkler installation.

140~~3~~1.15.3.1. On flat landscaped areas, sprinklers shall be installed plumb. In areas where they are installed on slopes, sprinklers may be tilted as required to prevent erosion. Sprinklers shall be adjusted to avoid unnecessary discharge on roads, pavements and structures.

140~~3~~1.15.3.2. There shall be a minimum separation of 4 inches (102 mm) between sprinklers and pavement. There shall be a minimum separation of 12 inches (305 mm) between sprinklers and buildings and other vertical structures. Piping shall be thoroughly flushed before installation of sprinkler nozzles. Surface mounted and pop-up heads shall be installed on swing joints, polyethylene (PE) nipples or flexible pipe. Polyethylene (PE) nipples shall not be used in maintenance equipment traffic areas or alongside roadways and driveways. Above-ground (riser mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be stabilized.

140~~3~~1.15.4 Pump installation.

140~~3~~1.15.4.1 Pumps shall be installed in accordance with the manufacturer's specifications. Pumps shall be set plumb and secure to a firm concrete base. There shall be no strain or distortion on the pipe and fittings. Pipe and fittings shall be supported to avoid placing undue strain on the pump. Steel pipe shall be used on pumps 5 horsepower (hp) or larger.

140~~3~~1.15.4.2 Pumps shall be installed in a manner to avoid loss of prime. Suction line shall be installed to prevent the accumulation of air pockets. All connections and reductions in suction pipe sizes shall be designed to avoid causing air pockets and cavitation.

140~~3~~1.15.4.3 Pumps shall be located to facilitate service and ease of removal. Appropriate fittings shall be provided to allow the pump to readily be primed, serviced, and disconnected. An enclosure shall be provide of adequate size and strength, with proper ventilation, to protect the pump from the elements (except residential systems).

140~~3~~1.15.5 Low voltage wire installation.

140~~3~~1.15.5.1 Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (305 mm) where not installed directly under the mainline. A sufficient length of wire shall be provided at each connection to allow for thermal expansion/shrinkage. As a minimum, a 12-inch (305 mm) diameter loop shall be provided at all splices and connections. Terminations at valves shall have 24 inches (610 mm) minimum free wire.

140~~3~~1.15.5.2 All above-ground wire runs and wire entries into buildings shall be installed in electrical conduit. Common wires with a different color than the power wires (white shall be used for common wires) shall be provided. Connections shall be made using devices conforming to UL 486C specifically designed for direct burial. All splices shall be enclosed within a valve box.

Exception: When wiring above ground manifolds from the valve to the ground immediately beneath it, no conduit is required.

140~~3~~1.15.6 Hydraulic control tubing installation

140~~3~~1.15.6.1. For hydraulic control systems, a water supply shall be used that is filtered and free of deleterious materials, as defined by the hydraulic control system manufacturer's specifications. A backflow prevention device shall be installed where the hydraulic control system is connected to potable water supplies.

140~~3~~1.15.6.2 Tubing shall be installed in trenches and spaced so that it will not rub against pipe, fittings, or other objects that could score the tubing, and with a minimum 12-inch (305 mm) diameter loop at all turns and connections A minimum depth of cover of 12 inches (305 mm) shall be provided.

140~~3~~1.15.6.3 Tubing shall be connected with couplings and collars according to Manufacturer's specifications. All splices shall be made in valve boxes. Tubing shall be prefilled with water to expel entrapped air and tested for leaks prior to installation.

140~~3~~1.15.6.4 Exposed tubing shall be installed in a protective conduit manufactured from Schedule 40 UV protected PVC or electrical conduit.

140~~3~~1.16 As-Built Drawings.

140~~3~~1.16.1 An As-Built drawing shall be required of all irrigation systems installed on commercial and residential developments and shall contain the following information:

140~~3~~1.16.1.1 Location, type, pressure and maximum flow available of all water sources.

140~~3~~1.16.1.2 Location, type and size of all components including sprinklers, microirrigation, main and lateral piping, master valves, valves, moisture sensors, rain sensors, controllers, pump start relays, backflow devices, pumps, wells, etc.

140~~3~~1.16.1.3 The flow rate, application rate (inches per hour), and the operating pressure for the sprinklers and micro irrigation within each zone.

140~~3~~1.16.1.4 The name, address, phone, email, professional license or certification number of the installation contractor.

140~~3~~1.16.1.5 Date of installation.

SECTION 1403
Surface and Subsurface Landscape Irrigation Systems

1403.1 Scope.

The provisions of Section 1403 shall govern the materials, design, construction and installation of turf and landscape irrigation systems that apply potable or nonpotable water by means of permanent above ground or subsurface sprinkler or microsprinkler equipment that move water through various means of mechanical pressure.

1403.1.2 This section shall apply to all irrigation systems used on residential and commercial landscape areas.

1403.1.3 This section shall apply to all new irrigation systems and any new work to existing irrigation systems.

> Exemption. This section shall_not apply to irrigation systems for golf courses, nurseries, greenhouses, or agricultural production systems.

1403.1.4 Nothing contained in this section shall be deemed to require any irrigation system or part thereof, which existed prior to the establishment of this code, to be changed altered or modified to meet the standards of this code.

1403.2 Permits.

1403.2.1 A permit shall be required for new installation of landscape irrigation systems and for repairs or modifications to the system design that exceed $1000.00 in labor and material based on invoice value.

1403.2.2 No permit shall be required for general maintenance or repairs which do not change the structure or alter the system and the value of which does not exceed $1000.00 in labor and material based on invoice value.

1403.3 Preconstruction submittals.

1403.3.1 Plans or drawings.

1403.3.1.1 Single-family residence. Design drawings or shop drawings, where required, shall be provided for the installation of irrigation systems prior to start of construction. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, and include all improvements. Drawings shall be prepared by a licensed plumbing or irrigation contractor or licensed landscape architect.

1403.3.1.2 Commercial, industrial, municipal and multiple-family. Professionally designed drawings prior to start of construction shall be provided for landscape irrigation systems. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all improvements, and shall include but not be limited to: date, scale, revisions, legend, specifications which list all aspects of equipment and assembly there of, water source, water meter and/or point of connection, backflow prevention devices, pump station size, pump station location, design operating pressure and flow rate per zone, precipitation rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, gate valves,senors, etc. The plans and specifications shall be prepared in accordance with Section 107 of the Florida Building Code, Building.

1403.4 Definitions. The following definitions are exclusive to this section of the code.

ABS Pipe. Acrylonitrile-butadiene-styrene black, semi-rigid, plastic pipe extruded to IPS. ABS pipe is in limited use in present day irrigation systems. Solvent weld fittings are used with this pipe (see ASTM D 1788).

Air Release Valve. A valve which will automatically release to the atmosphere accumulated small pockets of air from a pressurized pipeline. A small orifice is used to release air at low flow rates. Air release valves are normally required at all summits of mainline and submain pipelines in an irrigation system.

Anti-Siphon Device. A safety device used to prevent back-flow of irrigation water to the water source by back-siphonage.

Application Rate. The average rate at which water is applied by an irrigation system, sometimes also called precipitation rate. Units are typically inches/hr or mm/hr.

Application uniformity. Irrigation application uniformity (also known as distribution uniformity) describes how evenly water is distributed within an irrigation zone.

Arc. The angle of coverage of a sprinkler in degrees from one side of throw to the other. A 90-degree arc would be a quarter-circle sprinkler.

Atmospheric Vacuum Breaker (AVB). An anti-siphon backflow device which uses a floating seat to allow an air break to interrupt the vacuum effect on water flow.

Automatic Control Valve. A valve in a sprinkler system which is activated by an automatic controller by way of hydraulic or electrical control lines and controls a single device or multiple devices.

Automatic System. An irrigation system which operates following a preset program entered into an automatic controller.

Backflow Prevention Device. An approved safety device used to prevent pollution or contamination of the irrigation water supply due to backflow from the irrigation system.

Belled (Pipe). Pipe which is enlarged at one end so that the spigot end of another length of pipe can be inserted into it during the assembly of a pipeline.

Block (of sprinklers). A group of sprinklers controlled by one valve. Also called zones or subunits.

Block System. An irrigation system in which several groups of sprinklers are controlled by one valve for each group.

Bubbler Irrigation. The application of water to the soil surface or a container as a small stream or fountain. Bubbler emitter discharge rates generally range from 0.5 to 2 gpm but are generally less than 60 gph.

Check Valve. A valve which permits water to flow in one direction only.

Chemical Water Treatment. The addition of chemicals to water to make it acceptable for use in irrigation systems

Chemigation. The application of water soluble chemicals by mixing or injecting with the water applied through an irrigation system.

Contractor. Any person who engages in the fabrication and installation of any type of irrigation system on a contractual basis in accordance with all stipulations receiving compensation.

Control Lines. Hydraulic or electrical lines which carry signals to open and close the valves from the controller to the automatic valves.

Controller. The timing mechanism and its mounting box. The controller signals the automatic valves to open and close on a pre-set program or based on sensor readings.

Coverage. Refers to the way water is applied to an area.

Cycle. Refers to one complete run of a controller through all programmed controller stations.

Demand (or irrigation demand). Refers to the irrigation requirements of the irrigated area. Demand primarily depends on the type of crop, stage of growth, and climatic factors.

Design Area. The specific land area to which water is to be applied by an irrigation system.

Design Emission Uniformity. An estimate of the uniformity of water application with an irrigation system.

Design Pressure. The pressure at which the irrigation system or certain components are designed to operate. The irrigation system design pressure is that measured at the pump discharge or entrance to the system if there is no pump, and a zone design pressure is the average operating pressure of all emitters within that zone.

Direct Burial Wire. Plastic-coated single-strand copper wire for use as control line for electric valves.

Discharge Rate. The instantaneous flow rate of an individual sprinkler, emitter, or other water emitting device, or a unit length of line-source micro irrigation tubing. Also, the flow rate from a pumping system or from a reduced pressure assembly or relief valve.

Double Check Valve. An approved assembly of two single, independently-acting check valves with test ports to permit independent testing of each check valve.

Drain Valve. A valve used to drain water from a line. The valve may be manually or automatically operated.

Drip Irrigation. The precise low-rate application of water to or beneath the soil surface near or directly into the plant root zone. Applications normally occur as small streams, discrete or continuous drops, in the range of 0.5 to 2.0 gph.

Effluent water. Also referred to as reclaimed or gray water is wastewater which has been treated per Florida Statute, §403.086 and is suitable for use as a water supply for irrigation systems.

Emitters. Devices which are used to control the discharge of irrigation water from lateral pipes. This term is primarily used to refer to the low flow rate devices used in micro irrigation systems.

Fertigation. The application of soluble fertilizers with the water applied through an irrigation system.

Filtration System. The assembly of physical components used to remove suspended solids from irrigation water. These include both pressure and gravity type devices, such as settling basins, screens, media filters, and centrifugal force units (vortex sand separators).

Flexible Swing Joint. A flexible connection between the lateral pipe and the sprinkler which allows the sprinkler to move when force is applied to it.

Flow Meters. Devices used to measure the volume of flow of water (typically in gallons), or flow rates (typically in gpm), and to provide data on system usage.

Gauge (Wire). Standard specification for wire size. The larger the gauge number, the smaller the wire diameter.

Head. A sprinkler head. Sometimes used interchangeably with and in conjunction with “Sprinkler.”

Infiltration Rate. The rate of water flow across the surface of the soil and into the soil profile. Units are usually inches/hr.

Irrigation. Application of water by artificial means, that is, means other than natural precipitation. Irrigation is practiced to supply crop water requirements, leach salts, apply chemicals, and for environmental control including crop cooling and freeze protection.

Irrigation Water Requirement or Irrigation Requirement. The quantity of water that is required for crop production, exclusive of effective rainfall.

Landscape. Refers to any and all areas which are ornamentally planted, including but not limited to turf, ground covers, flowers, shrubs, trees, and similar plant materials as opposed to agricultural crops grown and harvested for monetary return.

Lateral. The water delivery pipeline that supplies water to the emitters or sprinklers from a manifold or header pipeline downstream of the control valve.

Line-Source Emitters. Lateral pipelines which are porous or contain closely-spaced perforations so that water is discharged as a continuous band or in overlapping patterns rather than discrete widely-spaced points along the pipeline length.

Looped System. A piping system which allows more than one path for water to flow from the supply to the emitters or sprinklers.

Low Volume Sprinklers. Sprinkler heads that emit less than .5 gallons per minute.

Mainline. A pipeline which carries water from the control station to submains or to manifolds or header pipelines of the water distribution system.

Manifold. The water delivery pipeline that conveys water from the main or submain pipelines to the laterals. Also sometimes called a header pipeline.

Manual System. A system in which control valves are manually operated rather than operated by automatic controls.

Matched Precipitation. An equal distribution of water over a given area or zone.

Meter Box. A concrete or plastic box buried flush to grade which houses flow (water) meters or other components.

Microirrigation. The frequent application of small quantities of water directly on or below the soil surface, usually as discrete drops, tiny streams, or miniature sprays through emitters placed along the water delivery pipes (laterals). Microirrigation encompasses a number of methods or concepts, including drip, subsurface, bubbler, and spray irrigation. Previously known as trickle irrigation.

Overlap. The amount one sprinkler pattern overlaps another one when installed in a pattern. Expressed as a percentage of the diameter of coverage.

PE Pipe. Flexible polyethylene pipe for use in irrigation systems, normally manufactured with carbon black for resistance to degradation by ultraviolet radiation.

Potable Water. Water which is suitable in quality for human consumption and meets the requirements of the Health Authority having jurisdiction.

Pressure Relief Valve. A valve which will open and discharge to atmosphere when the pressure in a pipeline or pressure vessel exceeds a pre-set point to relieve the high-pressure condition.

Pressure Vacuum Breaker. A backflow prevention device which includes a spring-loaded check valve and a spring-loaded vacuum breaker to prevent the backflow of irrigation system water to the water source.

Pumping Station. The pump or pumps that provide water to an irrigation system, together with all of the necessary accessories such as bases or foundations, sumps, screens, valves, motor controls, safety devices, shelters and fences.

PVC Pipe. Polyvinyl chloride plastic pipe made in standard thermoplastic pipe dimension ratios and pressure rated for water. Manufactured in accordance with AWWA C-900 or ASTM D-2241.

Rain Shut off Device. A calibrated device that is designed to detect rainfall and override the irrigation cycle of the sprinkler system when a predetermined amount of rain fall has occurred.

Reduced Pressure Principle Backflow Preventer (RPZD) (also known as Reduced Pressure Zone Device RPZ or RPZ Valve). A type of backflow prevention device used to protect water supplies from contamination.

Riser. A threaded pipe to which sprinklers or other emitters are attached for above-ground placement.

Runoff. The result of excess water applied either naturally (precipitation) or mechanically (irrigation) that exceeds the absorption rate of the soil, moving to an area of a lower elevation.

Sleeve. A pipe used to enclose other pipes, wire, or tubing; usually under pavement, sidewalks, or planters.

Spacing. The distance between sprinklers or other emitters.

Spray Irrigation. The micro irrigation application of water to the soil or plant surface by low flow rate sprays or mists.

Sprinkler. The sprinkler head. Sometimes called “Head.”

Supply (Water Source). The origin of the water used in the irrigation system.

Swing Joint. A ridged connection between the lateral pipe and the sprinkler, utilizing multiple elbows and nipples, which allows the sprinkler to move when force is applied to it.

Tubing. Generally used to refer to flexible plastic hydraulic control lines which are usually constructed of PE or PVC.

1403.4 DESIGN CRITERIA

1403.4.1 Design defined. Within the scope of this code, irrigation system design is defined as the science and art of properly selecting and applying all components within the system

1403.4.2 Water supply.

1403.4.2.1 The water source shall be adequate from the stand-point of volume, flow rate, pressure, and quality to meet the irrigation requirements of the area to be irrigated, as well as other demands, if any, both at the time the system is designed and for the expected life of the system.

1403.4.2.2 If the water source is effluent, it shall meet the advanced waste treatment standard as set forth in Florida Statute §403.086(4) as well as any other standard as set forth by the controlling governmental agency.

1403.4.3 Application uniformity.

1403.4.3.1 Sprinkler irrigation systems shall be designed with the appropriate uniformity for the type of plants being grown and the type of soil found in that area. The general watering of different types of plants as one group without regard to their individual water requirements shall be avoided.

1403.4.3.2 Sprinkler head spacing, type and nozzle selection that achieves the highest application uniformity shall be utilized.

1403.4.3.3 Application rates which avoid runoff and permit uniform water infiltration into the soil shall be utilized. Land slope, soil hydraulic properties, vegetative ground cover, and prevailing winds and sun exposure shall be considered when application rates are specified. Different types of sprinklers with different application rates, i.e., spray heads vs. rotor heads, bubbler heads vs rotor heads, shall not be combined on the same zone or circuit.

1403.4 System zoning. The irrigation system shall be divided into zones based on consideration of the following hydrozoning practices.

1403.4.1 Available flow rate.

1403.4.2 Cultural use of the area.

1403.4.3 Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

1403.4.4 Type of sprinkler, i.e., sprinklers with matching precipitation rates.

1403.4.5 Soil characteristics and slope.

1403.4.6 Sun exposure.

1403.5 Sprinkler/emitter spacing and selection.

1403.5.1 Sprinkler/Emitter spacing shall be determined considering the irrigation requirements, hydraulic characteristics of the soil and device, and water quality with its effect on plant growth, sidewalks, buildings, and public access areas.

1403.5.2 All pop-up spray head bodies in turf areas shall be no less than 6” in height for St. Augustine, Zoysia and Bahia and no less than 4” in height for Bermuda, Centapede and Seashore Paspalum.

1403.5.3 Sprinklers shall be located in accordance with manufacturer’s specifications in each irrigated zone area for a matched precipitation rate objective.

1403.5.4 Single row head spacing shall only occur when an additional row will cause saturated soils at the toe of a slope or other inefficiencies.

1403.5.5 All heads shall not exceed 50% of manufacturer’s specified diameters of coverage.

1403.5.6 Water conservation shall be taken into consideration by minimizing irrigation of non-vegetated areas.

1403.5.7 Microirrigation systems shall be designed using the Emission Uniformity concept. Microirrigation emitters shall be spaced to wet 100 percent of the root zone in turf areas and 50 percent of the root zone for shrubs and trees.

1403.5.8 Microirrigation or low volume heads shall be required in all areas to be irrigated that are less than 4 feet in any direction from the emitter or nozzle.

1403.5.9 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to supply pipelines to protect the emission devices from contamination from a PD main or lateral break.

1403.5.10 Each plant shall have an adequate number and size (gph) of microirrigation devices, properly placed, to meet the plant water requirements for no rainfall.

1403.6 Pipelines. Pipelines shall be sized to limit pressure variations so that the working pressure at all points in the irrigation system will be in the range required for uniform water application. Velocities shall not exceed 5 feet (1524 mm) per second.

1403.7 Wells.

1403.7.1 Well diameters, depths and location shall correspond to the irrigation system demand and in compliance to all applicable state, regulatory agencies and local codes and regulations.

1403.8 Pumps.

1403.8.1 Pump and motor combinations shall be capable of satisfying the total system demand without invading the service factor of the motor except during start-up and between zones.

1403.8.2 Pumps shall be positioned with respect to the water surface in order to ensure that the net positive suction head required (NPSHr) for proper pump operation is achieved.

1403.8.3 The pumping system shall be protected against the effects of the interruption of water flow.

1403.9 Control valves.

1403.9.1 Control valve size shall be based on the flow rate through the valve. Friction loss through the valve, an approved air gap separation, or a reduced pressure assembly shall not exceed 10 percent of the static mainline head.

1403.9.2 Control systems using hydraulic communication between controller and valve(s) shall comply with the manufacturer's recommendations for maximum distance between controller and valve, both horizontally and vertically (elevation change).

1403.9.3 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifications; based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except individual, single lot residential systems.

1403.9.4 Manually operated control valves shall be located so that they can be operated without wetting the operator.

1403.9.5 In ground valves shall be located away from large tree and palm root zones.

1403.9.6 A manual shut off valve shall be required to be installed close to the point of connection but downstream from any backflow device (or/unless included in the backflow device) to minimize water loss when the system is shut off for repairs or emergencies.

1403.9.7 An automatic shut-off valve or master valve (normally closed) is required on all systems with a constantly pressurized mainline to confine the water loss from minor main line leaks, weeping valves, or stuck on valves to just the time the system is operating automatically.

1403.10 Automatic irrigation controller. Automatic irrigation controllers shall conform to UL 1310 and have an adequate number of stations and power output per station to accommodate the irrigation system design. The controller shall be capable of incorporating a rain shut off device or other sensors to override the irrigation cycle when adequate rainfall has occurred, as required by Florida Statutes, Section 373.62.

1403.11 Chemical injection.

1403.11.1 Chemical injection systems for the injection of fertilizer, pesticides, rust inhibitors, or any other injected substance will be located and sized according to the manufacturers' recommendations.

1403.11.2 Injection systems shall be located downstream of the applicable backflow prevention devices as required by Florida Statutes, Section 487.021 and 487.055; the Environmental Protection Agency (EPA); Pesticide Regulation Notice 87-1; or other applicable codes.

1403.11.3 If an irrigation water supply is also used for human consumption, an air gap separation or an approved reduced pressure principal backflow prevention device shall be required in compliance with ASSE 1013 and Section 1403.12.

1403.12 Backflow prevention methods. Backflow prevention assemblies at all cross connections with all water supplies shall be provided in accordance with county, municipal or other applicable codes. In the event of conflicting regulations the assembly type shall be provided which gives the highest degree of protection.

1403.12.1 Irrigation systems into which chemicals are injected shall conform to Florida state law (Florida Statutes 487.021 and 487.055) and Environmental Protection Agency Pesticide Regulation Notice 87-1, which requires backflow prevention regulations to be printed on the chemical label.

1403.12.1.1 For municipal water supplies, chemical injection equipment must be separated from the water supply by an approved air gap separation or a reduced pressure principle assembly that is approved by the Foundation for CCC and the Hydraulic Research Institute. The equipment shall comply with ASSE 1013 to protect the water supply from back-siphonage and back-pressure.

1403.12.1.2 For other water supplies, Florida State law, EPA regulations, or other applicable local codes shall be followed. In the absence of legal guidelines at minimum a PVB shall be required.

SECTION 1403.13 REFERENCED STANDARDS

The standards referenced below are exclusive to this section.

1403.13.1 American Society of Agricultural Engineers (ASAE) Standards:

ASAE S330.1: Procedure for sprinkler distribution testing for research purposes.

ASAE S376.1: Design, installation, and performance of underground thermoplastic irrigation pipelines.

ASAE S397.1: Electrical service and equipment for irrigation.

ASAE S435: Drip/Trickle Polyethylene Pipe used for irrigation laterals.

ASAE S398.1: Procedure for sprinkler testing and performance reporting.

ASAE S339: Uniform classification for water hardness.

ASAE S394: Specifications for irrigation hose and couplings used with self-propelled, hose-drag agricultural irrigation system.

ASAE EP400.1: Designing and constructing irrigation wells.

ASAE EP405: Design, installation, and performance of trickle irrigation systems.

ASAE EP409: Safety devices for applying liquid chemicals through irrigation systems.

1403.13.2 ASTM International Standards:

ASTM D 2241: Poly (Vinyl Chloride) (PVC) Plastic pipe (SDR-PR).

ASTM D 2239: Specification for polyethylene (PE) plastic pipe (SDR-PR).

ASTM D 2466: Specification for socket-type poly (vinyl chloride) (PVC) and chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 40.

ASTM D 2855: Standard recommended practice for making solvent cemented joints with polyvinyl chloride pipe and fittings.

ASTM D 3139: Specification for joints for plastic pressure pipes using flexible elastomeric seals.

ASTM F 477: Specification for elastomeric seals (gaskets for joining plastic pipe).

1403.13.3 American Water Works Association (AWWA) standards:

AWWA C-900: PVC pipe standards and specifications

1403.13.4 American Society of Sanitary Engineers (ASSE) Standards:

ASSE 1001: Pipe applied atmospheric type vacuum breakers.

ASSE 1013: Reduced pressure principle backflow preventers.

ASSE 1015: Double check valve backflow preventers.

ASSE 1020: Vacuum breakers, anti-siphon, pressure type backflow preventers.

ASSE 1024: Dual check valve backflow preventers.

1403.13.5 Hydraulic Institute Standards, 14th Edition

1403.13.6 Standards and Specifications for Turf and Landscape Irrigation Systems Florida Irrigation Society (FIS) Standards

1403.13.7 Soil Conservation Service (SCS) Field Office Technical Guide, Section IV-A — Cropland Codes:

SCS Code 430-DD: Irrigation water conveyance, underground, plastic pipeline.

SCS Code 430-EE: Irrigation water conveyance. Low pressure, underground, plastic pipeline.

SCS Code 430-FF: Irrigation water conveyance, steel pipeline.

SOS Code 441-1: Irrigation system, trickle.

SCS Code 442: Irrigation system sprinkler.

SCS Code 449: Irrigation water management.

SCS Code 533: Pumping plant for water control.

SCS Code 642: Well.

1403.13.8. Underwriters Laboratories (UL) 333 Pfingsten Road, Northbrook, IL 60062-296 Standards

UL 486C-1995 Splicing Wire Connectors

UL 969-2013 Standard for Marking and Labeling Systems

UL 1310-2011 Standard for Class 2 Power Units

Section 1403.14 MATERIALS
The materials referenced below are exclusive to this section.

1403.14.1 PVC pipe and fittings.

1403.14.1.1 PVC pipe shall comply with one of the following standards ASTM D 1785, ASTM D 2241, AWWA C-900, or AWWA C-905. SDR-PR pipe shall have a minimum wall thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for nonpotable use by either label or by the industry standard color purple.

1403.14.1.2 All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set forth in ASTM D 2466.

1403.14.1.3. Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D 2464.

1403.14.1.4. PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

1403.14.1.5. PVC flexible pipe should be pressure rated as described in ASTM D 2740 with standard outside diameters compatible with PVC IPS solvent-weld fittings.

1403.14.1.6. PVC cement should meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

1403.14.2 Ductile iron pipe and fittings.

1403.14.2.1 Gasket fittings for iron pipe shall be of materials and type compatible with the piping material being used.

1403.14.3. Steel pipe and fittings.

1403.14.3.1. All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in accordance with ASTM 53.

1403.14.3.2 Threaded fittings for steel pipe shall be Schedule 40 Malleable Iron.

1403.14.4 Polyethylene pipe.

1403.14.4.1 Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in accordance with ASTM D 2239.

140314.4.2 Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

1403.14.4.3 Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

1403.14.5 Sprinklers, spray heads, and emitters.

1403.14.5.1 Units and nozzles shall be selected in accordance with the size of the area and the type of plant material being irrigated. Sprinklers shall fit the area they are intended to water without excessive overspray. Intentional direct spray onto walkways, buildings, roadways, and driveways is prohibited.

1403.14.5.2 Equipment shall be used that is protected from contamination and damage by use of seals, screens, and springs where site conditions present a potential for damage.

1403.14.5.3 Riser-mounted sprinklers shall be supported to minimize movement of the riser resulting from the action of the sprinkler.

1403.14.5.4 Swing joints, either flexible or rigid, shall be constructed to provide a leak-free connection between the sprinkler and lateral pipeline to allow movement in any direction and to prevent equipment damage.

1403.14,5.5 Check valves shall be installed on any sprinkler where low point drainage occurs.

1403.14.5.6 The pop-up height for sprays and rotator nozzles shall be adequate to prevent being obstructed by the turf grass blades: 6” height for St. Augustine, Zoysia and Bahia and 4” height for Bermuda, Centapede and Seashore Paspalum.

1403.14.5.7 All microirrigation zones shall have adequate filtration installed at the zone valve or at the point where the drip tubing is attached to PVC pipe to protect the emission devices from contamination from a PVC main or lateral break.

1403.14.5.8 All microirrigation zones shall have adequate pressure regulation installed at the zone valve or at the point where the drip tubing is attached to the PVC to ensure that all emission devices meet the manufacturer's performance standards.

1403.14.5.9 Each plant shall have a adequate number and size(gph) of microirrigation devices, properly placed to meet the plant water requirements for no rainfall.

1403.14.5.10 All tubing shall be secured to prevent movement in accordance with manufacturer's specificantion.

1403.14.6 Valves.

1403.14.6.1 Valves shall have a maximum working pressure rating equal to or greater than the maximum pressure of the system, but not less than 125 psi (861 kPa). This requirement shall be waived for low mainline pressure systems [30 psi (207 kPa) or less].

1403.14.6.2 Only valves that are constructed of materials designed for use with the water and soil conditions of the installation shall be used. Valves that are constructed from materials that will not be deteriorated by chemicals injected into the system shall be used on all chemical injection systems.

1403.14.7 Valve boxes.

1403.14.7.1 Valve boxes shall be constructed to withstand traffic loads common to the area in which they are installed. They should be sized to allow manual operation of the enclosed valves without excavation.

1403.14.7.2. Each valve box shall be permanently labeled in accordance with UL 969 to identify its contents.

1403.14.8 Low voltage wiring.

1403.14.8.1 All low voltage wire which is directly buried shall be labeled for direct burial wire. Wire not labeled for direct burial shall be installed in watertight conduits, and be listed TWN or THHN type wire as described in the NEC. All wire traveling under any hardscape or roadway must installed within a conduit and sleeve.

1403.14.8.2 The size of the electrical control wire shall be in accordance with the valve manufacturer's specifications, based on the solenoid in-rush amperage and the circuit length, considering the number of solenoids operating, on the circuit. Minimum of # 14 AWG single strand control wire shall be used on all systems, except single lot individual residential systems.

1403.14.8.3 Connections shall be made using devices conforming to UL 486 specifically designed for direct burial. All splices shall be enclosed within a valve box.

1403.14.9 Irrigation controllers.

1403.14.9.1 All irrigation controllers shall conform to UL 1310 and the provisions of the National Electric Code (NEC) and be grounded in accordance with the manufacturer's specifications. Solid state controls shall be equipped with surge suppressors on the primary and secondary wiring, except single lot residential systems.

1403.14.9.2 The controller housing or enclosure shall protect the controller from the hazards of the environment in which it is installed.

1403.14.9.3 The rain switch shall be placed on a stationary structure minimum of 5-foot (1524 mm) clearance from other outdoor equipment, free and clear of any tree canopy or other overhead obstructions, and above the height of the sprinkler coverage. Soil moisture sensors and ET sensors shall be installed in accordance with manufacturer's specifications and Florida Statutes, Section 373.62.

1403.14.10 Pumps and wells.

1403.14.10.1 Irrigation pump electrical control systems shall conform to the NEC and local building codes.

1403.14.10.2 The pumping system shall be protected from the hazards of the environment in which it is installed.

1403.14.10.3 Use electric motors with a nominal horsepower rating greater than the maximum horsepower requirement of the pump during normal operation. Motor shall have a service factor of at least 1.15.

1403.14.10.4 Casings for drilled wells shall be steel, reinforced plastic mortar, plastic, or fiberglass pipe. Only steel pipe casings shall be used in driven wells. See SCS code FL-642. Steel casings shall conform to ASTM A 589.

1403.14.11 Chemical injection equipment.

1403.14.11.1 Chemical injection equipment shall be constructed of materials capable of withstanding the potential corrosive effects of the chemicals being used. Equipment shall be used only for those chemicals for which it was intended as stated by the injection equipment manufacturer.

1403.14.12 Filters and strainers.

1403.14.12.1 Filtration equipment and strainers constructed of materials resistant to the potential corrosive and erosive effects of the water shall be used. They shall be sized to prevent the passage of foreign material that would obstruct the sprinkler/emitter outlets in accordance with the manufacturer's recommendations.

Section 1403.15 INSTALLATION

1403.15.1 Pipe installation.

1403.15.1.1 Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicular traffic or routine occurrences which occur in the normal use and maintenance of a property. Depths of cover shall meet or exceed SCS Code 430-DD, Water Conveyance, as follows:

1403.15.1.1.1 Vehicle traffic areas.

Pipe Size (inches)

Depth of Cover (inches)

½ – 2 ½

18 - 24

3 - 5

24 - 30

6 and larger

30 - 36

1403.15.1.1.2 All areas except vehicle traffic:

Pipe Size (inches)

Depth of Cover (inches)

½ – 1 ½

6

2 - 3

12

4 - 6

18

More than 6

24

1403.15.1.2 All pipe joints and connections shall be made according to manufacturer's specifications. All solvent-weld connections shall be performed in accordance with ASTM D 2855.

1403.15.1.3 Minimum clearances shall be maintained between irrigation lines and other utilities. In no case shall one irrigation pipe rest upon another.

1403.15.1.4 Thrust blocks shall be used on all gasketed PVC systems. They must be formed against a solid, hand-excavated trench wall undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and trench shall be filled to the height of the outside diameter of the pipe. Thrust blocks shall be sized in accordance with ASAE S-376.1.

1403.15.1.5 The trench bottom shall be uniform, free of debris, and of sufficient width to properly place pipe and support it over its entire length. Native excavated material may be used to backfill the pipe trench. However, the initial backfill material shall be free from rocks or stones larger than 1-inch in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. Blocking or mounding shall not be used to bring the pipe to final grade.

1403.15.1.6. Pipe sleeves shall be used to protect pipes or wires installed under pavement or roadways. Pipe sleeves two pipe sizes larger than the carrier pipe or twice the diameter of the wire bundle shall be used under the paving or roadway and extending a minimum of 3 feet beyond the paved area or as required by the Florida Department of Transportation (FDOT). Pipe sleeves shall be Sch 40. Proper backfill and compaction procedures shall be followed.

1403.15.2 Control valve installation.

1403.15.2.1 Valve installation shall allow enough clearance for proper operation and maintenance. Where valves are installed underground, they shall be provided with a valve box with cover extending from grade to the body of the valve. The top of the valve body should have a minimum of 6 inches (152 mm) of cover in nontraffic and noncultivated areas and 18 inches (457 mm) of cover in traffic areas. The valve box shall be installed to minimize the effect of soil intrusion within the valve box with the use of filter fabric, pea gravel, or other approved material. If an automatic valve is installed under each sprinkler, then the valve box may be omitted.

1403.15.2.2 Valve boxes shall be installed so that they do not rest on the pipe and the box cover does not conflict with the valve stem or interfere with valve operation. They shall be flush with the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscape.

1403.15.2.3. Quick coupling valves shall be installed on swing joints or flexible pipe with the top of the valve at ground level.

1403.15.2.4 Any above-ground manually-operated valves on nonpotable water systems shall be adequately identified with distinctive purple colored paint. Hose bibb connections on irrigation systems that utilize nonpotable water supplies shall not be permitted.

1403.15.3 Sprinkler installation.

1403.15.3.1. On flat landscaped areas, sprinklers shall be installed plumb. In areas where they are installed on slopes, sprinklers may be tilted as required to prevent erosion. Sprinklers shall be adjusted to avoid unnecessary discharge on roads, pavements and structures.

1403.15.3.2. There shall be a minimum separation of 4 inches (102 mm) between sprinklers and pavement. There shall be a minimum separation of 12 inches (305 mm) between sprinklers and buildings and other vertical structures. Piping shall be thoroughly flushed before installation of sprinkler nozzles. Surface mounted and pop-up heads shall be installed on swing joints, polyethylene (PE) nipples or flexible pipe. Polyethylene (PE) nipples shall not be used in maintenance equipment traffic areas or alongside roadways and driveways. Above-ground (riser mounted) sprinklers shall be mounted on Schedule 40 PVC or steel pipe and be stabilized.

1403.15.4 Pump installation.

1403.15.4.1 Pumps shall be installed in accordance with the manufacturer's specifications. Pumps shall be set plumb and secure to a firm concrete base. There shall be no strain or distortion on the pipe and fittings. Pipe and fittings shall be supported to avoid placing undue strain on the pump. Steel pipe shall be used on pumps 5 horsepower (hp) or larger.

1403.15.4.2 Pumps shall be installed in a manner to avoid loss of prime. Suction line shall be installed to prevent the accumulation of air pockets. All connections and reductions in suction pipe sizes shall be designed to avoid causing air pockets and cavitation.

1403.15.4.3 Pumps shall be located to facilitate service and ease of removal. Appropriate fittings shall be provided to allow the pump to readily be primed, serviced, and disconnected. An enclosure shall be provide of adequate size and strength, with proper ventilation, to protect the pump from the elements (except residential systems).

1403.15.5 Low voltage wire installation.

1403.15.5.1 Install low voltage wire (less than 98 volts) with a minimum depth of cover of 12 inches (305 mm) where not installed directly under the mainline. A sufficient length of wire shall be provided at each connection to allow for thermal expansion/shrinkage. As a minimum, a 12-inch (305 mm) diameter loop shall be provided at all splices and connections. Terminations at valves shall have 24 inches (610 mm) minimum free wire.

1403.15.5.2 All above-ground wire runs and wire entries into buildings shall be installed in electrical conduit. Common wires with a different color than the power wires (white shall be used for common wires) shall be provided. Connections shall be made using devices conforming to UL 486C specifically designed for direct burial. All splices shall be enclosed within a valve box.

Exception: When wiring above ground manifolds from the valve to the ground immediately beneath it, no conduit is required.

1403.15.6 Hydraulic control tubing installation

1403.15.6.1. For hydraulic control systems, a water supply shall be used that is filtered and free of deleterious materials, as defined by the hydraulic control system manufacturer's specifications. A backflow prevention device shall be installed where the hydraulic control system is connected to potable water supplies.

1403.15.6.2 Tubing shall be installed in trenches and spaced so that it will not rub against pipe, fittings, or other objects that could score the tubing, and with a minimum 12-inch (305 mm) diameter loop at all turns and connections A minimum depth of cover of 12 inches (305 mm) shall be provided.

1403.15.6.3 Tubing shall be connected with couplings and collars according to Manufacturer's specifications. All splices shall be made in valve boxes. Tubing shall be prefilled with water to expel entrapped air and tested for leaks prior to installation.

1403.15.6.4 Exposed tubing shall be installed in a protective conduit manufactured from Schedule 40 UV protected PVC or electrical conduit.

1403.16 As-Built Drawings.

1403.16.1 An As-Built drawing shall be required of all irrigation systems installed on commercial and residential developments and shall contain the following information:

1403.16.1.1 Location, type, pressure and maximum flow available of all water sources.

1403.16.1.2 Location, type and size of all components including sprinklers, microirrigation, main and lateral piping, master valves, valves, moisture sensors, rain sensors, controllers, pump start relays, backflow devices, pumps, wells, etc.

1403.16.1.3 The flow rate, application rate (inches per hour), and the operating pressure for the sprinklers and micro irrigation within each zone.

1403.16.1.4 The name, address, phone, email, professional license or certification number of the installation contractor.

1403.16.1.5 Date of installation.

CHAPTER14
~~SUBSURFACE~~ LANDSCAPE IRRIGATION SYSTEMS
SECTION 1401
GENERAL

1401.1Scope.
The provisions of Chapter 14 shall govern the materials, design, construction and installation of ~~subsurface~~ landscape irrigation systems connected to either potable or nonpotable water ~~from on-site water reuse~~ systems.

SECTION 1402
Subsurface Landscape Irrigation Systems Connected to NonPotable On-site Water Reuse Systems

1402.1 Scope.
The provisions of Section 1402 shall govern the materials, design, construction and installation of subsurface landscape irrigation systems connected to nonpotable water from on-site water reuse systems.

~~1402.2~~ 1402.2Materials.
Above-ground drain, waste and vent piping for subsurface landscape irrigation systems connected to NonPotabale On-site Water Reuse Systems shall conform to one of the standards listed in Table 702.1. Subsurface landscape irrigation, underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

~~1401.3~~ 1402.3Tests.
Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.

~~1401.4~~ 1402.4Inspections.
Subsurface landscape irrigation systems shall be inspected in accordance with Section 110 of the *Florida Building Code, Building*.

~~1401.5~~ 1402.5Disinfection.
Disinfection shall not be required for on-site nonpotable water reuse for subsurface landscape irrigation systems.

~~1401.6~~ 1402.6Coloring.
On-site nonpotable water reuse for subsurface landscape irrigation systems shall not be required to be dyed.

~~SECTION1402~~
~~SYSTEM DESIGN AND SIZING~~

~~1402.1~~ 1402.7Sizing.
The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irrigation system. Where gray water collection piping is connected to subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on the type of fixtures connected. The gray water discharge shall be calculated by the following equation:

$$C = A \times B$$

(Equation 14-1)

where:

A **= Number of occupants:**
Residential—Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.
Commercial—Number of occupants shall be determined by the *Florida Building Code, Building*.
B **= Estimated flow demands for each occupant:**
Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.
Commercial—Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.
C **= Estimated gray water discharge based on the total number of occupants.**

~~1402.2~~ 1402.8Percolation tests.
The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

~~1402.2.1~~ 1402.8.1Percolation tests and procedures.
At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

~~1402.2.1.1~~ 1402.8.1.1Percolation test hole.
The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

~~1402.2.1.2~~ 1402.8.1.2Test procedure, sandy soils.
The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 1303.7.1.3.

~~1402.2.1.3~~ 1402.8.1.3Test procedure, other soils.
The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate

shall be made as follows: any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than $^1/_{16}$ inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

~~1402.2.1.4~~ 1402.8.1.4Mechanical test equipment.

Mechanical percolation test equipment shall be of an *approved* type.

~~1402.2.2~~ 1402.8.2Permeability evaluation.

Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section ~~1402.2.1.1~~ 1402.8.1.1 for evaluating the soil.

~~1402.3~~ 1402.9Subsurface landscape irrigation site location.

The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table ~~1402.3~~ 1402.9. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

TABLE ~~1402.3~~ 1402.9
LOCATION OF SUBSURFACE IRRIGATION SYSTEM

ELEMENT	Storage tank (f
Buildings	5
Lot line adjoining private property	5
Water wells	50
Streams and lakes	50
Seepage pits	5
Septic tanks	0
Water service	5
Public water main	10

For SI: 1 foot = 304.8 mm.

~~SECTION1403~~
~~INSTALLATION~~

~~1403.1~~ 1402.10Installation.

Absorption systems shall be installed in accordance with Sections ~~1403.1.1~~ 1402.10.1 through ~~1403.1.5~~ 1402.10.1.5 to provide landscape irrigation without surfacing of water.

~~1403.1.1~~ 1402.10.1Absorption area.

The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table ~~1403.1.1~~ 1402.10.1.

TABLE ~~1403.1.1~~ 1402.10.1
DESIGN LOADING RATE

PERCOLATION RATE(minutes per inch)
0 to less than 10
10 to less than 30
30 to less than 45
45 to 60

For SI: 1 minute per inch = min/25.4 mm, 1 gallon per square foot = 40.7 L/m².

~~1403.1.2~~ 1402.10.1.2 Seepage trench excavations.

Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be not greater than 100 feet (30 480 mm) in *developed length*.

~~1403.1.3~~ 1402.10.1.3 Seepage bed excavations.

Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.

~~1403.1.4~~ 1402.10.1.4 Excavation and construction.

The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

~~1403.1.5~~ 1402.10.1.5 Aggregate and backfill.

Not less than 6 inches in depth of aggregate, ranging in size from $\frac{1}{2}$ to $2\frac{1}{2}$ inches (12.7 mm to 64 mm), shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with *approved* synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above the covering.

~~1403.2~~ 1402.11 Distribution piping.

Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table ~~1403.2~~ 1402.11. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

TABLE ~~1403.2~~ 1402.11
DISTRIBUTION PIPE

MATERIAL
Polyethylene (PE) plastic pipe
Polyvinyl chloride (PVC) plastic pipe
Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cell

For SI: 1 inch=25.4 mm.

1403.2.1 Joints.

Joints in distribution pipe shall be made in accordance with Section 705 of this code.

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Withdrawn: 3**

Total Mods for report: 63

Sub Code: Building

SP7674

61

Date Submitted	12/4/2018	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Withdrawn

Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **No**

Related Modifications

Summary of Modification

Revises the requirements for Mobile Medical Units

Rationale

This revision corrects the reference to the FGI Guidelines and deletes redundant requirements. Since the 2018 edition revised the chapter on Mobile Units, these requirements are no longer needed.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

449.3.3 Mobile testing and treatment facilities.

449.3.3.1 In addition to any other state of Florida required permits, mobile facilities shall be approved in

advance by the Agency for Health Care Administration before they may be utilized for patient services.

449.3.3.2 The mobile facility shall comply with the applicable requirements of the Florida Building Code,Building, The Guidelines, including Part 1 General and Part 2, Chapter 2.8~~Part 3 Outpatient Facilities, Chapter 3.13 Specific Requirements for Mobile, Transportable, and Relocatable Units,~~Specific Requirements for Mobile/Transportable Medical Units and with Section 449 of this code for the type of service to be provided.

~~449.3.3.3 Mobile or transportable units that are limited to providing noninvasive, diagnostic and treatment services without the use of anesthetics shall not be required to comply with other sections of The Guidelines as described in The Guidelines, Part 3 Outpatient Facilities, Chapters 3.13 - 8.2.1.2.~~

~~449.3.3.4 Electrical connection to the hospital electrical system shall be permitted only when the mobile facility complies with appropriate requirements of the Florida Building Code, Building.~~

~~449.3.3.5 When units provide critical care procedures, there shall be a “code blue” code call station in the unit connected to an attended location to summon assistance from the hospital emergency resuscitation response team.~~

SP7805

Date Submitted 12/9/2018
Chapter 4
Section 449.3.3.2
Affects HVHZ No
Proponent James gregory
Attachments No
TAC Recommendation Withdrawn
Commission Action Pending Review

Comments

General Comments **No**
Alternate Language **No**

Related Modifications

None

Summary of Modification

Updates the correct name of the referenced code of Mobile Units

Rationale

Updates the correct name of the referenced code for Mobile Units

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety an welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

1st Comment Period History

SP7805-G1

Proponent James gregory **Submitted** 2/16/2019 **Attachments** No

Comment:

This modification is redundant with SP7674. Therefore I am withdrawing this modification and supports SP7674.

1st Comment Period History

SP7805-G2

Proponent James gregory **Submitted** 2/16/2019 **Attachments** No

Comment:

I want to withdraw this modification and support SP7674.

449.3.3.2.The mobile facility shall comply with the applicable requirements of the Florida Building Code, Building, with The Guidelines, Chapter 2.8, Specific Requirements for Mobile/Transportable Medical Units~~Part 3 Outpatient Facilities, Chapter 3.13 Specific Requirements for Mobile, Transportable, and Relocatable Units~~, and with ~~of~~ Section 449 of this code for the type of service to be provided.

SP8268

Date Submitted	12/14/2018	**Section**	450.3.2	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Withdrawn
Commission Action Pending Review

Comments

General Comments **No**   **Alternate Language** **No**

Related Modifications

Summary of Modification

This modification will provide relief to facilities that were built for planned expansion that are prevented for expanding due to a recent code change.

Rationale

Prior to the adoption of FBC 6th Edition, a side-by-side semi-private room configuration was permitted by code. Some facilities choose to build private rooms designed to meet the requirements for double occupancy planning to convert the room use when the need arose for additional beds. Code changes intended to enhance resident privacy and access to an exterior window created a hardship for these facilities rendering them unable to expand their bed capacity. This modification provides relief to those facilities while still requiring new resident room construction and the conversion of existing room built after the adoption of FBC 6th Edition to comply with the enhanced privacy and window access requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

Will lower cost for some facilities by providing relief from code that prevents planned expansion.

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provides relief to facilities built in compliance with plans for future expansion while providing necessary standards for health, safety, and welfare of residents.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

1st Comment Period History

SP8268-G1

Proponent James gregory **Submitted** 2/18/2019 **Attachments** No

Comment:

I cannot support this modification for the following reasons:
1. After over 10 years of progress in room design, this provision will return us to a time when nursing home residents were packed into rooms without substantial connection to the out of doors and with sharing a room with a complete stranger.
2. Grandfathering sections should not be part of the FBC for new construction. They should go into the Florida Administrative Code.
3. This would permit nursing homes that have decompressed their side by side bedrooms by adding additions to the building, to simply pack those rooms back again.
4. There are many existing nursing homes that have bedrooms that are smaller than required by today's standards that could apply to add beds under this provision.
5. The old design of a room with side by side beds is not equivalent to current code requirements for new construction.

450.3.2 Resident rooms. In addition to the requirements of The Guidelines, Chapter 3.2, each resident room shall meet the following minimum standards:

450.3.2.1 In new construction and additions, the maximum room capacity of each resident room shall be two persons. In double occupancy resident rooms, sleeping areas shall be separated from each other by a wall or partition to increase acoustic and visual privacy. Each person lying in bed shall have direct visual access to an exterior window at all times. Either doors or cubicle curtains to these individual resident sleeping areas shall be provided.

450.3.2.2 Each resident room shall have a minimum of 100 square feet (9.29 m2) of clear floor area per bed in a double occupancy resident room and 120 square feet (11.15 m2) of clear floor area in a single occupancy resident room, exclusive of the space consumed by the toilet room, closet(s), wardrobe(s), lavatory(ies), alcove(s), and either the space for the door swing(s) into the room or the space for entrance vestibule, whichever is greater. For the purpose of determining the minimum clear floor area, the entrance vestibule is defined as that floor area located between the room entrance door and the room floor area containing the resident bed(s).

450.3.2.3 Where renovation work is undertaken that alters the room configuration, every effort shall be made to meet these minimum space standards. When this is not possible due to existing physical conditions or constraints, and with the approval of the Agency, a resident room shall have no less than 80 square feet (7.43 m2) of clear floor area per bed in a double occupancy resident room and 100 square feet (9.29 m2) of clear floor area in a single occupancy resident room.

450.3.2.4 Except as permitted by Section 450.3.2.6, ~~T~~the design for privacy shall not restrict resident access at any time to the room entrance, resident armchair, toilet or bathroom, wardrobe, exterior window or closet.

450.3.2.5 Each new resident room, and each individual resident sleeping area, as described in Section 450.3.2.1, shall have an exterior window(s) to the outside that is physically accessible to each resident at all times and visible from the resident's bed. The window shall be sized with a clear opening of 8 percent of the gross square footage of the resident sleeping room or individual resident sleeping area as described in Section 450.3.2.1. The clear opening of the resident room window width and height shall have a minimum of 20 feet (6.10 m) unobstructed vista to any permanent structure, or equipment, and 15 feet (4.57 m) unobstructed vista to any vehicular parking areas or property line measured horizontally from the plane of the window.

450.3.2.6 The conversion of an existing single occupancy resident room that was built prior to December 31, 2017 into a double occupancy room shall permit the use of a cubicle curtain in lieu of walls or partitions to separate individual resident sleeping areas. The cubicle curtains are permitted obstruct physical and visual access to the exterior window from the inboard resident sleeping area when closed.