

Proposed Code Modifications

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

WITH COMMENTS

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Modified**: 2

Total Mods for report: 8

Sub Code: Building

SP6364

1

Date Submitted 7/9/2015
Chapter 4

Section 453.15.5
Affects HVHZ No

Proponent Ippolito Michael
Attachments Yes

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language Yes

Related Modifications

FBC-Mechanical-403.2-Exception

Summary of Modification

The wording of 2014-FBC-Building-Section 453.15.5 is not included in or supported by ASHRAE 62.1 and was removed in the 2004 Edition of FBC-Mechanical-Section 403.3. Proposed Mod deletes current wording of BC 453.15.5 and adds new wording supported by ASHRAE 62.1 and Mechanical Code Section 403.

Rationale

The wording of 2014-FBC-Building-Section 453.15.5 is not included in or supported by ASHRAE 62.1 and was removed in the 2004 and subsequent Editions of FBC-Mechanical-Section 403.3. Proposed Mod deletes current wording of FBC-Building-453.15.5 and adds new wording supported by ASHRAE 62.1 and Mechanical Code Section 403. The current wording of FBC-453.15.5 (...the duration of operation of the air conditioning...)requires the outside air systems and their respective exhaust systems to operate even when spaces are unoccupied. This is costing School Districts approximately \$1,000,000 per year perpetually in unnecessary operating cost. In addition, there is no uniform method of application by the Engineer or verification by the Building Official. The new wording of FBC-Building 453.15.5 provides a uniform method of application by the Engineer and verification by the Building Code Official.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No cost impact to entity relative to enforcement of code.

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

There will be a reduction in equipment size and equipment cost of Outside Air Systems and their respective Exhaust Systems. There will be a savings of approximately \$1,000,000 dollars perpetually in life cycle operating cost district wide for each School District.

Impact to industry relative to the cost of compliance with code

No impact to industry relative to cost of compliance with Code.

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

No cost 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

It provides a uniform method of application by the Engineer and verification by the Building Code Official. It creates agreement with FBC-Mechanical-Chapter 4.

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

It provides a uniform method of application by the Engineer and verification by the Building Code Official. It creates agreement with FBC-Mechanical-Chapter 4.

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

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

Does not degrade the effectiveness of the code

It upgrades the effectiveness of the Code by providing a uniform method of application by the Engineer and verification by the Building Code Official. It creates agreement with FBC-Mechanical-Chapter 4.

Is the proposed code modification part of a prior code version? No

Alternate A1**53.15.5 Ventilation air make-up for HVAC systems.**

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3 of the Florida Building Code, Mechanical. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space. In accordance with Section 401.3 of the Florida Building Code, Mechanical, this ventilation shall be provided during the periods that the room or space is occupied.

Exceptions:

1. Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3 of the Florida Building Code, Mechanical, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design. In accordance with Section 401.3 of the Florida Building Code, Mechanical, this ventilation shall be provided during the periods that the room or space is occupied.

2. Where peak occupancies of less than 3 hours duration occur, the outdoor air flow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air-conditioning system, provided the average occupancy used is not less than one-half the maximum.

(SP6364-A1)

2nd Comment Period

6364-A5

Proponent	Ippolito Michael	Submitted	5/10/2016	Attachments	Yes
Rationale					
The wording of 2014-FBC-Building-Section 453.15.5 is not included in or supported by ASHRAE 62.1 and was removed in the 2004 Edition of FBC-Mechanical-Section 403.3. Proposed Mod deletes current wording of FBCB 453.15.5 and adds new wording to show compliance with FBCM 403 and ASHRAE 62.1.					
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					
No cost 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					
Outside Air make-up is required to dilute the carbon dioxide exhaled by the occupants and to dilute the contaminants of off-gassing from the materials of construction.					
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction					
Removes wording that does not comply with ASHRAE 62.1 and FBCM 403.					
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities					
It does not discriminate.					
Does not degrade the effectiveness of the code					
It does not degrade the effectiveness of the Code. It strengthens the effectiveness of the Code.					
Is the proposed code modification part of a prior code version? No					

1st Comment Period History

6364-A1

Proponent	Don Whitehead	Submitted	2/4/2016	Attachments	Yes
Rationale					
At the request of a school district the Ventilation air make-up for HVAC systems was initially added to the School Building Code requirements in 2007 FBC, Building, 423.15.6. The (FLDOE-OEF) modification directly copies the 5th Edition (2014) FBC, Mechanical, 401.3 and 403.2, for ventilation make-up air and also allows the existing code to remain as an exception. The registered design professional should demonstrate, as oppose to determine, that the ventilation system will prevent unacceptable levels of contaminants in order to validate the approach used.					
Fiscal Impact Statement					
Impact to local entity relative to enforcement of code					
No change from current requirement.					
Impact to building and property owners relative to cost of compliance with code					
No change from current requirement.					
Impact to industry relative to the cost of compliance with code					
No change from current requirement.					
Impact to Small Business relative to the cost of compliance with code					
No cost 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					
No change from current requirement.					
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction					
No change from current requirement.					
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities					
No change from current requirement.					
Does not degrade the effectiveness of the code					
No change from current requirement.					
Is the proposed code modification part of a prior code version? No					

2nd Comment Period

SP6364-G3	Proponent	Ippolito Michael	Submitted	5/10/2016	Attachments	No
	Comment:					
	The following comments correspond to SP6364-A1 and SP6364-R1: Item 2 does not comply with ASHRAE 62.1 and should be removed from SP6364 -A1, SP6364-R1 and FBCB 453.15.5.					
	Item 2 does not provide a uniform method of calculation by the registered design professional and does not provide a uniform method of verification by the Building Code Official having jurisdiction.					
	The original Modification (SP6364) complies with the intent of ASHRAE 62.1 and is necessary to reduce the equipment and operating costs of the outside air systems and their respective exhaust systems. In addition, the original Modification (SP6364) reduces the impact on environmental sustainability.					
	The original Modification (SP6364) provides a uniform method of calculation by the registered design professional and provides a uniform method of verification by the Building Code Official having jurisdiction.					
	The original Modification (SP6364) along with Modification M6366 allows for agreement between FBCB 453.15.5 and FBCM 403.					
	The original Modification (SP6364) along with Modification M6366 is the best way to go and should be approved.					

2nd Comment Period

SP6364-G4	Proponent	Don Whitehead	Submitted	5/27/2016	Attachments	No
	Comment:					
	The alternate language, A1, proposed by FLDOE-OEF represents the best interests of the school districts, state colleges and students; and therefore, the changes recommended by alternate language, A5, should not be included.					

1st Comment Period History

SP6364-G1	Proponent	Michael Ippolito	Submitted	2/8/2016	Attachments	Yes
	Comment:					
	1. Item number 2 is not supported by ASHRAE 62.1 and should not be acceptable. Item number 2 does not provide a uniform method of calculation by the Engineer or a uniform method of verification by the Building Official. If item number 2 were allowed, everyone would continue to use the item 2 method and continue to make up what ever outside (ventilation) air amounts they want. SP6364 provides a uniform method of calculation by the engineer and verification by the building official and is in line with ASHRAE 62.1. SP6364 is the better way to go.					
	2. The Item number 1 method results in larger outside air and exhaust equipment sizes and costs as well as larger operating costs than SP6364. SP6364 provides for lower outside air and exhaust equipment sizes and costs as well as lower operating costs. For economic and environmental sustainability reasons, SP6364 is the better way to go. Florida Public Education Capital Outlay (PECO) funds are running low and the money saved could be used for building maintenance, renovation or to otherwise educate the students.					
	3. The proposed FBC Code Change M6366 will apply to all occupancies including schools and allows for agreement between FBC Mechanical 403 and FBC Building 453.15.5. M6366 allows for economic and environmental sustainability for all occupancies and projects in the State of Florida. Proposed Code Changes M6366 and SP6364 are the best way to go.					
	The approval of Proposed FBC Code Changes SP6364 and M6366 is the right thing to do.					

1st Comment Period History

SP6364-G2	Proponent	Michael Ippolito	Submitted	2/9/2016	Attachments	No
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Comment:

The following comments and item numbers correspond to SP6364-A1:

1. Item number 2 is not supported by ASHRAE 62.1 and should not be acceptable. Item number 2 does not provide a uniform method of calculation by the Engineer or a uniform method of verification by the Building Official. If item number 2 were allowed, everyone would continue to use the item 2 method and continue to make up what ever outside (ventilation) air amounts they want. SP6364 provides a uniform method of calculation by the engineer and verification by the building official and is in line with ASHRAE 62.1. SP6364 is the better way to go.

2. The Item number 1 method results in larger outside air and exhaust equipment sizes and costs as well as larger operating costs than SP6364. SP6364 provides for lower outside air and exhaust equipment sizes and costs as well as lower operating costs. For economic and environmental sustainability reasons, SP6364 is the better way to go. Florida Public Education Capital Outlay (PECO) funds are running low and the money saved could be used for building maintenance, renovation or to otherwise educate the students.

3. The proposed FBC Code Change M6366 will apply to all occupancies including schools and allows for agreement between FBC Mechanical 403 and FBC Building 453.15.5. M6366 allows for economic and environmental sustainability for all occupancies and projects in the State of Florida. Proposed Code Changes M6366 and SP6364 are the best way to go.

The approval of Proposed FBC Code Changes SP6364 and M6366 is the right thing to do.

Thank you for your time and consideration.

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FBC -Building-453.15.5 Ventilation air make-up for HVAC systems.

~~Where peak occupancies of less than 3 hours duration occur, the outdoor air flow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air conditioning system, provided the average occupancy used is not less than one-half the maximum.~~

Add the following:

In accordance with FBC -Mechanical-403.2 Exception (2) and FBC-Mechanical-403.5, the minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the *registered design professional* determines that additional outside air is required, the Area Outdoor Airflow Rate (FBC-Mechanical-Table -403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table-403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3 of the Florida Building Code, Mechanical. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space. In accordance with Section 401.3 of the Florida Building Code, Mechanical, this ventilation shall be provided during the periods that the room or space is occupied.

Exceptions:

1. Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3 of the Florida Building Code, Mechanical, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design. In accordance with Section 401.3 of the Florida Building Code, Mechanical, this ventilation shall be provided during the periods that the room or space is occupied.

2. Where peak occupancies of less than 3 hours duration occur, the outdoor air flow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air-conditioning system, provided the average occupancy used is not less than one-half the maximum.

453.15.5 Ventilation air make-up for HVAC systems.

~~Where peak occupancies of less than 3 hours duration occur, the outdoor air flow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air conditioning system, provided the average occupancy used is not less than one-half the maximum.~~

The design of ventilation air make-up for HVAC systems shall comply with FBCM 403.3 or FBCM 403.2 Exception. If FBCM 403.2 Exception is chosen as the manner of compliance, the demonstrated method of compliance shall comply with the intent of ASHRAE 62.1 as adopted by the current Florida Building Code in effect at the time of the testing. The registered design professional shall submit a signed and sealed test report to the Building Code Official having jurisdiction clearly showing compliance with the intent of ASHRAE 62.1 as adopted by the current Florida Building Code in effect at the time of the testing.

2017 Proposed Change to 2014 FBC-Building-453.15.5

Background: The wording of 2014-Florida Building Code (FBC)-Building-453.15.5 came from ASHRAE 62-1999 and is no longer supported by ASHRAE. In 2001, ASHRAE 62 became ASHRAE 62.1. The wording of 2014-Florida Building Code (FBC)-Building-453.15.5 was not included in ASHRAE 62.1 and was removed in the 2004 Edition of FBC - Mechanical-Section 403.3 and subsequent Editions. The Proposed Code Modification deletes the current wording of FBC-Building-453.15.5 and adds new wording supported by ASHRAE 62.1 and FBC-Mechanical-Section 403. In addition, this Proposed Code Modification also includes a change to FBC -Mechanical Section 403.2-Exception to create agreement between FBC-Building Section 453.15.5 and FBC-Mechanical-Section 403.

Existing:

2014-FBC-Building-453.15.5: *"Ventilation Air Makeup for HVAC Systems: Where peak occupancies of less than 3 hours duration occur, the outside airflow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air conditioning system, provided that the occupancy used is not less than one-half the maximum."*

The Proposed Change to FBC-453.15.5 is requested for the following reasons:

1. **FBC-Building 453.15.5** is based on ASHRAE 62-1999 and earlier editions for Variable and Intermittent Use Occupancies. In 2001, ASHRAE 62 became ASHRAE 62.1. ASHRAE 62.1-2001 and later editions do not include the wording and support of FBC-Building-453.15.5.
2. FBC-Building-453.15.5 does not agree with FBC-Mechanical-403.1 and 403.3.
3. An Educational Facility is a Constant and Continuous Use Occupancy, and FBC 453.15.5 should never have been considered applicable.
4. The wording and intent of FBC-Building-453.15.5 is very ambiguous. There is no uniform application of the wording of FBC-Building 423.15.5. There is no way for the Building Code Official to uniformly verify that FBC-Building-453.15.5 is applied correctly.
5. The wording of FBC-Building-Section-453.15.5 was included in 2001-FBC-Mechanical-403.3 because of ASHRAE 62-1999. The Florida Building Code caught up with ASHRAE 62.1-2001 and removed the wording of FBC-Building-453.15.5 from FBC-Mechanical-403.3 in the 2004 and subsequent Editions. The wording of FBC 453.15.5 was added in 2007-FBC-Building (in 2007 it was FBC-Building-423.15.6) even though this same wording had been removed from 2004 and 2007 FBC-Mechanical-403.3 and subsequent Editions. **Due to revisions of ASHRAE 62.1 and FBC-Mechanical 403.3, 2014-FBC-Building-453.15.5 no longer has any basis of support.**
6. The wording of 2014-FBC-Building-453.15.5 which states in part *"...for the duration of operation of the air conditioning system..."* is requiring the operation of the Ventilation (Outside) Air Systems and associated Exhaust Systems even when spaces are unoccupied. For a large School District the operating cost of Ventilation (Outside) Air Systems and associated Exhaust Systems is approximately \$500,000 per hour per year District wide. 2014-FBC-Building-453.15.5 is costing large School Districts approximately \$1,000,000 per year in unnecessary operating cost (See Economic Analysis attached).
7. **2014-FBC-Mechanical-401.3-When required:** Ventilation shall be provided during the periods that the room or space is occupied.
8. **2007-FBC-Mechanical-403.4 ASHRAE 62 Alternative.** In lieu of compliance with Section 403.1 through Section 403.3, mechanical ventilation may be implemented in compliance with ASHRAE 62 including approved addenda. **The above reference to ASHRAE 62 was removed in the 2010 Edition of FBC-Mechanical-Section 403. 2004 and subsequent Editions of FBC-Mechanical-Section-403 are now based on ASHRAE 62.1.**

2017 Proposed Change to 2014-FBC-Building-453.15.5

FBC-Building-453.15.5: Delete the existing wording in its entirety.

The new wording of FBC-Building-453.15.5 should read as follows:

FBC-Building-453.15.5: In accordance with FBC-Mechanical-403.2-Exceptions (1) and (2) and FBC-Mechanical-403.5, The minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the *Licensed Mechanical Professional Engineer* determines that additional outside air is required, then the Area Outdoor Airflow Rate (FBC-Mechanical-Table -403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table-403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The above should be considered acceptable for the following reasons:

1. The above complies with 2014-FBC-Mechanical-403.5 which states “The minimum airflow rate of Outside Air that the Ventilation System must be capable of supplying during its operation shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column) and the actual number of occupants present.
2. The above change creates agreement between FBC-Building-453.15.5 and FBC-Mechanical-403 and 401.3.
3. The above will reduce Outside Air and associated Exhaust Equipment size and construction cost as well as reduce the life cycle (perpetual) operating costs of the Outside Air Systems and associated Exhaust Systems by approximately \$1,000,000 per year.
4. The above can be applied uniformly. The above can be uniformly verified by the Building Code Official.
5. The above complies with 2014-FBC-Mechanical-401.3-When required: Ventilation shall be provided during the periods that the room or space is occupied.
6. The above complies with the intent of ASHRAE 62.1.

2017 Proposed Changes to 2014-FBC-Mechanical-403.2

In order to create agreement between FBC-Building-453.15.5 and FBC-Mechanical-Chapter-4, FBC-Mechanical-403.2 shall be revised as follows:

Existing:

2014-FBC-Mechanical-403.2 Outdoor air required.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the *breathing zone* within each *occupiable space*.

Exception: Where the *registered design professional* demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

New:

2014-FBC-Mechanical-403.2 Outdoor air required.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the *breathing zone* within each *occupiable space*.

Exception (1): Where the *Licensed Mechanical Professional Engineer* demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

Exception (2): In accordance with Exception (1), for all occupancies, the minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the Licensed Mechanical Professional Engineer determines that additional outside air is required, the Area Outdoor Airflow Rate (FBC-Mechanical-Table 403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table 403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the operation of the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The above should be considered acceptable for the following reasons:

1. The above complies with 2014-FBC-Mechanical-403.5-2014 which states "The minimum airflow rate of Outside Air that the Ventilation System must be capable of supplying during its operation shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column) and the actual number of occupants present.
2. The above will reduce Outside Air and associated Exhaust Equipment size and construction cost as well as reduce the Life Cycle (perpetual) operating costs of the Outside Air Systems and associated Exhaust Systems.
3. The above can be applied uniformly. The above can be uniformly verified by the Building Code Official.
4. The above complies with 2014-FBC-Mechanical-401.3-When required: Ventilation shall be provided during the periods that the room or space is occupied.
5. The above complies with the intent of ASHRAE 62.1.

Economic Analysis of FBC-Building-453.15.5-2014 (423.15.5-2010)

A Typical School District utilizes separate Dedicated Outside Air Systems (DOAS) to supply fresh outside air to all occupant spaces. The purpose of the DOASs is to provide oxygen replenishment for the occupants, reduce the level of carbon dioxide exhaled by the space occupants and dissipate any odors emitted by the space occupants. Therefore, the DOASs are occupant based systems. Typically, separate chilled water air handling systems (CHWAHU) provide space cooling for each occupant space. For each school, the DOASs and CHWAHUs are connected into a chilled water system that is serviced by either air cooled or water cooled chillers. The Typical School District may also have some DOASs that utilize refrigerant instead of chilled water. The following economic analysis is also applicable for DOASs that utilize refrigerant. In addition to the DOASs, there are respective Exhaust Systems (ES) that run when the DOASs run to exhaust air from the respective spaces to main the building pressure balance.

The methodology utilized by the Typical School District is based on Florida Building Code-Building (FBC-B) 453.15.5-2014 (FBC-B-423.15.5-2010) which is based on Florida Building Code-Mechanical (FBC-M)-2001 Edition and ASHRAE 62-1999 Edition. The typical School District is currently under FBC-B-2010 and FBC-M-2010 Edition and ASHRAE 62.1-2004 Edition. FBC-M-403.3 and ASHRAE 62.1-2004 (and later Editions) have been revised and longer make any reference to the wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010). The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) came from ASHRAE 62-1999. In 2001 ASHRAE 62 became ASHRAE 62.1. The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is not included in or supported by ASHRAE 62.1. Therefore, FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is no longer has any basis of support. Due to the wording of FBC-B 453.15.5-2014 (FBC-B-423.15.5-2010), The Typical School District is operating the DOASs and respective ESs for approximately an extra 2 hours per day when the spaces are unoccupied.

The operation of the DOASs and respective ESs should be in accordance with FBC-M-401.3. The intent of FBC-M-401.3 is that all spaces are to be supplied with Ventilation (Outside) Air when they are occupied. The Typical School District schedules the Outside Air Systems and respective Exhaust Systems to run for a minimum of approximately 2 hours after the students are dismissed for the day when the spaces (e.g., classrooms) are unoccupied. This is not necessary. The need for operation of the DOASs is occupant based per FBC-M-401.3. The DOASs and respective Exhaust Systems should be turned off when the students are dismissed for the day and the spaces are unoccupied. If the DOASs and respective Exhaust Systems are turned off, their respective chillers would unload and utilize less electricity for the 2 hour period. In addition, the speed of the chilled water pumps would be reduced via the VFDs which would reduce the operating cost of the chilled water pumps. For water cooled chillers, there may also be some reduction in operating costs of the condenser water pumps. To be on the conservative side, the EER of the chillers will be assumed to include the chilled and condenser water pumps. Each DOAS has a fan motor and an electric reheat coil that utilizes electricity for the 2 hour period. The following analysis is based on an energy cost of \$0.1 per Kwh. In addition to energy cost there is a peak electrical demand charge (\$ per Kw) that is also levied by the Utility. This economic analysis does not include any possible savings do to a possible reduction in peak Kw demand. This economic analysis also does not include any possible savings in maintenance cost due to reduced run time of the Chillers, DOASs and respective ESs. Therefore, the actual savings may be more than what is shown. This economic analysis is for comparison purposes only and will give the an idea of how much money the unnecessary 2 hours of operation is costing a Typical School District.

For classrooms the outside air is supplied at 7.5 CFM per person. A large Typical School District serves approximately 210,000 students and 7500 teachers for a total of 217,500 people. 7.5 CFM per person x 217,500 people = 1,631,250 CFM. There are 180 school days per year.

- 1. Chiller Energy Cost for DOASs:** Based on 1,631,250 CFM; a chiller EER of 9.6 Btuh/watt; 150 CFM per cooling Ton; 12,000-Btuh per Ton and \$0.1 per Kwh:

1,631,250 CFM/150 CFM per Ton = 10,875 Tons of cooling x 12,000 BTUH/ton = 130,500,000 Btuh
 130,500,000 Btuh x 1 watt/ 9.6 Btuh x 1 Kw/1000 Watts = 13,594 Kw x 2 Hrs per day = 27,188 Kwh per day
 27,188 Kwh per day x \$0.1 per Kwh = \$ 2,719 per day x 180 days per year = **\$489,420 per year.**

- 2. DOAS Fan Energy Cost:** Based on Bhp=5.2PQ/(33000 (0.6)); 5.2 PSF per inch w.g.; \$0.1 per Kwh, and 3.0 inches w.g.; Bhp= Brake Horsepower. 0.6 is the Efficiency of the fan wheel.

Bhp = 5.2 x (3) x (1,631, 250) / (33000 (0.6)) = 1285 Bhp
 1285 Bhp x 0.75 Kw per Bhp = 964 Kw x 2 Hrs per day = 1,928 Kwh per day

1928 Kwh per day x 0.1\$ per Kwh = \$193 per day x 180 days per year = **\$34,740 per year**

- 3. DOAS Reheat Energy Cost:** The air leaves the cooling coil at 50F and has to be reheated to 72F before entering space. $72 - 50 = 22\text{F dT}$; $\text{Btuh} = 1.085 (\text{CFM}) (\text{dT})$; 3,413 Btuh/Kw; 1,631,250 CFM and \$0.1/Kwh

$\text{Btuh} = 1.085 (1,631,250) (22) = 38,937,936 \text{ Btuh} \times 1 \text{ Kw} / 3,413 \text{ Btuh} = 11,409 \text{ Kw}$
 $11,409 \text{ Kw} \times 2\text{Hr per day} = 22,818 \text{ Kwh per day} \times \$0.1/\text{Kwh} = \$2,282 \text{ per day}$
 $\$2,282 \text{ per day} \times 180 \text{ days per year} = \textbf{\$410,760 per year}$

- 4. Exhaust Fan Cost:** Based on $\text{Bhp} = 5.2\text{PQ}/(33000 (0.6))$; 5.2 PSF per inch w.g.; \$0.1 per Kwh, and 1.0 inches w.g.; Bhp= Brake Horsepower. 0.6 is the Efficiency of the fan wheel.

$\text{Bhp} = 5.2 \times (1) \times (1,631, 250) / (33000 (0.6)) = 428 \text{ Bhp}$
 $428 \text{ Bhp} \times 0.75 \text{ Kw per Bhp} = 321 \text{ Kw} \times 2 \text{ Hrs per day} = 642 \text{ Kwh per day}$
 $642 \text{ Kwh per day} \times 0.1\$ \text{ per Kwh} = \$64.2 \text{ per day} \times 180 \text{ days per year} = \textbf{\$11,556 per year}$

- 5. Total Energy Cost For 2 Unnecessary Hours of DOAS Operation:** $\$489,420 + \$34,740 + \$410,760 + 11,556 = \textbf{\$946,476 per year or \$473,238 per hour per year of unnecessary operation of the DOASs.}$ In addition, there might be additional savings due to a possible reduction in the peak demand Kw. There may also be some savings due to a possible reduction in maintenance cost due to reduced run time of the chillers, DOASs and respective ESs.

For conservative purposes let use 10 years. For 10 years of unnecessary operation of the DOASs and respective ESs for 2 hours per day it has cost the Typical School District approximately **10 years x \$946,476 per year = \$9,464,760** that could have been saved and utilized to educated students. **Until this issue is corrected, it will continue to cost the Typical School District approximately \$946,476 per year.**

There is a simple solution. Program the Energy Management System (EMS) for each school to shutdown all DOASs and respective ESs for unoccupied spaces at the time of student dismissal. This would automatically cause the chillers to unload and the chilled water pumps to slow down. For schools without Energy Management Systems, there is some type of time clock system control. The time clock system can be programmed to shut down all the respective DOASs and respective ESs at the time of school dismissal.

The intent of FBC-M 401.3 is that all occupied spaces be supplied with Ventilation (Outside) Air. If the spaces are unoccupied and have Dedicated Outside Air Systems (DOAS) that do not affect other occupied spaces, then the unoccupied space DOASs and respective Exhaust Systems can be turned off. Optimizing the operation of DOASs and respective ESs to shut down when rooms are unoccupied will save the Typical School District approximately \$1,000,000 per year.

It is imperative that a clear and concise interpretation by the Florida Building Code Commission be made as to the intent and application of the codes. Petitioner appreciates the due diligence of the Florida Building Code Commission and fully understands the extensive work of the Florida Building Code Commission in developing the Codes for the greater safety and improvement of the consumer. Likewise, it would seem reasonable to ensure the Codes are uniformly interpreted. Section 553.775(1) Florida Statutes states: "It is the intent of the Legislature that the Florida Building Code be interpreted by the Building Officials, Local Enforcement Agencies and the Florida Building Code Commission in a manner that protects the public safety and welfare at the most reasonable cost to the consumer by ensuring uniform interpretations throughout the State by providing processes for resolving disputes regarding interpretations of the Florida Building Code that are just and expeditious."

Thank you for your time and consideration.

Respectfully Submitted,

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1. **Item number 2 is not supported by ASHRAE 62.1 and should not be acceptable.** Item number 2 does not provide a uniform method of calculation by the Engineer or a uniform method of verification by the Building Official. If item number 2 were allowed, everyone would continue to use the item 2 method and continue to make up what ever outside (ventilation) air amounts they want. SP6364 provides a uniform method of calculation by the engineer and verification by the building official and is in line with ASHRAE 62.1. SP6364 is the better way to go.

2. The Item number 1 method results in larger outside air and exhaust equipment sizes and costs as well as larger operating costs than SP6364. SP6364 provides for lower outside air and exhaust equipment sizes and costs as well as lower operating costs. **For economic and environmental sustainability reasons, SP6364 is the better way to go. Florida Public Education Capital Outlay (PECO) funds are running low and the money saved could be used for building maintenance, renovation or to otherwise educate the students.**

3. **The proposed FBC Code Change M6366 will apply to all occupancies including schools and allows for agreement between FBC Mechanical 403 and FBC Building 453.15.5. M6366 allows for economic and environmental sustainability for all occupancies and projects in the State of Florida. Proposed Code Changes M6366 and SP6364 are the best way to go.**

The approval of Proposed FBC Code Changes SP6364 and M6366 is the right thing to do.

2017 Proposed Change to 2014 FBC-Building-453.15.5

Background: The wording of 2014-Florida Building Code (FBC)-Building-453.15.5 came from ASHRAE 62-1999 and is no longer supported by ASHRAE. In 2001, ASHRAE 62 became ASHRAE 62.1. The wording of 2014-Florida Building Code (FBC)-Building-453.15.5 was not included in ASHRAE 62.1 and was removed in the 2004 Edition of FBC - Mechanical-Section 403.3 and subsequent Editions. The Proposed Code Modification deletes the current wording of FBC-Building-453.15.5 and adds new wording supported by ASHRAE 62.1 and FBC-Mechanical-Section 403. In addition, this Proposed Code Modification also includes a change to FBC -Mechanical Section 403.2-Exception to create agreement between FBC-Building Section 453.15.5 and FBC-Mechanical-Section 403.

Existing:

2014-FBC-Building-453.15.5: *"Ventilation Air Makeup for HVAC Systems: Where peak occupancies of less than 3 hours duration occur, the outside airflow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air conditioning system, provided that the occupancy used is not less than one-half the maximum."*

The Proposed Change to FBC-453.15.5 is requested for the following reasons:

1. **FBC-Building 453.15.5** is based on ASHRAE 62-1999 and earlier editions for Variable and Intermittent Use Occupancies. In 2001, ASHRAE 62 became ASHRAE 62.1. ASHRAE 62.1-2001 and later editions do not include the wording and support of FBC-Building-453.15.5.
2. FBC-Building-453.15.5 does not agree with FBC-Mechanical-403.1 and 403.3.
3. An Educational Facility is a Constant and Continuous Use Occupancy, and FBC 453.15.5 should never have been considered applicable.
4. The wording and intent of FBC-Building-453.15.5 is very ambiguous. There is no uniform application of the wording of FBC-Building 423.15.5. There is no way for the Building Code Official to uniformly verify that FBC-Building-453.15.5 is applied correctly.
5. The wording of FBC-Building-Section-453.15.5 was included in 2001-FBC-Mechanical-403.3 because of ASHRAE 62-1999. The Florida Building Code caught up with ASHRAE 62.1-2001 and removed the wording of FBC-Building-453.15.5 from FBC-Mechanical-403.3 in the 2004 and subsequent Editions. The wording of FBC 453.15.5 was added in 2007-FBC-Building (in 2007 it was FBC-Building-423.15.6) even though this same wording had been removed from 2004 and 2007 FBC-Mechanical-403.3 and subsequent Editions. **Due to revisions of ASHRAE 62.1 and FBC-Mechanical 403.3, 2014-FBC-Building-453.15.5 no longer has any basis of support.**
6. The wording of 2014-FBC-Building-453.15.5 which states in part *"...for the duration of operation of the air conditioning system..."* is requiring the operation of the Ventilation (Outside) Air Systems and associated Exhaust Systems even when spaces are unoccupied. For a large School District the operating cost of Ventilation (Outside) Air Systems and associated Exhaust Systems is approximately \$500,000 per hour per year District wide. 2014-FBC-Building-453.15.5 is costing large School Districts approximately \$1,000,000 per year in unnecessary operating cost (See Economic Analysis attached).
7. **2014-FBC-Mechanical-401.3-When required:** Ventilation shall be provided during the periods that the room or space is occupied.
8. **2007-FBC-Mechanical-403.4 ASHRAE 62 Alternative.** In lieu of compliance with Section 403.1 through Section 403.3, mechanical ventilation may be implemented in compliance with ASHRAE 62 including approved addenda. **The above reference to ASHRAE 62 was removed in the 2010 Edition of FBC-Mechanical-Section 403. 2004 and subsequent Editions of FBC-Mechanical-Section-403 are now based on ASHRAE 62.1.**

2017 Proposed Change to 2014-FBC-Building-453.15.5

FBC-Building-453.15.5: Delete the existing wording in its entirety.

The new wording of FBC-Building-453.15.5 should read as follows:

FBC-Building-453.15.5: In accordance with FBC-Mechanical-403.2-Exceptions (1) and (2) and FBC-Mechanical-403.5, The minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the *Licensed Mechanical Professional Engineer* determines that additional outside air is required, then the Area Outdoor Airflow Rate (FBC-Mechanical-Table -403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table-403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The above should be considered acceptable for the following reasons:

1. The above complies with 2014-FBC-Mechanical-403.5 which states “The minimum airflow rate of Outside Air that the Ventilation System must be capable of supplying during its operation shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column) and the actual number of occupants present.
2. The above change creates agreement between FBC-Building-453.15.5 and FBC-Mechanical-403 and 401.3.
3. The above will reduce Outside Air and associated Exhaust Equipment size and construction cost as well as reduce the life cycle (perpetual) operating costs of the Outside Air Systems and associated Exhaust Systems by approximately \$1,000,000 per year.
4. The above can be applied uniformly. The above can be uniformly verified by the Building Code Official.
5. The above complies with 2014-FBC-Mechanical-401.3-When required: Ventilation shall be provided during the periods that the room or space is occupied.
6. The above complies with the intent of ASHRAE 62.1.

2017 Proposed Changes to 2014-FBC-Mechanical-403.2

In order to create agreement between FBC-Building-453.15.5 and FBC-Mechanical-Chapter-4, FBC-Mechanical-403.2 shall be revised as follows:

Existing:

2014-FBC-Mechanical-403.2 Outdoor air required.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the *breathing zone* within each *occupiable space*.

Exception: Where the *registered design professional* demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

New:

2014-FBC-Mechanical-403.2 Outdoor air required.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the *breathing zone* within each *occupiable space*.

Exception (1): Where the *Licensed Mechanical Professional Engineer* demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

Exception (2): In accordance with Exception (1), for all occupancies, the minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the *Licensed Mechanical Professional Engineer* determines that additional outside air is required, the Area Outdoor Airflow Rate (FBC-Mechanical-Table 403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table 403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the operation of the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The above should be considered acceptable for the following reasons:

1. The above complies with 2014-FBC-Mechanical-403.5-2014 which states "The minimum airflow rate of Outside Air that the Ventilation System must be capable of supplying during its operation shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column) and the actual number of occupants present.
2. The above will reduce Outside Air and associated Exhaust Equipment size and construction cost as well as reduce the Life Cycle (perpetual) operating costs of the Outside Air Systems and associated Exhaust Systems.
3. The above can be applied uniformly. The above can be uniformly verified by the Building Code Official.
4. The above complies with 2014-FBC-Mechanical-401.3-When required: Ventilation shall be provided during the periods that the room or space is occupied.
5. The above complies with the intent of ASHRAE 62.1.

Economic Analysis of FBC-Building-453.15.5-2014 (423.15.5-2010)

A Typical School District utilizes separate Dedicated Outside Air Systems (DOAS) to supply fresh outside air to all occupant spaces. The purpose of the DOASs is to provide oxygen replenishment for the occupants, reduce the level of carbon dioxide exhaled by the space occupants and dissipate any odors emitted by the space occupants. Therefore, the DOASs are occupant based systems. Typically, separate chilled water air handling systems (CHWAHU) provide space cooling for each occupant space. For each school, the DOASs and CHWAHUs are connected into a chilled water system that is serviced by either air cooled or water cooled chillers. The Typical School District may also have some DOASs that utilize refrigerant instead of chilled water. The following economic analysis is also applicable for DOASs that utilize refrigerant. In addition to the DOASs, there are respective Exhaust Systems (ES) that run when the DOASs run to exhaust air from the respective spaces to main the building pressure balance.

The methodology utilized by the Typical School District is based on Florida Building Code-Building (FBC-B) 453.15.5-2014 (FBC-B-423.15.5-2010) which is based on Florida Building Code-Mechanical (FBC-M)-2001 Edition and ASHRAE 62-1999 Edition. The typical School District is currently under FBC-B-2010 and FBC-M-2010 Edition and ASHRAE 62.1-2004 Edition. FBC-M-403.3 and ASHRAE 62.1-2004 (and later Editions) have been revised and longer make any reference to the wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010). The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) came from ASHRAE 62-1999. In 2001 ASHRAE 62 became ASHRAE 62.1. The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is not included in or supported by ASHRAE 62.1. Therefore, FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is no longer has any basis of support. Due to the wording of FBC-B 453.15.5-2014 (FBC-B-423.15.5-2010), The Typical School District is operating the DOASs and respective ESs for approximately an extra 2 hours per day when the spaces are unoccupied.

The operation of the DOASs and respective ESs should be in accordance with FBC-M-401.3. The intent of FBC-M-401.3 is that all spaces are to be supplied with Ventilation (Outside) Air when they are occupied. The Typical School District schedules the Outside Air Systems and respective Exhaust Systems to run for a minimum of approximately 2 hours after the students are dismissed for the day when the spaces (e.g., classrooms) are unoccupied. This is not necessary. The need for operation of the DOASs is occupant based per FBC-M-401.3. The DOASs and respective Exhaust Systems should be turned off when the students are dismissed for the day and the spaces are unoccupied. If the DOASs and respective Exhaust Systems are turned off, their respective chillers would unload and utilize less electricity for the 2 hour period. In addition, the speed of the chilled water pumps would be reduced via the VFDs which would reduce the operating cost of the chilled water pumps. For water cooled chillers, there may also be some reduction in operating costs of the condenser water pumps. To be on the conservative side, the EER of the chillers will be assumed to include the chilled and condenser water pumps. Each DOAS has a fan motor and an electric reheat coil that utilizes electricity for the 2 hour period. The following analysis is based on an energy cost of \$0.1 per Kwh. In addition to energy cost there is a peak electrical demand charge (\$ per Kw) that is also levied by the Utility. This economic analysis does not include any possible savings do to a possible reduction in peak Kw demand. This economic analysis also does not include any possible savings in maintenance cost due to reduced run time of the Chillers, DOASs and respective ESs. Therefore, the actual savings may be more than what is shown. This economic analysis is for comparison purposes only and will give the an idea of how much money the unnecessary 2 hours of operation is costing a Typical School District.

For classrooms the outside air is supplied at 7.5 CFM per person. A large Typical School District serves approximately 210,000 students and 7500 teachers for a total of 217,500 people. 7.5 CFM per person x 217,500 people = 1,631,250 CFM. There are 180 school days per year.

- 1. Chiller Energy Cost for DOASs:** Based on 1,631,250 CFM; a chiller EER of 9.6 Btuh/watt; 150 CFM per cooling Ton; 12,000-Btuh per Ton and \$0.1 per Kwh:

1,631,250 CFM/150 CFM per Ton = 10,875 Tons of cooling x 12,000 BTUH/ton = 130,500,000 Btuh
 130,500,000 Btuh x 1 watt/ 9.6 Btuh x 1 Kw/1000 Watts = 13,594 Kw x 2 Hrs per day = 27,188 Kwh per day
 27,188 Kwh per day x \$0.1 per Kwh = \$ 2,719 per day x 180 days per year = **\$489,420 per year.**

- 2. DOAS Fan Energy Cost:** Based on Bhp=5.2PQ/(33000 (0.6)); 5.2 PSF per inch w.g.; \$0.1 per Kwh, and 3.0 inches w.g.; Bhp= Brake Horsepower. 0.6 is the Efficiency of the fan wheel.

Bhp = 5.2 x (3) x (1,631, 250) / (33000 (0.6)) = 1285 Bhp
 1285 Bhp x 0.75 Kw per Bhp = 964 Kw x 2 Hrs per day = 1,928 Kwh per day

1928 Kwh per day x 0.1\$ per Kwh = \$193 per day x 180 days per year = **\$34,740 per year**

- 3. DOAS Reheat Energy Cost:** The air leaves the cooling coil at 50F and has to be reheated to 72F before entering space. $72 - 50 = 22\text{F dT}$; $\text{Btuh} = 1.085 (\text{CFM}) (\text{dT})$; 3,413 Btuh/Kw; 1,631,250 CFM and \$0.1/Kwh

$\text{Btuh} = 1.085 (1,631,250) (22) = 38,937,936 \text{ Btuh} \times 1 \text{ Kw} / 3,413 \text{ Btuh} = 11,409 \text{ Kw}$

$11,409 \text{ Kw} \times 2\text{Hr per day} = 22,818 \text{ Kwh per day} \times \$0.1/\text{Kwh} = \$2,282 \text{ per day}$

$\$2,282 \text{ per day} \times 180 \text{ days per year} = \textbf{\$410,760 per year}$

- 4. Exhaust Fan Cost:** Based on $\text{Bhp} = 5.2\text{PQ}/(33000 (0.6))$; 5.2 PSF per inch w.g.; \$0.1 per Kwh, and 1.0 inches w.g.; Bhp= Brake Horsepower. 0.6 is the Efficiency of the fan wheel.

$\text{Bhp} = 5.2 \times (1) \times (1,631, 250) / (33000 (0.6)) = 428 \text{ Bhp}$

$428 \text{ Bhp} \times 0.75 \text{ Kw per Bhp} = 321 \text{ Kw} \times 2 \text{ Hrs per day} = 642 \text{ Kwh per day}$

$642 \text{ Kwh per day} \times 0.1\$ \text{ per Kwh} = \$64.2 \text{ per day} \times 180 \text{ days per year} = \textbf{\$11,556 per year}$

- 5. Total Energy Cost For 2 Unnecessary Hours of DOAS Operation:** $\$489,420 + \$34,740 + \$410,760 + 11,556 = \textbf{\$946,476 per year or \$473,238 per hour per year of unnecessary operation of the DOASs.}$ In addition, there might be additional savings due to a possible reduction in the peak demand Kw. There may also be some savings due to a possible reduction in maintenance cost due to reduced run time of the chillers, DOASs and respective ESs.

For conservative purposes let use 10 years. For 10 years of unnecessary operation of the DOASs and respective ESs for 2 hours per day it has cost the Typical School District approximately **10 years x \$946,476 per year = \$9,464,760** that could have been saved and utilized to educated students. **Until this issue is corrected, it will continue to cost the Typical School District approximately \$946,476 per year.**

There is a simple solution. Program the Energy Management System (EMS) for each school to shutdown all DOASs and respective ESs for unoccupied spaces at the time of student dismissal. This would automatically cause the chillers to unload and the chilled water pumps to slow down. For schools without Energy Management Systems, there is some type of time clock system control. The time clock system can be programmed to shut down all the respective DOASs and respective ESs at the time of school dismissal.

The intent of FBC-M 401.3 is that all occupied spaces be supplied with Ventilation (Outside) Air. If the spaces are unoccupied and have Dedicated Outside Air Systems (DOAS) that do not affect other occupied spaces, then the unoccupied space DOASs and respective Exhaust Systems can be turned off. Optimizing the operation of DOASs and respective ESs to shut down when rooms are unoccupied will save the Typical School District approximately \$1,000,000 per year.

It is imperative that a clear and concise interpretation by the Florida Building Code Commission be made as to the intent and application of the codes. Petitioner appreciates the due diligence of the Florida Building Code Commission and fully understands the extensive work of the Florida Building Code Commission in developing the Codes for the greater safety and improvement of the consumer. Likewise, it would seem reasonable to ensure the Codes are uniformly interpreted. Section 553.775(1) Florida Statutes states: "It is the intent of the Legislature that the Florida Building Code be interpreted by the Building Officials, Local Enforcement Agencies and the Florida Building Code Commission in a manner that protects the public safety and welfare at the most reasonable cost to the consumer by ensuring uniform interpretations throughout the State by providing processes for resolving disputes regarding interpretations of the Florida Building Code that are just and expeditious."

Thank you for your time and consideration.

Respectfully Submitted,

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2001-FBC-Mechanical-Section 403

SECTION 403**MECHANICAL VENTILATION**

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing a negative or positive pressure. The system to convey the ventilation air shall be designed and installed in accordance with Chapter 6.

Ventilation supply systems shall be designed to deliver the required rate of supply air to the occupied zone within an occupied space. The occupied zone shall have boundaries measured at 3 inches (76 mm) and 72 inches (1829 mm) above the floor and 24 inches (610 mm) from the enclosing walls.

403.2 Outdoor air required. The minimum ventilation rate of required outdoor air shall be determined in accordance with Section 403.3.

Exception: Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

403.2.1 Recirculation of air. The air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces.

403.2.2 Transfer air. Except where recirculation from such spaces is prohibited by Table 403.3, air transferred from occupied spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Sections 403.3 and 403.3.1.

4.2 FLORIDA BUILDING CODE — MECHANICAL

(continued)

403.3 Ventilation rate. Ventilation systems shall be designed to have the capacity to supply the minimum outdoor air flow rate determined in accordance with Table 403.3 based on the occupancy of the space and the occupant load or other parameter as stated therein. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3. Where peak occupancies

2001-FBC-Mechanical-Section 403.3

of less than three hours duration occur, the outside air flow rate may be determined on the basis of average occupancy for the space for the duration of the system, provided the average occupancy used is not less than one-half the maximum.

Ventilation rates for occupancies not represented in Table 403.3 shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the space is occupied, except as otherwise stated in other provisions of the code.

Exception: The occupant load is not required to be determined, based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate anticipated occupant density.

TABLE 403.3
REQUIRED OUTDOOR VENTILATION AIR

*Mechanical
FMC 2004 FMC + Subsequent
Editions*

Chapter 4, Section 403, (3)

403.3 Ventilation rate.

Ventilation systems for other than Group R-3 (one- and two-family dwellings), shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with Table 403.3 based on the occupancy of the space and the occupant load or other parameter as stated therein. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3. Ventilation rates for occupancies not represented in Table 403.3 shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

Exception: The occupant load is not required to be determined, based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate anticipated occupant density.

Chapter 4, Section 403, (3)(1)

403.3.1 System operation.

The minimum flow rate of outdoor air that the ventilation system must be capable of supplying during its operation shall be permitted to be based on the rate per person indicated in Table 403.3 and the actual number of occupants present.

Note: 2004 + Subsequent Editions do not contain the peak occupancy wording. This wording was removed because it is not included in ASHRAE 62.1 or supported by ASHRAE 62.1.

FMC 2004 FMC

http://ecodes.cyberregs.com/cgi-exe/cpage.dll?pg=x&rp=/indx/ST/fl/st/b1100v04/st_fl_st... 10/25/2014

Date Submitted	12/31/2015	Section	450.3	Proponent	skip gregory
Chapter	4	Affects HVHZ	No	Attachments	No
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments**General Comments** No**Alternate Language** Yes**Related Modifications**

450.1

Summary of Modification

Adopts the 2014 edition of the The Guidelines for Design and Construction of Residential Health, Care, and Support Facilities as the primary design requirements for skilled nursing homes. Deletes and revises existing requirements as needed to adopt this new standard.

Rationale

This revision to the nursing home rule will bring the rule into compliance with the nationally recognized standard for nursing home design similar to how the hospital and ambulatory surgical center requirements are currently written. Because the Guidelines are updated every four years, the nursing homes in Florida will keep up with the latest changes and technologies of a national adopted and recognized 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 cost of compliance.

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to 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**

Yes.

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.

Is the proposed code modification part of a prior code version? No

Original mod plus A5, A6 and A7

Section 450.3. Change the text of Section 450.3 as follows.

450.3 Additional physical plant requirements for nursing homes. In addition to the codes and standards referenced in Section 450.2 the following minimum standards of construction and specified minimum essential facilities shall apply to

all new nursing homes, and all additions, alterations or renovations to an existing licensed nursing home, as described in Section 450.1 and listed in this section.

450.3.1 Special Considerations:

450.3.1.1 Nursing homes designed to serve only for children 0 through 20 years of age may have a maximum room capacity of four persons.

450.3.1.1 Skilled Nursing Units that are part of a hospital and licensed as a hospital bed but certified as a skilled nursing bed shall meet the requirements for a Skilled Nursing Unit in the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities.

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~~450.3.1 Alternate design models. Because nursing homes may provide care utilizing two basic organizational models, two alternate design models are permitted to meet some of the specific physical plant requirements of this section. These alternate design models, the institutional design model and the household design model for person centered care, are described in Sections 450.3.2.1 and 450.3.2.2 of this code and are further defined by the physical plant requirements for each model as described in the applicable paragraphs of Section 450.3.~~

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~~450.3.1.1 Either one or both of these design models may be used in the design of the nursing home as described by the functional program of the facility.~~

-

~~450.3.1.2 An institutional design model may utilize specific physical plant requirements of a household design model without being required to incorporate all of the household design elements.~~

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~~450.3.1.3 Where no alternate design model is permitted, all nursing homes shall meet the described requirement.~~

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450.3.2 Resident unit. Each resident unit shall consist of the resident rooms and support areas, and shall be arranged to avoid unnecessary and unrelated travel

through the unit. It shall be designed to meet the organizational patterns of staffing, functional operations, and care programs as described in the functional program of the facility. Based on these aspects of the functional program,

the resident unit may be designed to meet one of the following models:

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450.3.2.1 Institutional design model. This model is based on an institutionalized medical program similar in arrangement to that found in some hospitals. If this

model is utilized for the design of the resident unit, it shall consist of the resident rooms, nurse station(s), and resident support areas and services as described in Section 450.3.4.1. Dining, activity, and social areas may be centralized and located away from the resident unit.

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450.3.2.1.1 Each resident unit shall be limited to a maximum of 60 beds.

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450.3.2.1.2 Travel distance from the entrance to a nurses' station, and from a clean utility and a soiled utility room(s) or function(s) to the middle of the entrance door of the farthest resident room served shall be a maximum of 150 feet (45.72 m).

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450.3.2.2 Household design model for person-centered care. This model is based on a home-like environment similar in arrangement to that found in a

typical home. If this model is utilized for the design of the resident unit, it shall consist of the resident rooms and resident support areas and services as described in Section 450.3.4.2. Dining, activity, and social areas shall be decentralized and included within the resident household.

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450.3.2.2.1 Each resident household (unit) shall be limited to a maximum of 20 residents.

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450.3.2.2.2 Two individual resident households (units) may be grouped into a distinct neighborhood with a maximum of 40 residents. This neighborhood,

composed of the two resident households, may share the required resident support areas and services as described in Section 450.3.4.2.

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450.3.2.2.3 If an access corridor is utilized as part of this design, it shall be designed to include an open resident sitting and resting area(s) located along the

~~corridor at least every 100 feet (30.48 m) of corridor length.~~

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450.3.32 Resident rooms. In addition to the requirements of the Guidelines, Chapter 3.2, Each resident room shall meet the following minimum standards:

450.3.32.1 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.

450.3.3.2 ~~Nursing homes designed to serve only for children 0 through 20 years of age may have a maximum room capacity of four persons.~~

450.3.3.3 ~~Where renovation work of an existing resident room alters the physical configuration of the room and the present capacity of the room is more than two~~

~~persons, the maximum room capacity shall be no more than two persons at the conclusion of the renovation.~~

450.3.3.42.2 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).

450.3.3.52.3 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. ~~Clear floor area is as described in Section 450.3.3.4.~~

450.3.3.6 2.4 ~~For planning purposes, a full-size bed is assumed to be 3 feet 6 inches (1.07 m) wide by 8 feet (2.43 m) long.~~

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450.3.3.7 A 3 feet (0.91 m) wide clear access space to each bed shall be provided along at least 75 percent of the length of one side of the bed and shall be designed to allow access for the use of a wheelchair and other portable equipment.

~~450.3.3.8 For a bed equipped with a piped in medical gas headwall unit, there shall be a minimum of 3 feet clearance (0.91 m) along the entire length of the bed between both sides and foot of the bed and any other bed, wall or any other fixed obstruction.~~

~~450.3.3.9 The dimensions and arrangement of each resident room shall be such that at least two bed locations are designed to accommodate resident personal choice. All such alternate bed locations shall meet the clearance~~

~~requirements of Section 450.3.3.7 and shall be designed so the bed will not obstruct access to the supporting utilities serving the bed including the nurse call~~

~~station, individual reading lamp or fixture, and the required electrical outlets that provide service for the bed or other equipment. In a double occupancy resident~~

~~room, only one bed must meet this requirement and any bed equipped with a piped in medical gas headwall unit shall meet the requirements of Section 450.3.3.8 and is exempt from this requirement.~~

~~450.3.3.10 The configuration of each resident room shall be designed to meet one of the following models:~~

~~450.3.3.10.1 Institutional design model. If a double occupancy resident room is designed where the beds are located side by side, there shall be a minimum clearance of 3 feet (0.91 m) between both sides of each bed and any wall or any other fixed furniture, fixed obstruction or adjacent bed for at least 75 percent of the length of the bed, and a clearance of 3 feet 8 inches (1.11 m) to any fixed furniture, fixed obstruction, or adjacent bed at the foot of each bed to permit the passage of equipment or beds.~~

~~450.3.3.10.1.1 At a minimum, visual privacy shall be provided for each person by the installation of flame-retardant cubicle curtains or equivalent built-in devices.~~

~~450.3.3.10.1.2 2.4 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.~~

~~450.3.3.10.2 Household design model for person centered care. Individual resident sleeping areas in a double occupancy resident room shall be separated from each other by a full height wall or a permanently installed sliding or folding door or partition that provides visual privacy for each person. 450.3.3.10.2.1 Either doors or cubicle curtains to these individual resident sleeping areas shall be provided.~~

~~450.3.3.10.2.2 The design for privacy shall not restrict resident access at any time to the room entrance, resident armchair, toilet room, bathroom, window, wardrobe, or closet.~~

~~450.3.3.11 Each resident room shall be provided with a bedside table or equivalent furniture, a reading lamp, a well-constructed appropriate bed, and a nonfolding type armchair for each individual resident. As determined by the functional program of the facility, there shall be a number of over-bed tables available to bed restricted residents.~~

~~450.3.3.12 2.4 Each new resident room, and each individual resident sleeping area, as described in Section 450.3.3.10.2 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, except when a cubicle curtain is closed. 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 450.3.3.10.2 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 ~~driveway~~ parking areas or property line measured horizontally from the plane of the window.~~

~~450.3.3.13 A handwashing facility complete with mixing faucet shall be provided within each resident toilet room and within each resident room that shares a toilet room with another resident room. Separate resident sleeping areas, as described in Section 450.3.3.10.2, do not constitute a separate resident room.~~

~~450.3.3.14 Each resident shall have access to a toilet room without having to enter the general corridor area or another resident bed area in a double occupancy resident room. One toilet room shall serve no more than two residents and no more than two resident rooms. A plumbing connection for a rinsing device shall be provided at the resident toilet within each resident toilet room unless the functional program provides a method for disposing of bedpans, urinals, and emesis basins after each and every use and is approved by AHCA.~~

~~450.3.3.15 The door to the toilet room shall be side hinged, and either swing out from the toilet room or be equipped with emergency release hardware. A sliding door equipped with sliding door hardware located on the resident room side of the wall and not equipped with a bottom door track shall be permitted. Unless otherwise required by this code, the door shall be at least 32 inches (813 mm) in clear width opening. The toilet room door that swings open into the resident room shall not impede the swing of any other door that opens into the resident room.~~

~~450.3.3.16 Each resident room shall be provided with a wardrobe or closet for each resident. Each wardrobe or closet shall have minimum inside dimensions of 1 foot 10 inches (0.55 m) in depth by 2 feet 6 inches (0.58 m) in width. Each wardrobe or closet shall be accessible to the resident at all times and shall have an adjustable shelf(s) and an adjustable clothes rod that is adjustable in a maximum of 4 inches (10.16 cm) increments from 4 feet (1.22 m) to 5 feet 8 inches (1.73 m) above finished floor or higher as wardrobe or closet size permits. When the wardrobe or closet is designed to meet the requirements for accessibility in accordance with the Florida Building Code, Accessibility, it shall include additional accessible storage area(s) for full-length garments. The shelf may be omitted if the clothing unit provides at least two drawers. Locked storage for a resident's personal items shall be provided within the resident sleeping room if required by the functional program.~~

~~450.3.43 Resident support areas and services. The size and features of each resident support area will depend upon the number and type of residents served. The resident support areas shall be located inside of or readily accessible to~~

each resident unit. The support areas and services shall be designed in accordance with one of the following design models:

450.3.4.1 Institutional design model.

450.3.4.13.3.1 Staff work area(s) (nurse station). (See the Guidelines for requirements) A central and/or decentralized staff work area(s) shall be provided. Where a centralized staff work model is utilized it shall have space for supervisory administrative work activities, charting, and storage. The minimum area required shall be equal to 2 square feet (0.19 m²) for each resident bed served. Where a decentralized staff work model is utilized it shall provide for charting or transmitting charted data and for any storage of administrative activities.

450.3.4.13.3.2 Clean utility room. (See the Guidelines for requirements) A clean utility or clean holding room for storage and distribution of clean supply materials shall be provided. If the room is used for preparing resident care items, it shall contain a work counter, a hand washing facility, and storage facilities for clean and sterile supplies. If the room is used only for storage and holding as a part of a system for distribution of clean and sterile supply materials, the work counter and handwashing facility requirements may be omitted. The minimum size of the room shall be 60 square feet (5.57 m²).

450.3.4.1.3 A clean linen storage room, closet or area shall be provided. This area may be located within the clean utility or clean holding room. It shall be large enough to accommodate the storage of linen carts. If in compliance with the Florida Fire Prevention Code a closed cart system may be used and stored in an alcove open to the corridor.

450.3.4.1.4 3.3 A soiled utility or soiled holding room(s) shall be provided. (See the Guidelines for requirements) The soiled utility function shall be comprised of a flushing rim clinical service sink or deep bowl utility fixture with bedpan rinsing device, a double compartment sink, soiled linen receptacles, waste receptacles and a work counter with a usable minimum work surface area of 6 square feet (0.56 m²). The total minimum size of the function shall be 80 square feet (7.43 m²) and may be allocated among several soiled utility or soiled holding rooms. Rooms used only for the holding of soiled materials need contain only a handwashing facility.

450.3.4.1.5 3.4 Medication storage and distribution. (See the Guidelines for requirements) A medicine preparation room or a self-contained medicine dispensing unit shall be provided for the provision of medication storage and distribution.

450.3.4.1.5.1 If a medicine preparation room is utilized, it shall be equipped with a lockable door, have a minimum area of 50 square feet (4.55 m²) and shall contain a refrigerator, locked storage for controlled drugs, a handwashing facility, and a work counter with a minimum of 6 square feet (0.56 m²) of work surface.

450.3.4.1.5.2 If a self-contained medicine dispensing unit is utilized, it shall be under the visual control of the staff and may be located at the nurses' station, in the clean utility room, in an alcove, or in other spaces convenient for staff control provided the area occupied by the unit does not encroach upon required minimum areas. The dispensing unit may be used in a medicine preparation room as locked storage for controlled drugs within the minimum area of 50 square feet (4.55 m²); however, the standard "cup sinks" provided in many self-contained units shall not be a substitute for the required handwashing facility.

450.3.4.1.5.3 If there is no linen storage in the clean utility room, medicine preparation may be part of the clean utility room, in which case an additional 20 square feet (1.8 m²) dedicated for this purpose shall be required. A refrigerator shall also be required if medicine preparation is included in this room.

450.3.4.1.6 3.5 A nourishment room (See Resident and Participant Kitchen in the Guidelines for requirements) for serving nourishments between meals shall be provided that shall contain a work counter, refrigerator, storage cabinets, and sink.

450.3.4.1.6.1 3.6 Ice for residents' consumption (See the Guidelines for requirements) shall be provided by an icemaker unit that may serve more than one nourishment station if the nourishment stations are in close proximity to each other. Where the icemaker unit is accessible to residents or the public, it shall be a self-dispensing type.

450.3.4.1.6.2 The nourishment room shall include space for trays and dishes used for nonscheduled meal service. Hand washing facilities shall be in or immediately accessible from the nourishment room.

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450.3.4.2 Household design model for person-centered care.

450.3.4.2.1 The functions of administrative work, charting and storage may be located among several separate direct care staff work areas located within the resident household. The administrative work area(s) shall be designed and located so it is not visually or physically separated from the normal use areas of residents and family members.

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450.3.4.2.2 A clean utility or clean holding room, as described in Section 450.3.4.1.2, shall be provided but may be sized in accordance with the functional program and allocated among several rooms or closets within the resident household.

450.3.4.2.3 A clean linen storage room, closet or area shall be provided in accordance with Section 450.3.4.1.3 and shall be located within the resident household.

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~~450.3.4.2.4 A soiled utility or soiled holding room as described in Section 450.3.4.1.4 shall be provided but may be sized in accordance with the functional program and allocated among several rooms or closets within the resident household.~~

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~~450.3.4.2.5 A medicine preparation room or a self-contained medicine dispensing unit as described in Section 450.3.4.1.5 shall be provided. Non-controlled prescription drugs may be stored inside the resident's sleeping room, area, or toilet room if they are secured inside of an automatic closing and automatic locking dispensing unit that is secured in place.~~

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~~450.3.4.2.6 A nourishment room as described in Section 450.3.4.1.6 shall be provided but resident dietary facilities as described in Section 450.3.8.1.13 may substitute for this function.~~

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~~450.3.4.3 The following resident support areas, utilities, or services shall be provided in all nursing homes. Unless specifically required, these support areas may be either within the nursing unit, adjacent to the nursing unit or on the same floor as the nursing unit.~~

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~~450.3.4.3.1 An equipment storage room(s) shall be provided for storage of nursing unit equipment. The minimum area required shall be equal to 2 square feet (0.19 m²) for each resident, with no room being less than 20 square feet (1.86 m²) in area.~~

~~450.3.4.3.2 A housekeeping room(s) shall be provided for storage and use of housekeeping supplies and equipment.~~

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~~450.3.4.3.3 If required by the functional program of the facility, a hot water or chemical type sanitizer shall be provided per facility.~~

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~~450.3.4.3.4 Storage alcove space for a wheelchair(s) shall be provided in an area located out of the required means of exit egress.~~

~~450.3.4.3.5 Resident bathing facilities:~~

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~~450.3.4.3.5.1 A centralized resident bathing room(s) shall be provided with a minimum of one bathtub, hydro tub, or shower for every 20 residents or fraction thereof not otherwise served by bath or shower facilities connected directly to the resident rooms.~~

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~~450.3.4.3.5.2 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. This toilet may also serve as a toilet training facility.~~

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~~450.3.4.3.5.3 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.~~

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~~450.3.4.3.5.4 If the institutional design model is utilized, in addition to bathing facilities connected to the resident rooms, residents shall have access to at least one bathing room per floor or unit sized to permit assisted bathing in a tub or shower. The bathtub in this room shall be accessible to residents in wheelchairs and if a shower is used it shall be large enough to accommodate a person in a recumbent position. Other tubs or showers located within the bathing room shall be located inside of individual rooms or curtained enclosures with space for private use of the bathing fixture, for drying and dressing and access to a grooming location containing a sink, mirror and counter or shelf. If every resident sleeping room has a bathing room directly connected to it that is equipped with a 3 feet \times 5 feet (0.914 m \times 1.52 m) roll in shower, the central bathing room shall be as required by the functional program.~~

~~450.3.4.3.5.5 If the household design model for person-centered care is utilized, in addition to the bathing facilities connected to the resident rooms, residents within each household shall have access to at least one bathing room located in or directly adjacent to the household and sized to permit assisted bathing in a tub or shower. This bathing room may be shared between two households if it is located so that it is directly adjacent to each household. The bathtub in this room shall be accessible to residents in wheelchairs and if a shower is used it shall be large enough to accommodate a person in a recumbent position. Other tubs or showers located within the bathing room shall be located inside of individual rooms or curtained enclosures with space for private use of the bathing fixture, for drying and dressing and access to a grooming location containing a sink, mirror and counter or shelf. If every resident sleeping room has a bathing room directly connected to it that is equipped with a 3 feet \times 5 feet (0.914 m \times 1.52 m) roll in shower, the central bathing room shall be as required by the functional program.~~

~~450.3.5 4 Resident living, social, and treatment areas. (See the Guidelines for additional requirements)~~

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~~450.3.5.4.1 Dining, lounges, recreation areas, and social areas for residents shall be provided. The total area of these spaces shall be a minimum of 35 square feet (3.25 m²) per bed with a minimum total area of 225 square feet (20.90 m²). At least 20 square feet (1.86 m²) per resident shall be available for dining. Additional space may be required for resident day care programs. Storage for supplies and equipment shall be provided in the recreation area.~~

~~450.3.5.1.1 If the institutional design model is utilized, these areas may be grouped together and centrally located.~~

~~450.3.5.1.2 If a household design model for person centered care is utilized, these areas shall be decentralized and provided within each resident household or can be shared between a maximum of two households.~~

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450.3.5.1.3 4.2 (See the Guidelines for additional requirements) Storage for supplies, and resident needs, ~~and recreation~~ shall be provided. ~~This area~~ Storage shall be on site but not necessarily in the same building as the resident rooms, provided access is convenient. The minimum required area shall be 5 square feet (0.46 m²) per ~~bed~~ resident up to 600 square feet (55.74 m²).

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450.3.5.2 4.3 (See the Guidelines for additional requirements) Outdoor area(s) shall be provided for the use of all residents and shall include walking paths of durable materials, benches, shaded areas, and visual focusing element(s) such as landscaping, sculpture, or fountain(s). Security fencing if used shall be of a residential design and provide some visual connection to the exterior of the secured area. If an exterior visual connection is not possible or desirable then the interior of the outside area shall be landscaped to be visually interesting.

450.3.5.3 If required by the functional program of the facility, physical, speech, and occupational therapy units shall be provided and contain the following:

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450.3.5.3.1 Space for files, records and administrative activities.

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450.3.5.3.2 Provisions for storage of wheelchairs.

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450.3.5.3.3 Storage for supplies and equipment.

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450.3.5.3.4 Hand washing facilities within the therapy unit.

450.3.5.3.5 Space and equipment for carrying out each of the types of therapy that the facility will provide.

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450.3.5.3.6 Provisions for resident privacy.

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450.3.5.3.7 Housekeeping rooms, in or near the unit.

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450.3.5.3.8 Resident toilet room(s) usable by wheelchair residents.

450.3.5 4.4 (See the Guidelines for additional requirements) A barber/beauty room shall be provided with facilities and equipment for resident hair care and grooming. The area of the room shall be a minimum of 120 square feet (11.15 m²) with the least dimension of 10 feet (3.05 m).

450.3.6 Staff support areas.

450.3.6.1 If required by the functional program of the facility, a staff lounge area(s) shall be provided. It may be shared by multiple resident units if the lounge is located so it is accessible without requiring the user to enter into or through any other resident unit.

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450.3.6.2 A staff toilet room with hand washing facilities shall be provided conveniently located to each resident unit.

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450.3.6.3 Lockable closets, drawers or compartments shall be provided on the resident unit for staff and may be located in the lounge for safekeeping of staff personal effects.

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450.3.6.4 A conference or consultation room for resident and family use shall be provided and may be shared between resident units.

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450.3.7 Administrative and public area. Each administrative and public area shall meet the following standards:

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450.3.7.1 A covered vehicular drop-off and pedestrian entrance that is located at grade level and that provides shelter from inclement weather shall be provided.

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450.3.7.2 An administrative/lobby area shall be provided that shall include a counter or desk for reception and information, a public waiting area. This function may be located in a separate building on the campus of the facility. Public toilet facilities, a public telephone and an electric drinking fountain for this area shall be provided in accordance with the Florida Building Code, Plumbing. Residents shall have access to toilet facilities in public areas.

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450.3.7.3 General offices shall be provided for business transactions, admissions, social services, private interviews, medical and financial records, and administrative and professional staff. Clerical files and staff office space shall be provided as needed. At a minimum there shall be a private office for the administrator and director of nursing.

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~~450.3.7.4 At least one multipurpose room per nursing home facility shall be provided for conferences, meetings, and health education purposes, and shall include provisions for the use of visual aids. This room may be remotely located on the campus and shall have a minimum area of 120 square feet (11.15 m2).~~

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~~450.3.7.5 Storage for office equipment and supplies shall be provided.~~

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~~450.3.8 Facility support areas. Each facility support area shall meet the following standards.~~

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~~450.3.8.1 Facility dietary. A facility dietary area shall be provided for dietary service to residents and others as may be appropriate. No part of the kitchen area may be used as a pass through to the linen/laundry area. The facility dietary area shall contain the following facilities, in the size and number appropriate for the type of food service selected:~~

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~~450.3.8.1.1 Storage space, including cold storage, for at least a seven-day supply of food shall be provided.~~

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~~450.3.8.1.2 Food preparation facilities for cook to serve, cook to chill or a proprietary system of food preparation and adequate space and equipment for production shall be provided.~~

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~~450.3.8.1.3 Employee dining and serving lines shall not be permitted in the dietary facilities area.~~

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~~450.3.8.1.4 Hand washing facilities shall be conveniently located in the food preparation area.~~

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~~450.3.8.1.5 Facilities for assembly and distribution of resident meals shall be provided.~~

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~~450.3.8.1.6 Ware washing space shall be located in a room or an alcove separate from the food preparation and serving area. Commercial-type ware washing equipment shall be provided. Space shall also be provided for receiving, scraping, sorting, and stacking soiled tableware and for transferring clean tableware to the use areas. Convenient handwashing facilities shall be available on the soiled dish side of the ware washing area.~~

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~~450.3.8.1.7 Pot washing facilities shall be provided.~~

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~~450.3.8.1.8 Storage areas and cleaning facilities for cans, carts, and mobile tray conveyors shall be provided.~~

~~450.3.8.1.9 An office for the food service manager shall be provided.~~

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~~450.3.8.1.10 A toilet, handwashing facility and lockers for dietary staff shall be located within the dietary facilities area. A vestibule shall be provided between the toilet and the kitchen.~~

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~~450.3.8.1.11 A housekeeping room located within the dietary facilities area shall be provided and shall include a service sink and storage space for housekeeping equipment and supplies.~~

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~~450.3.8.1.12 An icemaker unit shall be provided and may be located in the food preparation area or in a separate room.~~

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~~450.3.8.1.13 If the household design for the person centered care model is utilized and if required by the functional program, a resident dietary area including cooking equipment, counter tops, kitchen sink, and storage areas shall be provided within the resident household for the use by staff, residents, and family. The cooking equipment shall be designed or secured in such a way to insure resident safety and shall meet all applicable fire safety codes. This dietary area may substitute for the nourishment requirement of Section 450.3.4.2.5.~~

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~~450.3.8.2 Facility laundry. A facility laundry area shall be provided that shall have provisions for the storing and processing of clean and soiled linen for appropriate resident care. Processing may be done within the facility, in a separate building on or off site, or in a commercial or shared laundry. Where soiled linen is processed as part of a facility laundry area, at a minimum, the following elements shall be included:~~

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~~450.3.8.2.1 A separate room for receiving and holding soiled linen until ready for pickup or processing shall be provided. Discharge from soiled linen chutes may be received within this room or in a separate room. A handwashing facility and a utility sink shall be provided.~~

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~~450.3.8.2.2 A central, clean linen storage and issuing room(s), in addition to the linen storage required at the nursing units shall be provided.~~

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~~450.3.8.2.3 Parking of clean and soiled linen carts in separate areas from each other and out of traffic shall be provided.~~

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~~450.3.8.2.4 Hand-washing facilities in each area where untagged, soiled linen is handled shall be provided.~~

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450.3.8.2.5 When linen is processed off site, a service entrance protected from inclement weather for loading and unloading of linen shall be provided.

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450.3.8.2.6 When linen is processed in a laundry facility located on site, the following additional elements shall be provided:

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450.3.8.2.6.1 A laundry processing room(s), separated by walls from other elements of the laundry, with commercial type laundry equipment for washing and drying. Walls separating the functions of washing and drying are not required.

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450.3.8.2.6.2 Storage for laundry supplies.

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450.3.8.2.6.3 Arrangement of the laundry processes shall generally provide for an orderly workflow from dirty to clean to minimize cross traffic that might mix clean and soiled operations.

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450.3.8.2.7 If the household design model for person-centered care is utilized and if required by the functional program, resident laundry facilities including washing and drying equipment shall be provided for staff, family or individual resident use for the laundering only of a resident's personal items. If these laundry facilities are provided, they shall be readily accessible from each resident household without requiring the user to enter another resident unit, or floor and may be shared between two resident households. These resident laundry facilities shall not have to meet the requirements of the facility laundry described in Section 450.3.8.2 and may utilize residential laundry equipment. Each resident laundry room or area shall contain a handwash facility and if required by the functional program a single deep bowl utility sink.

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450.3.9 Housekeeping rooms/janitor's closets.

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450.3.9.1 Housekeeping rooms or janitor's closets shall be provided throughout the facility as required to maintain a clean and sanitary environment, but not less than one housekeeping room/janitor's closet shall be provided for each floor in addition to the housekeeping room required in the facility dietary area. Each room has storage space for housekeeping equipment and supplies. A service sink shall be provided in at least one housekeeping room or janitor's closet on each floor.

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450.3.10 Engineering service and equipment areas.

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~~450.3.10.1 Room(s) or separate building(s) for boilers, mechanical and electrical equipment shall be provided as required.~~

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~~450.3.10.2 Room(s) for the storage of building maintenance supplies and solvents shall be provided. On-site safe and secure storage for the facility drawings, records and manuals shall be provided.~~

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~~450.3.10.3 A general maintenance area for repair and maintenance shall be provided as required.~~

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~~450.3.10.4 Yard equipment and supply storage room, if provided, shall be located so that equipment may be moved directly to the exterior.~~

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~~450.3.11~~ 5 Details and finishes (See the Guidelines for additional requirements).

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~~450.3.11.1 Potential hazards such as sharp corners, loose laid rugs or carpets, shall not be permitted.~~

~~450.3.11.2~~ 5.1 Doors to all rooms containing bathtubs, showers, and water closets for resident use located in double occupancy rooms or are shared between two single occupancy rooms, shall be equipped with privacy hardware that permits emergency access without the use of keys. When such room has only one entrance and is equipped with a swing door, the door shall open outward, or be equipped with emergency release hardware. When emergency release hardware is utilized on a swing door located in a public area, it shall provide visual privacy for the resident and if required by other sections of this code, be smoke resistive. The toilet room door that swings open into the resident room shall not impede the swing of any other door that opens into the resident room.

~~450.3.11.3~~ 5.2 Interior corridor doors, except those to small closets, janitor's closets, electrical or mechanical rooms, housekeeping closets and other small rooms not subject to occupancy, shall not swing into the corridor. A door located on the exit access corridor, and required to swing outward, shall open into an alcove.

~~450.3.11.4~~ 5.3 A sliding door equipped with sliding hardware located on the resident room side of the wall and without a bottom track shall be permitted on an individual resident toilet or bathroom. If a sliding door is used on a resident toilet or bathroom, a D-shaped handle at least 4 inches (10.16 cm) long shall be provided to open the door.

~~450.3.11.5~~ 5.4 Door thresholds, except where required at exterior doors, and expansion joint covers shall be designed to facilitate use of wheelchairs and carts and to prevent tripping and shall provide a smooth and level transition from surface-to-surface.

~~450.3.11.6 All resident room windows shall have a minimum net glazed area of not less than 8 percent of the gross floor area of the room or bed area served. Operable windows are not required but if they are provided they shall be equipped with insect screens.~~

~~450.3.11.7 Handrails shall be provided on both sides of all corridors that are defined by walls and normally used by residents. Mounting height shall be between 36 inches (0.91 m) and 42 inches (1.07 m). A clearance of 1 1/2 inches (38 mm) shall be provided between the handrail and the wall. Handrails shall be designed without sharp corners, edges or hardware and shall permit easy grasping by the resident with a maximum diameter of 1.5 inches (38 mm). It shall be designed to provide a profile with a surface wide enough for the resident to be able to lean on the rail to rest. Rail ends shall return to the wall.~~

~~450.3.11.8 Grab bars, 1 1/2 inches (38 mm) in diameter, either permanent or flip down, shall be installed in all resident showers, tubs, and baths and on any two sides of all resident use toilets. Wall mounted grab bars shall provide an 1 1/2 inch (38 mm) clearance from walls and shall sustain a concentrated load of 250 pounds (113.4 kg). Where flip down grab bars are used, the toilet does not need to be located within 18 inches (455 mm) of an adjacent wall, except as required by the Florida Building Code, Accessibility.~~

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~~450.3.11.9 Each resident handwashing facility shall have a mirror unless prohibited by the nursing program. Mirror placement shall allow for convenient use by both wheelchair occupants and ambulatory persons. Tops and bottoms may be at levels usable by individuals either sitting or standing. Additional mirrors may be provided for wheelchair occupants, or one separate fulllength mirror located in the resident room may be provided to meet the needs of wheelchair occupants.~~

~~450.3.11.10 Provisions for soap dispensing and hand drying shall be included at all handwashing facilities. Those in resident use areas shall be paper or cloth towels enclosed to protect against dust or soil and shall be single-unit dispensing. 450.3.11.11 Reserved.~~

~~450.3.11.12~~ 5.5 Towel bars shall be provided at each bathing facility.

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~~450.3.11.13 All resident use plumbing fixtures and door operating hardware shall be equipped with levertype hardware for easy gripping and turning.~~

~~450.3.11.14~~ 5.6 Toilet compartment partitions and urinal screens shall be constructed of product that do not rust, corrode or delaminate.

~~450.3.11.15 The minimum ceiling height throughout the facility shall be 8 feet (2.44 m) above the finished floor with the following exceptions:~~

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~~450.3.11.15.1 Steam boiler and hot water generator rooms shall have ceiling clearances of at least 2 feet 6 inches (0.76 m) above the main header and connecting pipe.~~

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~~450.3.11.15.2 Ceilings in storage rooms, resident room entrance vestibules and toilet rooms shall be at least 7 feet 6 inches (2.33 m) above the finished floor.~~

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~~450.3.11.15.3 Ceilings in normally unoccupied spaces and alcoves may be reduced to 7 feet (2.13 m) above the finished floor.~~

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~~450.3.11.15.4 Ceilings in exit access corridors and exit passageways shall be a minimum of 8 feet (2.44 m) above the finished floor.~~

~~450.3.11.16 5.7 In addition to the electric drinking fountain or water and cup dispenser in the administrative/lobby area in Section 450.3.7.2, a~~ A ~~minimum of one electric drinking fountain or water and cup dispenser shall be provided per resident floor unless drinking water is available from the resident dietary area.~~

~~450.3.11.17 Floor material shall be readily cleanable and appropriate for the location. Floor surfaces in resident use areas shall be nonglossy to minimize glare. If composition floor tiles are used, the interstices shall be tight.~~

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~~450.3.11.17.1 In residential care and sleeping areas, a base shall be provided at the floor line.~~

~~450.3.11.17.2 Floors in areas used for food preparation and assembly shall be water resistant. Floor surfaces, including tile joints, shall be resistant to food acids. In all areas subject to frequent wet cleaning methods, floor materials shall not be physically affected by germicidal cleaning solutions.~~

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~~450.3.11.17.3 Floors subject to traffic while wet, such as shower and bath areas, kitchens, and similar work areas, shall have a slip-resistant surface and floor-to-base intersections shall be watertight.~~

~~450.3.11.17.4 Carpet and padding in resident areas shall be stretched tight, in good repair and free of loose edges or wrinkles that might create hazards or interfere with the operation of wheelchairs, walkers or wheeled carts.~~

~~450.3.11.18 Wall finishes shall be washable and, if near plumbing fixtures, shall be smooth and have a moisture-resistant finish. Finish, trim, walls, and floor constructions in dietary and food storage areas shall be free from rodent and insect harboring spaces.~~

~~450.3.11.18.1 Basic wall construction in areas not subject to conditioned air shall be constructed of masonry, cement plaster or moisture-resistant gypsum wallboard.~~

~~450.3.11.18.2 The finishes of all exposed ceilings and ceiling structures in the dietary facilities area shall be readily cleanable with routine housekeeping equipment.~~

~~450.3.11.18.3 Highly polished walls or wall finishes that create glare shall be avoided.~~

~~450.3.11.18.4~~ 5.8 Wall coverings that promote the growth of mold and mildew shall be avoided on exterior walls or on walls that are located in normally wet locations.

~~450.3.11.19~~ 5.9 All smoke partitions, horizontal exits and exit passageway partitions shall be constructed prior to the construction of intervening walls.

All fire walls, smoke barriers, horizontal exits and exit passageway partitions shall be constructed prior to the construction of all intervening walls. Where rated walls, barriers or partitions intersect, the continuity of the higher priority wall, barrier, or partition shall be maintained through the intersection.

~~450.3.11.20~~ 5.10 Smoke barriers shall be constructed so as to provide a continuous smoke-tight membrane from exterior wall to exterior wall and from the floor to the underside of the deck above. This includes interstitial space and the area above solid fire-tested membranes.

Smoke barriers shall be constructed so as to provide a continuous smoke-tight membrane from exterior wall to exterior wall and from the floor to the

underside of the floor or roof deck above. This includes interstitial space and the area above monolithic fire-rated ceiling membranes. Roof trusses shall be permitted to penetrate portions of the smoke barrier located above the fire-rated ceiling membrane where the annular space between the penetrating truss member and the smoke barrier is sealed to limit the transfer of smoke.

~~450.3.11.21~~ 5.11 Where it is not possible to visually inspect a fire-rated partition, wall or barrier or a smoke barrier that extends through the attic or interstitial space to the roof or floor deck above because of the location of a monolithic ceiling membrane, ceiling access panel(s) shall be installed adjacent to each side of the partition, wall or barrier at intervals not exceeding 30 feet (9.0 m) and in such locations as necessary to view all surfaces of the partition, fire wall or smoke barrier. Other ceiling access panels shall only be installed as required by other sections of the code. Partitions, walls and barriers requiring protected openings or penetrations shall be identified in accordance with Section 703 of this code.

~~450.3.11.22~~ 5.12 Where electrical conduits, cable trays, ducts and utility pipes pass through the smoke partition, the utilities shall be located so that access is maintained to adjacent wall surfaces and to all damper access panels. The details shall show the studs and reinforcing half studs so that proper support is provided for the wall surfacing material. There shall be a minimum clearance of 4 inches (102 mm) between all conduits, piping, and duct work insulation that are located parallel or adjacent to a fire wall or to a smoke barrier ~~at corridor walls~~ to facilitate the inspection of these walls.

~~450.3.12~~ 6 Elevators. ~~(Where required.)~~ (See the Guidelines for additional requirements) ~~450.3.12.1~~ All buildings having resident use areas on more than one floor shall have hospital-type electric or hydraulic elevator(s) that shall be in compliance with the requirements of Chapter 30 of this code and Chapter 69A-47, Florida Administrative Code, Uniform Fire Safety Standards for Elevators.

~~450.3.12.2~~ In the absence of an engineered traffic study, the minimum number of elevators shall be as follows:

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~~450.3.12.2.1~~ At least one elevator shall be installed where resident beds are located on any floor other than the main entrance floor.

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~~450.3.12.2.2~~ When 60 to 200 resident beds are located on floors other than the main entrance floor, at least two elevators, one of which shall be of the hospital type and capacity, shall be installed.

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~~450.3.12.2.3~~ When 201 to 350 resident beds are located on floors other than the main entrance floor, at least three elevators, two of which shall be of the hospital type and capacity, shall be installed.

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~~450.3.12.2.4~~ For facilities with more than 350 resident beds above the main entrance floor, the number of elevators shall be determined from a facility plan study and from the estimated vertical transportation requirements.

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~~450.3.12.3~~ Cars of elevators shall have inside dimensions that accommodate a resident bed with attendants. Cars shall be at least 5 feet (1.52 m) wide by 7 feet 6 inches (2.29 m) deep. The car door shall have a clear opening of not less than 4 feet (1.22 m).

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450.3.12.4 Elevator call buttons shall not be activated by heat or smoke. If employed, light beam door activators shall be used in combination with door-edge safety devices and shall be connected to a system of smoke detectors such that the light control feature will disengage or be overridden if it encounters smoke at any landing.

450.3.13 Water supply and sewage disposal.

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450.3.13.1 An approved, accessible, adequate, safe and potable supply of water shall be provided. The water supply shall be accessible and available at all times for drinking, fire protection, culinary, bathing, cleaning and laundry purposes.

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450.3.13.2 Hot water shall be supplied to all lavatory and sink plumbing fixtures available for use by residents and staff.

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450.3.13.3 An approved, adequate and safe method of sewage collection, treatment and disposal shall be provided for each nursing home.

450.3.14 7 Heating, ventilating and air-conditioning (HVAC) systems. (See the Guidelines for additional requirements) In addition to the basic HVAC system requirements as described by Part 6, ANSI/ASHRAE/ ASHE Standard 170-2008, Ventilation of Health Care Facilities of The Guidelines, the following specific elements are also required.

450.3.14.1 Mechanical equipment shall be defined as equipment utilized in air conditioning, heating, ventilating systems and associated electrical, electronic and pneumatic components required for the mechanical equipment to provide the function intended by the application of the equipment. New and existing equipment replacements shall comply with these requirements.

450.3.14.2 7.1 Mechanical equipment shall be installed exterior of the building, to include the roof, in a designated equipment room(s), or in a space(s) located in an attic(s). Air-handling equipment shall be installed exterior of the building, to include the roof, in a designated equipment room(s), in an open space(s) of an attic(s) or interstitial space(s) located inside the conditioned envelop of the building, or in an enclosed space located in an unconditioned attic(s). If the equipment serves only one room, it may be located above the ceiling and shall be accessible through an access opening in accordance with the requirements of such openings in this code. Access panels are not required for lay-in ceiling installations, provided the service functions are not obstructed by other above-ceiling construction, such as electrical conduits, piping, audio visual cabling and like equipment components or supports.

450.3.14.3 If the unit serves only one room, it may be located above the ceiling and shall be accessible through an access opening in accordance with this code. Access panels are not required for lay-in ceiling installations, provided the service functions are not obstructed by other above-ceiling construction, such as electrical conduits, piping, audio visual cabling and like equipment components or supports.

450.3.14.4 Ventilation shall be provided by mechanical means in all rooms in new facilities and in all renovated or remodeled rooms. The minimum air quantities and filtration efficiencies shall be met as set forth in Part 6 of The Guidelines and Table 4.1-1, Ventilation Requirements for Areas Affecting Resident Care in Nursing Homes of The Guidelines for those spaces that are listed.

450.3.14.5 For spaces listed in the minimum ventilated rate table, central station type air handling equipment shall be used. Package terminal air conditioning units or fan coils may be used to serve resident rooms and shall be provided with MERV 8 filters minimum.

450.3.14.6 System designs utilizing fan coil or package terminal air conditioning units shall have the outdoor air ventilation damper permanently closed. The ventilation requirement shall be satisfied by a central station type air handling unit provided with MERV 8 filter minimum or as required by the listed space served. Spaces designated for the exclusive use of physical plant personnel need not comply with this requirement.

450.3.14.7 Administrative and other staff only areas shall be provided with outside air at the minimum rate of 20 cfm (9.43 L/s) per person, and the central system shall have a minimum of 30 percent ASHRAE dust spot efficiency filter.

450.3.14.8 7.2 All outdoor air intakes shall be located a minimum of 3 feet (0.91 m) above surrounding surfaces and a minimum of 10 feet (3.05 m) horizontally from any exhaust air or plumbing vent. This requirement shall take priority over referenced standards.

450.3.14.9 All filters in systems in excess of 1,000 cfm (28.32 m³/min) capacity shall be installed with differential pressure gauges. The filter gauge shall have the range of acceptable filter operation clearly and permanently indicated.

450.3.14.10 Filter housings for MERV 13 efficiency filters shall be fully gasketed and sealed with mechanical latching devices capable of exerting and maintaining a continuous, uniform sealing pressure on the filter media when in the latched, closed position.

450.3.14.11 7.3 The transfer of air quantities through one space to an adjacent space is not permitted except that the transfer of air to maintain space relative pressure by the under cutting of doors is permitted. The maximum

allowable air quantity for door undercuts shall be 75 cfm (35.38 L/s) for single door widths up to 44 inches (1117 mm).

~~450.3.14.12 Space relative pressure requirements shall be maintained throughout the entire system control range where variable volume systems are utilized.~~

~~450.3.14.13 Spaces having exhaust hoods shall have sufficient make-up supply air such that the required pressure relationship will not be affected by the operation of the hood.~~

450.3.14.14 7.4 All supply, return and exhaust ventilation fans shall operate continuously. Dietary hood, laundry area, administrative areas that are separated from all resident areas and support areas and maintenance area supply and exhaust fans shall be exempted from continuous operation.

450.3.14.15 7.5 Cooling coil condensate shall be piped to a roof drain, floor drain or other approved location.

450.3.14.16 7.6 Each new resident sleeping room or resident sleeping area that is separated by a permanent partition and door shall be provided with a separate thermostat to provide individual adjustment of room or area temperature.

450.3.15-8 Exhaust. (See the Guidelines for additional requirements)

450.3.15-1 8.1 Exhaust fans and other fans operating in conjunction with a negative duct system pressure shall be located at the discharge end of the system. Fans located immediately within the building located at the end of all exhaust ducts shall be permitted. Existing, nonconforming systems need not be brought into compliance when equipment is replaced due to equipment failure.

450.3.15-2 8.2 Exhaust hoods in food preparation areas shall be listed or certified by a nationally recognized testing laboratory (NRTL).

450.3.16 9 Ducts. (See the Guidelines for additional requirements)

450.3.16 9.1 All new facility construction shall have totally ducted supply, return, exhaust and outside air systems including areas of all occupancy classifications.

~~450.3.16.2~~ 9.2 In new construction, duct system risers penetrating more than one floor shall be installed in vertical fire-rated shafts. Horizontal offsets of the risers shall not be allowed. Fire/smoke dampers shall be installed at duct penetrations of the chase. Existing nonconforming systems shall be brought into compliance when remodel or renovation work is proposed.

~~450.3.17~~ 10 Fan and damper control during fire alarm (See the Guidelines for additional requirements)

~~450.3.17~~ 10.1 During an automatic fire alarm or the activation of a duct smoke detector, fan systems and fan equipment serving more than one room shall be stopped to prevent the movement of smoke by mechanical means from the zone in alarm to adjacent smoke zones.

~~450.3.17~~ 10.2 Air-handling and fan coil units serving exit access corridors for the zone in alarm shall shut down upon fire alarm.

~~450.3.17~~ 10.3 Smoke or fire/smoke dampers shall close upon fire alarm and upon manual shutdown of the associated supply, return or exhaust fan.

~~450.3.18~~ 11 Plumbing (See the Guidelines for additional requirements)

~~450.3.18.1 All plumbing fixtures provided in spaces shall conform to the requirements of Table 450.3.18.1 of plumbing fixtures and minimum trim.~~

~~450.3.18.2 The temperature of hot water supplied to resident and staff use lavatories, showers and bath shall be between 105°F (41°C) and 115°F (46°C) at the discharge end of the fixture.~~

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~~450.3.18.3 Wall-mounted water closets, lavatories, drinking fountains and hand-washing facilities shall be attached to floor-mounted carriers and shall withstand an applied vertical load of a minimum of 250 pounds (113.39 kg) to the front of the fixture.~~

~~450.3.18.4~~ 11.1 Grease interceptors shall be located outside of the building.

~~450.3.18.5~~ 11.2 Provide deep seal traps for floor drains in resident showers.

~~450.3.18.6~~ 11.3 Food preparation sinks, pot washing, dishwashers, janitor sinks, floor drains, and cart and can wash drains shall run through the grease trap. Garbage disposers shall not run through the grease trap.

~~450.3.18.7~~ 11.4 Ice machines, rinse sinks, dishwashers, and beverage dispenser drip receptacles shall be indirectly wasted.

~~450.3.18.8~~ 11.5 Each water service main, branch main, riser and branch to a group of fixtures shall have valves. Stop valves shall be provided for each fixture. Panels for valve access shall be provided at all valves.

~~450.3.18.9~~ Backflow preventers (vacuum breakers) shall be installed on bedpan-rinsing attachments, hose bibs and supply nozzles used for connection of hoses or tubing in housekeeping sinks and similar applications.

~~450.3.18.10~~ 11.5 A backflow preventer shall be installed on the facility main water source(s).

~~450.3.18.11~~ 11.6 All piping, except control-line tubing, shall be identified. All valves shall be tagged, and a valve schedule shall be provided to the facility owner for permanent record and reference.

450.3.11.7 If eye wash stations are provided, they shall be installed in accordance with American National Standards Institute (ANSI) Z358.1 for Emergency Eyewash and Shower Equipment.

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~~450.3.19~~ 12 Medical gas and vacuum systems. (See the Guidelines for additional requirements) ~~450.3.19.1~~ Provide If provided, a medical gas and vacuum system shall be in conformance with the requirements for a nursing Home Category 2 Building System as described in NFPA 99, Health Care Facilities Code.

~~450.3.19.2~~ Provide a dedicated area for the location of the oxygen system emergency supply source with an impervious, nonecombustible, nonpetroleum-based surface located adjacent to the emergency low pressure gaseous oxygen inlet connection. Provision shall be made for securing the vessel to protect it from accidental damage.

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450.3.20-13 Fire pump. (Where required.)

450.3.20.1 Fire pumps and ancillary equipment shall be separated from other functions by construction having a 2-hour fire resistance rating. Where required by another section of this code, a new 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. 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.

450.3.20.2 The fire pump normal service disconnect shall be rated to hold locked rotor current. If the approved normal service disconnect is located on the exterior, it shall be supervised by connection to the fire pump remote annunciator and shall provide a separate fire alarm system trouble indication.

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450.3.20.3 When the fire pump is placed on the emergency system in addition to the normal supply, the emergency feeder protective device shall be sized in accordance with maximum rating or settings of Chapter 27 of the Florida Building Code, Building.

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450.3.20.4 The fire pump transfer switch may be either manual or automatic. If located on the line side of the controller as a separate unit, the switch must be rated for the pump motor locked rotor current indefinitely and must be located in the pump room.

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450.3.20.5 Combination fire pump controller and transfer switch units listed by the Underwriter's Laboratories, Inc., as prescribed by Chapter 27 of the Florida Building Code, Building are acceptable when the transfer switch has exposable and replaceable contacts, not circuit breaker types, rated for the available short-circuit current.

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450.3.20.6 The fire pump shall be installed in a readily accessible location. When it is located on the grade level floor, there shall be direct access from the exterior.

450.3.24 14 Electrical requirements (See the Guidelines for additional requirements)

450.3.24-14.1 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.

~~450.3.24~~ 14.2 For purposes of ~~this section 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 considered reviewed as a "general patient care area"~~ basic care room or space as described defined in NFPA 99 Health Care Facilities Code and Chapter 27, Electrical Systems, of this 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.

~~450.3.24~~ 14.3 Panels located in spaces subject to storage 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.

~~450.3.24~~ 14.4 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.

~~450.3.24~~ 14.5 There shall be documentation for equipotential grounding in all patient care areas, building service ground electrode systems, lightning protection ground terminals and special systems such as fire alarm, nurse call, paging, generator, emergency power and breaker coordination.

~~450.3.22~~ 15 Lighting (See the Guidelines for additional requirements)

~~450.3.22~~ 15.1 All spaces occupied by people, machinery and equipment within buildings, approaches to buildings and parking lots shall have electric lighting.

~~450.3.22~~ 15.2 Resident bedrooms shall have general lighting from ceiling mounted fixtures, floor lamp fixtures or table mounted fixtures. Separate fixed night lighting shall be provided. The night-light shall have a switch at the entrance to each resident's room or separate sleeping area. A reading light shall be provided for each resident. Resident reading lights and other fixed lights not switched at the door shall have switch controls convenient for use at the luminary. Wall-mounted switches for control of lighting in resident areas shall be of quiet operating type.

~~450.3.22~~ 15.3 All lighting in the resident use areas including corridors, shared spaces, treatment areas, sleeping areas, social areas and living areas shall meet the recommendations of ANSI/IES RP-28-07 Lighting and the Visual Environment for Senior Living as referenced in Chapter 35 of this code.

~~450.3.22~~ 15.4 All general resident room lighting and all corridor lighting used by residents shall be designed to minimize glare such as indirect lighting.

450.3.23 Receptacles—

450.3.23.1 ~~Provide one general purpose duplex receptacle on another wall to serve each resident and one additional duplex receptacle at the head of the bed if a motorized bed is provided.~~

450.3.23.2 Duplex receptacles for general use shall be installed in all general purpose corridors, approximately 50 feet (15.24 m) apart and within 25 feet (7.52 m) of corridor ends.

450.3.24 16 Fire alarm systems.

450.3.24 16.1A fire alarm annunciator panel shall be provided at a single designated 24-hour monitored location. The panel shall indicate visually, the zone of actuation of the alarm and audibly and visually system trouble. ~~As a minimum, devices located in each smoke compartment shall be interconnected as a separate fire alarm zone. Annunciator wiring shall be supervised. The annunciator shall clearly indicate the zone location of the alarm. Each smoke compartment shall be annunciated as a separate fire alarm zone. A fire alarm system zone shall not include rooms or spaces in other smoke compartments, and shall be limited to a maximum area of 22,500 square feet (2090m²). Provide an adjacent~~ A zone location map to quickly locate alarm condition shall be provided at the fire alarm control panel.

450.3.16.2 In all resident care rooms, spaces and areas, including sleeping, treatment, diagnostic, and therapeutic, the design and installation of the private operating mode fire alarm using visual signaling instead of audible signaling, 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.

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.

450.3.25-17 Nurse call systems. 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 ~~be~~ have been tested and approved by a national 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.

450.3.25 17.1 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. 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 multicorridor nursing units, corridor zone lights shall be installed at corridor intersections in the vicinity of staff work areas.

~~450.3.25~~ 17.2 An 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.

~~450.3.25~~ 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.

~~450.3.25~~ 17.4 Activation of an emergency call shall not cancel a normal call from the same room.

~~450.3.25~~ 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.

~~450.3.26~~ 18 Essential electrical system.

~~450.3.26~~ 18.1 A Type 1 essential electrical system shall be provided in all new nursing homes as described in NFPA 99, Health Care Facilities. The emergency power for this system shall meet the requirements of a Level 1, Type 10, Class 48 generator as described in NFPA 110, Standard for Emergency and Standby Power Systems.

~~450.3.26~~ 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.

450.3.26 ~~18.3~~ The There shall be a generator remote alarm annunciator in accordance with the requirements of NFPA 110 ~~shall be~~ located at a designated on-site 24-hour staffed location.

450.3.26.4 ~~Switches for critical branch lighting shall be completely separate from normal switching. Critical branch switches may 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.~~

450.3.26.5 ~~18.4~~ There shall be selected life safety lighting provided at a minimum of 1 footcandle (10 lux) illumination of the means of egress in accordance with NFPA 101 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. 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.

450.3.26.6 ~~18.5~~ 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.~~

450.3.26.7 ~~18.6~~ 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 derangement panel~~ generator remote alarm annunciator as described in section 450.3.18.3

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

450.3.26.9 ~~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.~~

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450.3.27 Lightning protection.

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

450.3.27.2 Where additions are constructed to existing buildings, the existing building's lightning protection system, if connected to the new lightning protection system, shall be inspected and brought into compliance with current standards.

450.3.27.3 There shall be surge protection for all normal and emergency electrical services.

450.3.27.4 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 appropriate IEEE Standards for the type of equipment protected.

450.3.27.5 All low-voltage system main or branch circuits entering or exiting the structure shall have surge suppressors installed for each pair of conductors and shall have visual indication for protector failure to the maximum extent feasible.

TABLE 450.3.18.1

PLUMBING FIXTURES AND MINIMUM TRIM

NOTES:

1. ~~Mixing valves used in shower applications shall be of the balanced pressure type design.~~
2. ~~If eye wash stations are provided, they shall be installed in accordance with American National Standards Institute (ANSI) Z358.1 for Emergency Eyewash~~
~~and Shower Equipment.~~

ROOM/FUNCTION FIXTURE, FITTING, AND TRIM

Barber and beauty G-6

Bed pan sanitizer K-7

Clean utility room C-2

Per resident floor I-5

Eye wash station(s) L-5

Exam/treatment room A-2

Housekeeping/janitor's closet E-6

~~Laundry A-1; H-1~~

~~Medication preparation room C-2~~

~~Nourishment room C-2~~

~~Staff handwashing facilities C-2~~

~~Resident baths J-1~~

~~Resident bedrooms with three or more beds A-1~~

~~Resident room bath A-1; B-4; J-1~~

~~Resident toilet rooms A-1; B-4~~

~~Soiled utility room(s) D-2; F-3 AND 4; K-5~~

~~Therapy areas A-2~~

~~Toilet rooms, public A-1; B-5~~

~~FIXTURE LEGEND~~

~~A. Lavatory G. Sink, shampoo~~

~~B. Water closet H. Sink, laundry~~

~~C. Sink, single compartment I. Electric drinking fountain or water with cup dispenser~~

~~D. Sink, double compartment J. Bathing Facilities or shower (Note 1)~~

~~E. Sink or receptor, janitor K. Sanitizer w/ rinse water at 140°F (60°C) or chemical rinse. (If required by the functional program of the facility.)~~

~~F. Sink, clinical service and rinsing device L. Eye wash fixtures~~

~~FIXTURE LEGEND~~

~~1. Hot and cold supplies~~

~~2. Hot and cold supplies with wrist blades from 3 1/2 inches (89 mm) to 4 1/2 inches (114 mm) in length or foot or knee control and a gooseneck~~

~~spout with discharge a minimum of 5 inches (127 mm) above the fixture rim~~

~~3. Hot and cold supplies with elbow blades a minimum of 6 inches (152 mm) long or foot or knee control~~

~~4. Bedpan rinsing attachment, cold water only (If required by the functional program of the facility.)~~

~~5. Cold supply~~

6. Hot and cold supplies with hose connection and backflow preventer

7. Hot water supply

(SP6990)

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Alternate Language

2nd Comment Period

6990-A9	Proponent	skip gregory	Submitted	6/4/2016	Attachments	Yes
	Rationale	This comment adds the correct year edition of ANSI Z 358.1				
	Fiscal Impact Statement					
	Impact to local entity relative to enforcement of code	There is no impact				
	Impact to building and property owners relative to cost of compliance with code	There is no impact				
	Impact to industry relative to the cost of compliance with code	There is no impact				
	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	Adds edition to the standard				
	Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction	Improves the code				
6990-A7	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				
	Is the proposed code modification part of a prior code version?	No				

Alternate Language

6990-A7	Proponent	skip gregory	Submitted	2/25/2016	Attachments	Yes
	Rationale	Adds call button to exam rooms for resident care				
	Fiscal Impact Statement					
	Impact to local entity relative to enforcement of code	no impact				
	Impact to building and property owners relative to cost of compliance with code	no impact				
	Impact to industry relative to the cost of compliance with code	no impact				
	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, safety, and 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, and provides equivalent or better products, methods, or systems of construction				
6990-A6	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 of demonstrated capabilities				
	Does not degrade the effectiveness of the code	Does not degrade the effectiveness of the code				
	Is the proposed code modification part of a prior code version?	No				

Alternate Language

6990-A6	Proponent	skip gregory	Submitted	2/25/2016	Attachments	Yes
	Rationale	Adds requirement for accessibility for all resident beds				
	Fiscal Impact Statement					
	Impact to local entity relative to enforcement of code	no impact				
	Impact to building and property owners relative to cost of compliance with code	no impact				
	Impact to industry relative to the cost of compliance with code					

no impact

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, safety, and 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, and provides equivalent or better products, methods, or systems of construction

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 of demonstrated capabilities

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code

Is the proposed code modification part of a prior code version? No

Alternate Language

6990-A5

Proponent skip gregory

Submitted

2/25/2016

Attachments

Yes

Rationale

450.3.14.2: The codes have been revised and now provide an additional category of room and areas. This revision more closely fits those new definitions in NFPA 99. The NFPA 70 (NEC) 2014 edition will also have those same categories of room and areas and if the 2014 or later edition of the NEC is to be adopted by this code, both the NEC and NFPA 99 could be referenced. Right now the 2012 edition of NFPA 99 is out of sync with the 2011 edition of the NEC. 450.3.16.1 The NFPA 101 may adopt a larger smoke compartment size the next edition up to 40,000 SF. This revision simply deletes the smoke compartment size as that is provide by other sections of the FBC and the LSC. 450.3.16.2 This revision clarifies the requirement to use the Private Operating Mode as described in NFPA 72. It does not require anymore or less than what is in NFPA 72.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Has no impact

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

Has no impact

Impact to industry relative to the cost of compliance with code

Has no impact

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

is reasonable

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

strengthens

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

Is the proposed code modification part of a prior code version? No

450.3 Additional physical plant requirements for nursing homes. In addition to the codes and standards referenced in Section 450.2 the following minimum standards of construction and specified minimum essential facilities shall apply to

all new nursing homes, and all additions, alterations or renovations to an existing licensed nursing home, as described in Section 450.1 and listed in this section.

450.3.1 Special Considerations:

450.3.1.1 Nursing homes designed to serve only for children 0 through 20 years of age may have a maximum room capacity of four persons.

450.3.1.1 Skilled Nursing Units that are part of a hospital and licensed as a hospital bed but certified as a skilled nursing bed shall meet the requirements for a Skilled Nursing Unit in the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities.

-

~~450.3.1 Alternate design models. Because nursing homes may provide care utilizing two basic organizational models, two alternate design models are permitted to meet some of the specific physical plant requirements of this~~

~~section. These alternate design models, the institutional design model and the household design model for person centered care, are described in Sections 450.3.2.1 and 450.3.2.2 of this code and are further defined by the physical~~

~~plant requirements for each model as described in the applicable paragraphs of Section 450.3.~~

-

~~450.3.1.1 Either one or both of these design models may be used in the design of the nursing home as described by the functional program of the facility.~~

-

~~450.3.1.2 An institutional design model may utilize specific physical plant requirements of a household design model without being required to incorporate all of the household design elements.~~

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~~450.3.1.3 Where no alternate design model is permitted, all nursing homes shall meet the described requirement.~~

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~~450.3.2 Resident unit. Each resident unit shall consist of the resident rooms and support areas, and shall be arranged to avoid unnecessary and unrelated travel~~

~~through the unit. It shall be designed to meet the organizational patterns of staffing, functional operations, and care programs as described in the functional program of the facility. Based on these aspects of the functional program,~~

~~the resident unit may be designed to meet one of the following models:~~

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~~450.3.2.1 Institutional design model. This model is based on an institutionalized medical program similar in arrangement to that found in some hospitals. If this~~

~~model is utilized for the design of the resident unit, it shall consist of the resident rooms, nurse station(s), and resident support areas and services as described in Section 450.3.4.1. Dining, activity, and social areas may be centralized and located away from the resident unit.~~

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~~450.3.2.1.1 Each resident unit shall be limited to a maximum of 60 beds.~~

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~~450.3.2.1.2 Travel distance from the entrance to a nurses' station, and from a clean utility and a soiled utility room(s) or function(s) to the middle of the entrance door of the farthest resident room served shall be a maximum of 150 feet (45.72 m).~~

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~~450.3.2.2 Household design model for person-centered care. This model is based on a home-like environment similar in arrangement to that found in a~~

~~typical home. If this model is utilized for the design of the resident unit, it shall consist of the resident rooms and resident support areas and services as described in Section 450.3.4.2. Dining, activity, and social areas shall be decentralized and included within the resident household.~~

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~~450.3.2.2.1 Each resident household (unit) shall be limited to a maximum of 20 residents.~~

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~~450.3.2.2.2 Two individual resident households (units) may be grouped into a distinct neighborhood with a maximum of 40 residents. This neighborhood,~~

~~composed of the two resident households, may share the required resident support areas and services as described in Section 450.3.4.2.~~

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~~450.3.2.2.3 If an access corridor is utilized as part of this design, it shall be designed to include an open resident sitting and resting area(s) located along the~~

corridor at least every 100 feet (30.48 m) of corridor length.

450.3.32 Resident rooms. In addition to the requirements of the Guidelines, Chapter 3.2, Each resident room shall meet the following minimum standards:

450.3.32.1 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.

~~450.3.3.2 Nursing homes designed to serve only for children 0 through 20 years of age may have a maximum room capacity of four persons.~~

~~450.3.3.3 Where renovation work of an existing resident room alters the physical configuration of the room and the present capacity of the room is more than two~~

~~persons, the maximum room capacity shall be no more than two persons at the conclusion of the renovation.~~

450.3.3.4.2 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).

450.3.3.5.2.3 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. ~~Clear floor area is as described in Section 450.3.3.4.~~

450.3.3.6.2.4 For planning purposes, a full-size bed is assumed to be 3 feet 6 inches (1.07 m) wide by 8 feet (2.43 m) long.

~~450.3.3.7 A 3 feet (0.91 m) wide clear access space to each bed shall be provided along at least 75 percent of the length of one side of the bed and shall be designed to allow access for the use of a wheelchair and other portable equipment.~~

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~~450.3.3.8 For a bed equipped with a piped in medical gas headwall unit, there shall be a minimum of 3 feet clearance (0.91 m) along the entire length of the bed between both sides and foot of the bed and any other bed, wall or any other fixed obstruction.~~

~~450.3.3.9 The dimensions and arrangement of each resident room shall be such that at least two bed locations are designed to accommodate resident personal choice. All such alternate bed locations shall meet the clearance~~

~~requirements of Section 450.3.3.7 and shall be designed so the bed will not obstruct access to the supporting utilities serving the bed including the nurse call~~

~~station, individual reading lamp or fixture, and the required electrical outlets that provide service for the bed or other equipment. In a double occupancy resident~~

~~room, only one bed must meet this requirement and any bed equipped with a piped in medical gas headwall unit shall meet the requirements of Section 450.3.3.8 and is exempt from this requirement.~~

~~450.3.3.10 The configuration of each resident room shall be designed to meet one of the following models:~~

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~~450.3.3.10.1 Institutional design model. If a double occupancy resident room is designed where the beds are located side by side, there shall be a minimum clearance of 3 feet (0.91 m) between both sides of each bed and any wall or any other fixed furniture, fixed obstruction or adjacent bed for at least 75 percent of the length of the bed, and a clearance of 3 feet 8 inches (1.11 m) to any fixed furniture, fixed obstruction, or adjacent bed at the foot of each bed to permit the passage of equipment or beds.~~

~~450.3.3.10.1.1 At a minimum, visual privacy shall be provided for each person by the installation of flame-retardant cubicle curtains or equivalent built-in devices.~~

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~~450.3.3.10.1.2 2.4 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.~~

~~450.3.3.10.2 Household design model for person centered care. Individual resident sleeping areas in a double occupancy resident room shall be separated from each other by a full height wall or a permanently installed sliding or folding door or partition that provides visual privacy for each person. 450.3.3.10.2.1 Either doors or cubicle curtains to these individual resident sleeping areas shall be provided.~~

~~450.3.3.10.2.2 The design for privacy shall not restrict resident access at any time to the room entrance, resident armchair, toilet room, bathroom, window, wardrobe, or closet.~~

~~450.3.3.11 Each resident room shall be provided with a bedside table or equivalent furniture, a reading lamp, a well-constructed appropriate bed, and a nonfolding type armchair for each individual resident. As determined by the functional program of the facility, there shall be a number of over-bed tables available to bed restricted residents.~~

~~450.3.3.12 2.4 Each new resident room, and each individual resident sleeping area, as described in Section 450.3.3.10.2 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. except when a cubicle curtain is closed. 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 450.3.3.10.2 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 driveway parking areas or property line measured horizontally from the plane of the window.~~

~~450.3.3.13 A handwashing facility complete with mixing faucet shall be provided within each resident toilet room and within each resident room that shares a toilet room with another resident room. Separate resident sleeping areas, as described in Section 450.3.3.10.2, do not constitute a separate resident room.~~

~~450.3.3.14 Each resident shall have access to a toilet room without having to enter the general corridor area or another resident bed area in a double occupancy resident room. One toilet room shall serve no more than two residents and no more than two resident rooms. A plumbing connection for a rinsing device shall be provided at the resident toilet within each resident toilet room unless the functional program provides a method for disposing of bedpans, urinals, and emesis basins after each and every use and is approved by AHCA.~~

~~450.3.3.15 The door to the toilet room shall be side hinged, and either swing out from the toilet room or be equipped with emergency release hardware. A sliding door equipped with sliding door hardware located on the resident room side of the wall and not equipped with a bottom door track shall be permitted. Unless otherwise required by this code, the door shall be at least 32 inches (813 mm) in clear width opening. The toilet room door that swings open into the resident room shall not impede the swing of any other door that opens into the resident room.~~

~~450.3.3.16 Each resident room shall be provided with a wardrobe or closet for each resident. Each wardrobe or closet shall have minimum inside dimensions of 1 foot 10 inches (0.55 m) in depth by 2 feet 6 inches (0.58 m) in width. Each wardrobe or closet shall be accessible to the resident at all times and shall have an adjustable shelf(s) and an adjustable clothes rod that is adjustable in a maximum of 4 inches~~

(10.16 cm) increments from 4 feet (1.22 m) to 5 feet 8 inches (1.73 m) above finished floor or higher as wardrobe or closet size permits. When the wardrobe or closet is designed to meet the requirements for accessibility in accordance with the Florida Building Code, Accessibility, it shall include additional accessible storage area(s) for full-length garments. The shelf may be omitted if the clothing unit provides at least two drawers. Locked storage for a resident's personal items shall be provided within the resident sleeping room if required by the functional program.

450.3.43 Resident support areas and services. The size and features of each resident support area will depend upon the number and type of residents served. The resident support areas shall be located inside of or readily accessible to each resident unit. The support areas and services shall be designed in accordance with one of the following design models.

450.3.4.1 Institutional design model.

450.3.4.13.3.1 Staff work area(s) (nurse station). (See the Guidelines for requirements) A central and/or decentralized staff work area(s) shall be provided. Where a centralized staff work model is utilized it shall have space for supervisory administrative work activities, charting, and storage. The minimum area required shall be equal to 2 square feet (0.19 m²) for each resident bed served. Where a decentralized staff work model is utilized it shall provide for charting or transmitting charted data and for any storage of administrative activities.

450.3.4.13.3.2 Clean utility room. (See the Guidelines for requirements) A clean utility or clean holding room for storage and distribution of clean supply materials shall be provided. If the room is used for preparing resident care items, it shall contain a work counter, a hand washing facility, and storage facilities for clean and sterile supplies. If the room is used only for storage and holding as a part of a system for distribution of clean and sterile supply materials, the work counter and handwashing facility requirements may be omitted. The minimum size of the room shall be 60 square feet (5.57 m²).

450.3.4.1.3 A clean linen storage room, closet or area shall be provided. This area may be located within the clean utility or clean holding room. It shall be large enough to accommodate the storage of linen carts. If in compliance with the Florida Fire Prevention Code a closed cart system may be used and stored in an alcove open to the corridor.

450.3.4.1.4 3.3 A soiled utility or soiled holding room(s) shall be provided. (See the Guidelines for requirements) The soiled utility function shall be comprised of a flushing rim clinical service sink or deep bowl utility fixture with bedpan rinsing device, a double compartment sink, soiled linen receptacles, waste receptacles and a work counter with a usable minimum work surface area of 6 square feet (0.56 m²). The total minimum size of the function shall be 80 square feet (7.43 m²) and may be allocated among several soiled utility or soiled holding rooms. Rooms used only for the holding of soiled materials need contain only a handwashing facility.

~~450.3.4.1.5 3.4 Medication storage and distribution. (See the Guidelines for requirements) A medicine preparation room or a self-contained medicine dispensing unit shall be provided for the provision of medication storage and distribution.~~

~~450.3.4.1.5.1 If a medicine preparation room is utilized, it shall be equipped with a lockable door, have a minimum area of 50 square feet (4.55 m²) and shall contain a refrigerator, locked storage for controlled drugs, a handwashing facility, and a work counter with a minimum of 6 square feet (0.56 m²) of work surface.~~

~~450.3.4.1.5.2 If a self-contained medicine dispensing unit is utilized, it shall be under the visual control of the staff and may be located at the nurses' station, in the clean utility room, in an alcove, or in other spaces convenient for staff control provided the area occupied by the unit does not encroach upon required minimum areas. The dispensing unit may be used in a medicine preparation room as locked storage for controlled drugs within the minimum area of 50 square feet (4.55 m²); however, the standard "cup sinks" provided in many self-contained units shall not be a substitute for the required handwashing facility.~~

~~450.3.4.1.5.3 If there is no linen storage in the clean utility room, medicine preparation may be part of the clean utility room, in which case an additional 20 square feet (1.8 m²) dedicated for this purpose shall be required. A refrigerator shall also be required if medicine preparation is included in this room.~~

~~450.3.4.1.6 3.5 A nourishment room (See Resident and Participant Kitchen in the Guidelines for requirements) for serving nourishments between meals shall be provided that shall contain a work counter, refrigerator, storage cabinets, and sink.~~

~~450.3.4.1.6.1 3.6 Ice for residents' consumption (See the Guidelines for requirements) shall be provided by an icemaker unit that may serve more than one nourishment station if the nourishment stations are in close proximity to each other. Where the icemaker unit is accessible to residents or the public, it shall be a self-dispensing type.~~

~~450.3.4.1.6.2 The nourishment room shall include space for trays and dishes used for nonscheduled meal service. Hand-washing facilities shall be in or immediately accessible from the nourishment room.~~

~~450.3.4.2 Household design model for person-centered care.~~

450.3.4.2.1 The functions of administrative work, charting and storage may be located among several separate direct care staff work areas located within the resident household. The administrative work area(s) shall be designed and located so it is not visually or physically separated from the normal use areas of residents and family members.

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450.3.4.2.2 A clean utility or clean holding room, as described in Section 450.3.4.1.2, shall be provided but may be sized in accordance with the functional program and allocated among several rooms or closets within the resident household.

450.3.4.2.3 A clean linen storage room, closet or area shall be provided in accordance with Section 450.3.4.1.3 and shall be located within the resident household.

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450.3.4.2.4 A soiled utility or soiled holding room as described in Section 450.3.4.1.4 shall be provided but may be sized in accordance with the functional program and allocated among several rooms or closets within the resident household.

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450.3.4.2.5 A medicine preparation room or a self contained medicine dispensing unit as described in Section 450.3.4.1.5 shall be provided. Non-controlled prescription drugs may be stored inside the resident's sleeping room, area, or toilet room if they are secured inside of an automatic closing and automatic locking dispensing unit that is secured in place.

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450.3.4.2.6 A nourishment room as described in Section 450.3.4.1.6 shall be provided but resident dietary facilities as described in Section 450.3.8.1.13 may substitute for this function.

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450.3.4.3 The following resident support areas, utilities, or services shall be provided in all nursing homes. Unless specifically required, these support areas may be either within the nursing unit, adjacent to the nursing unit or on the same floor as the nursing unit.

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450.3.4.3.1 An equipment storage room(s) shall be provided for storage of nursing unit equipment. The minimum area required shall be equal to 2 square feet (0.19 m²) for each resident, with no room being less than 20 square feet (1.86 m²) in area.

450.3.4.3.2 A housekeeping room(s) shall be provided for storage and use of housekeeping supplies and equipment.

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450.3.4.3.3 If required by the functional program of the facility, a hot water or chemical type sanitizer shall be provided per facility.

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450.3.4.3.4 Storage alcove space for a wheelchair(s) shall be provided in an area located out of the required means of exit egress.

450.3.4.3.5 Resident bathing facilities.

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

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450.3.4.3.5.2 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. This toilet may also serve as a toilet training facility.

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450.3.4.3.5.3 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.

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450.3.4.3.5.4 If the institutional design model is utilized, in addition to bathing facilities connected to the resident rooms, residents shall have access to at least one bathing room per floor or unit sized to permit assisted bathing in a tub or shower. The bathtub in this room shall be accessible to residents in wheelchairs and if a shower is used it shall be large enough to accommodate a person in a recumbent position. Other tubs or showers located within the bathing room shall be located inside of individual rooms or curtained enclosures with space for private use of the bathing fixture, for drying and dressing and access to a grooming location containing a sink, mirror and counter or shelf. If every resident sleeping room has a bathing room directly connected to it that is equipped with a 3 feet x 5 feet (0.914 m x 1.52 m) roll in shower, the central bathing room shall be as required by the functional program.

450.3.4.3.5.5 If the household design model for person-centered care is utilized, in addition to the bathing facilities connected to the resident rooms, residents within each household shall have access to at least one bathing room located in or directly adjacent to the household and sized to permit assisted bathing in a tub or shower. This bathing room may be shared between two households if it is located so that it is directly adjacent to each household. The bathtub in this room shall be accessible to residents in wheelchairs and if a shower is used it shall be large enough to accommodate a person in a recumbent position. Other tubs or showers located within the bathing room shall be located inside of individual rooms or curtained enclosures with space for private use of the bathing fixture, for drying and dressing and access to a grooming location containing a sink, mirror and counter or shelf. If every resident sleeping

room has a bathing room directly connected to it that is equipped with a 3 feet x 5 feet (0.914 m x 1.52 m) roll-in shower, the central bathing room shall be as required by the functional program.

450.3.5 ~~4~~ Resident living, social, and treatment areas. (See the Guidelines for additional requirements)

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450.3.5 ~~4.1~~ Dining, lounges, recreation areas, and social areas for residents shall be provided. The total area of these spaces shall be a minimum of 35 square feet (3.25 m²) per bed with a minimum total area of 225 square feet (20.90 m²). At least 20 square feet (1.86 m²) per resident shall be available for dining. Additional space may be required for resident day care programs. Storage for supplies and equipment shall be provided in the recreation area.

450.3.5.1.1 ~~If the institutional design model is utilized, these areas may be grouped together and centrally located.~~

450.3.5.1.2 ~~If a household design model for person centered care is utilized, these areas shall be decentralized and provided within each resident household or can be shared between a maximum of two households.~~

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450.3.5.1.3 ~~4.2~~ (See the Guidelines for additional requirements) Storage for supplies, and resident needs, and recreation shall be provided. ~~This area~~ Storage shall be on site but not necessarily in the same building as the resident rooms, provided access is convenient. The minimum required area shall be 5 square feet (0.46 m²) per ~~bed~~ resident up to 600 square feet (55.74 m²).

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450.3.5.2 ~~4.3~~ (See the Guidelines for additional requirements) Outdoor area(s) shall be provided for the use of all residents and shall include walking paths of durable materials, benches, shaded areas, and visual focusing element(s) such as landscaping, sculpture, or fountain(s). Security fencing if used shall be of a residential design and provide some visual connection to the exterior of the secured area. If an exterior visual connection is not possible or desirable then the interior of the outside area shall be landscaped to be visually interesting.

450.3.5.3 ~~If required by the functional program of the facility, physical, speech, and occupational therapy units shall be provided and contain the following.~~

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450.3.5.3.1 ~~Space for files, records and administrative activities.~~

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~~450.3.5.3.2 Provisions for storage of wheelchairs.~~

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~~450.3.5.3.3 Storage for supplies and equipment.~~

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~~450.3.5.3.4 Hand washing facilities within the therapy unit.~~

~~450.3.5.3.5 Space and equipment for carrying out each of the types of therapy that the facility will provide.~~

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~~450.3.5.3.6 Provisions for resident privacy.~~

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~~450.3.5.3.7 Housekeeping rooms, in or near the unit.~~

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~~450.3.5.3.8 Resident toilet room(s) usable by wheelchair residents.~~

450.3.5.4.4 (See the Guidelines for additional requirements) A barber/beauty room shall be provided with facilities and equipment for resident hair care and grooming. The area of the room shall be a minimum of 120 square feet (11.15 m²) with the least dimension of 10 feet (3.05 m).

~~450.3.6 Staff support areas.~~

~~450.3.6.1 If required by the functional program of the facility, a staff lounge area(s) shall be provided. It may be shared by multiple resident units if the lounge is located so it is accessible without requiring the user to enter into or through any other resident unit.~~

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~~450.3.6.2 A staff toilet room with hand washing facilities shall be provided conveniently located to each resident unit.~~

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~~450.3.6.3 Lockable closets, drawers or compartments shall be provided on the resident unit for staff and may be located in the lounge for safekeeping of staff personal effects.~~

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450.3.6.4 A conference or consultation room for resident and family use shall be provided and may be shared between resident units.

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450.3.7 Administrative and public area. Each administrative and public area shall meet the following standards:

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450.3.7.1 A covered vehicular drop-off and pedestrian entrance that is located at grade level and that provides shelter from inclement weather shall be provided.

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450.3.7.2 An administrative/lobby area shall be provided that shall include a counter or desk for reception and information, a public waiting area. This function may be located in a separate building on the campus of the facility. Public toilet facilities, a public telephone and an electric drinking fountain for this area shall be provided in accordance with the Florida Building Code, Plumbing. Residents shall have access to toilet facilities in public areas.

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450.3.7.3 General offices shall be provided for business transactions, admissions, social services, private interviews, medical and financial records, and administrative and professional staff. Clerical files and staff office space shall be provided as needed. At a minimum there shall be a private office for the administrator and director of nursing.

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450.3.7.4 At least one multipurpose room per nursing home facility shall be provided for conferences, meetings, and health education purposes, and shall include provisions for the use of visual aids. This room may be remotely located on the campus and shall have a minimum area of 120 square feet (11.15 m²).

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450.3.7.5 Storage for office equipment and supplies shall be provided.

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450.3.8 Facility support areas. Each facility support area shall meet the following standards:

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450.3.8.1 Facility dietary. A facility dietary area shall be provided for dietary service to residents and others as may be appropriate. No part of the kitchen area may be used as a pass through to the linen/laundry area. The facility dietary area shall contain the following facilities, in the size and number appropriate for the type of food service selected:

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~~450.3.8.1.1 Storage space, including cold storage, for at least a seven-day supply of food shall be provided.~~

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~~450.3.8.1.2 Food preparation facilities for cook to serve, cook to chill or a proprietary system of food preparation and adequate space and equipment for production shall be provided.~~

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~~450.3.8.1.3 Employee dining and serving lines shall not be permitted in the dietary facilities area.~~

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~~450.3.8.1.4 Hand washing facilities shall be conveniently located in the food preparation area.~~

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~~450.3.8.1.5 Facilities for assembly and distribution of resident meals shall be provided.~~

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~~450.3.8.1.6 Ware washing space shall be located in a room or an alcove separate from the food preparation and serving area. Commercial type ware washing equipment shall be provided. Space shall also be provided for receiving, scraping, sorting, and stacking soiled tableware and for transferring clean tableware to the use areas. Convenient handwashing facilities shall be available on the soiled dish side of the ware washing area.~~

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~~450.3.8.1.7 Pot washing facilities shall be provided.~~

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~~450.3.8.1.8 Storage areas and cleaning facilities for cans, carts, and mobile tray conveyors shall be provided.~~

~~450.3.8.1.9 An office for the food service manager shall be provided.~~

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~~450.3.8.1.10 A toilet, handwashing facility and lockers for dietary staff shall be located within the dietary facilities area. A vestibule shall be provided between the toilet and the kitchen.~~

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~~450.3.8.1.11 A housekeeping room located within the dietary facilities area shall be provided and shall include a service sink and storage space for housekeeping equipment and supplies.~~

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~~450.3.8.1.12 An icemaker unit shall be provided and may be located in the food preparation area or in a separate room.~~

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450.3.8.1.13 If the household design for the person centered care model is utilized and if required by the functional program, a resident dietary area including cooking equipment, counter tops, kitchen sink, and storage areas shall be provided within the resident household for the use by staff, residents, and family. The cooking equipment shall be designed or secured in such a way to insure resident safety and shall meet all applicable fire safety codes. This dietary area may substitute for the nourishment requirement of Section 450.3.4.2.5.

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450.3.8.2 Facility laundry. A facility laundry area shall be provided that shall have provisions for the storing and processing of clean and soiled linen for appropriate resident care. Processing may be done within the facility, in a separate building on or off site, or in a commercial or shared laundry. Where soiled linen is processed as part of a facility laundry area, at a minimum, the following elements shall be included:

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450.3.8.2.1 A separate room for receiving and holding soiled linen until ready for pickup or processing shall be provided. Discharge from soiled linen chutes may be received within this room or in a separate room. A handwashing facility and a utility sink shall be provided.

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450.3.8.2.2 A central, clean linen storage and issuing room(s), in addition to the linen storage required at the nursing units shall be provided.

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450.3.8.2.3 Parking of clean and soiled linen carts in separate areas from each other and out of traffic shall be provided.

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450.3.8.2.4 Hand washing facilities in each area where untagged, soiled linen is handled shall be provided.

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450.3.8.2.5 When linen is processed off site, a service entrance protected from inclement weather for loading and unloading of linen shall be provided.

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450.3.8.2.6 When linen is processed in a laundry facility located on site, the following additional elements shall be provided:

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450.3.8.2.6.1 A laundry processing room(s), separated by walls from other elements of the laundry, with commercial-type laundry equipment for washing and drying. Walls separating the functions of washing and drying are not required.

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450.3.8.2.6.2 Storage for laundry supplies.

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450.3.8.2.6.3 Arrangement of the laundry processes shall generally provide for an orderly workflow from dirty to clean to minimize cross traffic that might mix clean and soiled operations.

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450.3.8.2.7 If the household design model for person-centered care is utilized and if required by the functional program, resident laundry facilities including washing and drying equipment shall be provided for staff, family or individual resident use for the laundering only of a resident's personal items. If these laundry facilities are provided, they shall be readily accessible from each resident household without requiring the user to enter another resident unit, or floor and may be shared between two resident households. These resident laundry facilities shall not have to meet the requirements of the facility laundry described in Section 450.3.8.2 and may utilize residential laundry equipment. Each resident laundry room or area shall contain a handwash facility and if required by the functional program a single deep bowl utility sink.

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450.3.9 Housekeeping rooms/janitor's closets.

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450.3.9.1 Housekeeping rooms or janitor's closets shall be provided throughout the facility as required to maintain a clean and sanitary environment, but not less than one housekeeping room/janitor's closet shall be provided for each floor in addition to the housekeeping room required in the facility dietary area. Each room has storage space for housekeeping equipment and supplies. A service sink shall be provided in at least one housekeeping room or janitor's closet on each floor.

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450.3.10 Engineering service and equipment areas.

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450.3.10.1 Room(s) or separate building(s) for boilers, mechanical and electrical equipment shall be provided as required.

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450.3.10.2 Room(s) for the storage of building maintenance supplies and solvents shall be provided. On-site safe and secure storage for the facility drawings, records and manuals shall be provided.

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450.3.10.3 A general maintenance area for repair and maintenance shall be provided as required.

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~~450.3.10.4 Yard equipment and supply storage room, if provided, shall be located so that equipment may be moved directly to the exterior.~~

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450.3.14 5 Details and finishes (See the Guidelines for additional requirements).

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~~450.3.11.1 Potential hazards such as sharp corners, loose laid rugs or carpets, shall not be permitted.~~

450.3.14.2 5.1 Doors to all rooms containing bathtubs, showers, and water closets for resident use located in double occupancy rooms or are shared between two single occupancy rooms, shall be equipped with privacy hardware that permits emergency access without the use of keys. When such room has only one entrance and is equipped with a swing door, the door shall open outward, or be equipped with emergency release hardware. When emergency release hardware is utilized on a swing door located in a public area, it shall provide visual privacy for the resident and if required by other sections of this code, be smoke resistive. The toilet room door that swings open into the resident room shall not impede the swing of any other door that opens into the resident room.

450.3.14.3 5.2 Interior corridor doors, except those to small closets, janitor's closets, electrical or mechanical rooms, housekeeping closets and other small rooms not subject to occupancy, shall not swing into the corridor. A door located on the exit access corridor, and required to swing outward, shall open into an alcove.

450.3.14.4 5.3 A sliding door equipped with sliding hardware located on the resident room side of the wall and without a bottom track shall be permitted on an individual resident toilet or bathroom. If a sliding door is used on a resident toilet or bathroom, a D-shaped handle at least 4 inches (10.16 cm) long shall be provided to open the door.

450.3.14.5 5.4 Door thresholds, except where required at exterior doors, and expansion joint covers shall be designed to facilitate use of wheelchairs and carts and to prevent tripping and shall provide a smooth and level transition from surface-to-surface.

~~450.3.11.6 All resident room windows shall have a minimum net glazed area of not less than 8 percent of the gross floor area of the room or bed area served. Operable windows are not required but if they are provided they shall be equipped with insect screens.~~

~~450.3.11.7 Handrails shall be provided on both sides of all corridors that are defined by walls and normally used by residents. Mounting height shall be between 36 inches (0.91 m) and 42 inches (1.07 m). A clearance of 11/2 inches (38 mm) shall be provided between the handrail and the wall. Handrails shall~~

be designed without sharp corners, edges or hardware and shall permit easy grasping by the resident with a maximum diameter of 1.5 inches (38 mm). It shall be designed to provide a profile with a surface wide enough for the resident to be able to lean on the rail to rest. Rail ends shall return to the wall.

450.3.11.8 Grab bars, 1 1/2 inches (38 mm) in diameter, either permanent or flip down, shall be installed in all resident showers, tubs, and baths and on any two sides of all resident use toilets. Wall mounted grab bars shall provide an 1 1/2 inch (38 mm) clearance from walls and shall sustain a concentrated load of 250 pounds (113.4 kg). Where flip down grab bars are used, the toilet does not need to be located within 18 inches (455 mm) of an adjacent wall, except as required by the Florida Building Code, Accessibility.

450.3.11.9 Each resident handwashing facility shall have a mirror unless prohibited by the nursing program. Mirror placement shall allow for convenient use by both wheelchair occupants and ambulatory persons. Tops and bottoms may be at levels usable by individuals either sitting or standing. Additional mirrors may be provided for wheelchair occupants, or one separate fulllength mirror located in the resident room may be provided to meet the needs of wheelchair occupants.

450.3.11.10 Provisions for soap dispensing and hand drying shall be included at all handwashing facilities. Those in resident use areas shall be paper or cloth towels enclosed to protect against dust or soil and shall be single unit dispensing. 450.3.11.11 Reserved.

450.3.11.12 5.5 Towel bars shall be provided at each bathing facility.

450.3.11.13 All resident use plumbing fixtures and door operating hardware shall be equipped with levertype hardware for easy gripping and turning.

450.3.11.14 5.6 Toilet compartment partitions and urinal screens shall be constructed of product that do not rust, corrode or delaminate.

450.3.11.15 The minimum ceiling height throughout the facility shall be 8 feet (2.44 m) above the finished floor with the following exceptions:

450.3.11.15.1 Steam boiler and hot water generator rooms shall have ceiling clearances of at least 2 feet 6 inches (0.76 m) above the main header and connecting pipe.

~~450.3.11.15.2 Ceilings in storage rooms, resident room entrance vestibules and toilet rooms shall be at least 7 feet 6 inches (2.33 m) above the finished floor.~~

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~~450.3.11.15.3 Ceilings in normally unoccupied spaces and alcoves may be reduced to 7 feet (2.13 m) above the finished floor.~~

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~~450.3.11.15.4 Ceilings in exit access corridors and exit passageways shall be a minimum of 8 feet (2.44 m) above the finished floor.~~

~~450.3.11.16 5.7 In addition to the electric drinking fountain or water and cup dispenser in the administrative/lobby area in Section 450.3.7.2, a A minimum of one electric drinking fountain or water and cup dispenser shall be provided per resident floor unless drinking water is available from the resident dietary area.~~

~~450.3.11.17 Floor material shall be readily cleanable and appropriate for the location. Floor surfaces in resident use areas shall be nonglossy to minimize glare. If composition floor tiles are used, the interstices shall be tight.~~

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~~450.3.11.17.1 In residential care and sleeping areas, a base shall be provided at the floor line.~~

~~450.3.11.17.2 Floors in areas used for food preparation and assembly shall be water resistant. Floor surfaces, including tile joints, shall be resistant to food acids. In all areas subject to frequent wet cleaning methods, floor materials shall not be physically affected by germicidal cleaning solutions.~~

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~~450.3.11.17.3 Floors subject to traffic while wet, such as shower and bath areas, kitchens, and similar work areas, shall have a slip-resistant surface and floor-to-base intersections shall be watertight.~~

~~450.3.11.17.4 Carpet and padding in resident areas shall be stretched tight, in good repair and free of loose edges or wrinkles that might create hazards or interfere with the operation of wheelchairs, walkers or wheeled carts.~~

~~450.3.11.18 Wall finishes shall be washable and, if near plumbing fixtures, shall be smooth and have a moisture-resistant finish. Finish, trim, walls, and floor constructions in dietary and food storage areas shall be free from rodent and insect harboring spaces.~~

~~450.3.11.18.1 Basic wall construction in areas not subject to conditioned air shall be constructed of masonry, cement plaster or moisture-resistant gypsum wallboard.~~

~~450.3.11.18.2 The finishes of all exposed ceilings and ceiling structures in the dietary facilities area shall be readily cleanable with routine housekeeping equipment.~~

~~450.3.11.18.3 Highly polished walls or wall finishes that create glare shall be avoided.~~

~~450.3.11.18.4 5.8~~ Wall coverings that promote the growth of mold and mildew shall be avoided on exterior walls or on walls that are located in normally wet locations.

~~450.3.11.19 5.9 All smoke partitions, horizontal exits and exit passageway partitions shall be constructed prior to the construction of intervening walls.~~

All fire walls, smoke barriers, horizontal exits and exit passageway partitions shall be constructed prior to the construction of all intervening walls. Where rated walls, barriers or partitions intersect, the continuity of the higher priority wall, barrier, or partition shall be maintained through the intersection.

~~450.3.11.20 5.10 Smoke barriers shall be constructed so as to provide a continuous smoke-tight membrane from exterior wall to exterior wall and from the floor to the underside of the deck above. This includes interstitial space and the area above solid fire-tested membranes.~~

Smoke barriers shall be constructed so as to provide a continuous smoke-tight membrane from exterior wall to exterior wall and from the floor to the

underside of the floor or roof deck above. This includes interstitial space and the area above monolithic fire-rated ceiling membranes. Roof trusses shall be permitted to penetrate portions of the smoke barrier located above the fire-rated ceiling membrane where the annular space between the penetrating truss member and the smoke barrier is sealed to limit the transfer of smoke.

~~450.3.11.24 5.11~~ Where it is not possible to visually inspect a fire-rated partition, wall or barrier or a smoke barrier that extends through the attic or interstitial space to the roof or floor deck above because of the location of a monolithic ceiling membrane, ceiling access panel(s) shall be installed adjacent to each side of the partition, wall or barrier at intervals not exceeding 30 feet (9.0 m) and in such locations as necessary to view all surfaces of the partition, fire wall or smoke barrier. Other ceiling access panels shall only be installed as required by other sections of the code. Partitions, walls and barriers requiring protected openings or penetrations shall be identified in accordance with Section 703 of this code.

~~450.3.11.22-5.12~~ Where electrical conduits, cable trays, ducts and utility pipes pass through the smoke partition, the utilities shall be located so that access is maintained to adjacent wall surfaces and to all damper access panels. The details shall show the studs and reinforcing half studs so that proper support is provided for the wall surfacing material. There shall be a minimum clearance of 4 inches (102 mm) between all conduits, piping, and duct work insulation that are located parallel or adjacent to a fire wall or to a smoke barrier at corridor walls to facilitate the inspection of these walls.

450.3.12 6 Elevators. ~~(Where required.)~~ (See the Guidelines for additional requirements) 450.3.12.1 All buildings having resident use areas on more than one floor shall have hospital-type electric or hydraulic elevator(s) that shall be in compliance with the requirements of Chapter 30 of this code and Chapter 69A-47, Florida Administrative Code, Uniform Fire Safety Standards for Elevators.

~~450.3.12.2 In the absence of an engineered traffic study, the minimum number of elevators shall be as follows:~~

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~~450.3.12.2.1 At least one elevator shall be installed where resident beds are located on any floor other than the main entrance floor.~~

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~~450.3.12.2.2 When 60 to 200 resident beds are located on floors other than the main entrance floor, at least two elevators, one of which shall be of the hospital type and capacity, shall be installed.~~

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~~450.3.12.2.3 When 201 to 350 resident beds are located on floors other than the main entrance floor, at least three elevators, two of which shall be of the hospital type and capacity, shall be installed.~~

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~~450.3.12.2.4 For facilities with more than 350 resident beds above the main entrance floor, the number of elevators shall be determined from a facility plan study and from the estimated vertical transportation requirements.~~

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~~450.3.12.3 Cars of elevators shall have inside dimensions that accommodate a resident bed with attendants. Cars shall be at least 5 feet (1.52 m) wide by 7 feet 6 inches (2.29 m) deep. The car door shall have a clear opening of not less than 4 feet (1.22 m).~~

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~~450.3.12.4 Elevator call buttons shall not be activated by heat or smoke. If employed, light beam door activators shall be used in combination with door edge safety devices and shall be connected to a system~~

of smoke detectors such that the light control feature will disengage or be overridden if it encounters smoke at any landing.

450.3.13 Water supply and sewage disposal.

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450.3.13.1 An approved, accessible, adequate, safe and potable supply of water shall be provided. The water supply shall be accessible and available at all times for drinking, fire protection, culinary, bathing, cleaning and laundry purposes.

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450.3.13.2 Hot water shall be supplied to all lavatory and sink plumbing fixtures available for use by residents and staff.

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450.3.13.3 An approved, adequate and safe method of sewage collection, treatment and disposal shall be provided for each nursing home.

450.3.14 7 Heating, ventilating and air-conditioning (HVAC) systems. (See the Guidelines for additional requirements) In addition to the basic HVAC system requirements as described by Part 6, ANSI/ASHRAE/ ASHE Standard 170-2008, Ventilation of Health Care Facilities of The Guidelines, the following specific elements are also required.

450.3.14.1 Mechanical equipment shall be defined as equipment utilized in air conditioning, heating, ventilating systems and associated electrical, electronic and pneumatic components required for the mechanical equipment to provide the function intended by the application of the equipment. New and existing equipment replacements shall comply with these requirements.

450.3.14.2 7.1 Mechanical equipment shall be installed exterior of the building, to include the roof, in a designated equipment room(s), or in a space(s) located in an attic(s). Air-handling equipment shall be installed exterior of the building, to include the roof, in a designated equipment room(s), in an open space(s) of an attic(s) or interstitial space(s) located inside the conditioned envelop of the building, or in an enclosed space located in an unconditioned attic(s). If the equipment serves only one room, it may be located above the ceiling and shall be accessible through an access opening in accordance with the requirements of such openings in this code. Access panels are not required for lay-in ceiling installations, provided the service functions are not obstructed by other above-ceiling construction, such as electrical conduits, piping, audio visual cabling and like equipment components or supports.

450.3.14.3 If the unit serves only one room, it may be located above the ceiling and shall be accessible through an access opening in accordance with this code. Access panels are not required for lay-in ceiling

installations, provided the service functions are not obstructed by other above ceiling construction, such as electrical conduits, piping, audio visual cabling and like equipment components or supports.

450.3.14.4 Ventilation shall be provided by mechanical means in all rooms in new facilities and in all renovated or remodeled rooms. The minimum air quantities and filtration efficiencies shall be met as set forth in Part 6 of The Guidelines and Table 4.1-1, Ventilation Requirements for Areas Affecting Resident Care in Nursing Homes of The Guidelines for those spaces that are listed.

450.3.14.5 For spaces listed in the minimum ventilated rate table, central station type air handling equipment shall be used. Package terminal air conditioning units or fan coils may be used to serve resident rooms and shall be provided with MERV 8 filters minimum.

450.3.14.6 System designs utilizing fan coil or package terminal air conditioning units shall have the outdoor air ventilation damper permanently closed. The ventilation requirement shall be satisfied by a central station type air handling unit provided with MERV 8 filter minimum or as required by the listed space served. Spaces designated for the exclusive use of physical plant personnel need not comply with this requirement.

450.3.14.7 Administrative and other staff only areas shall be provided with outside air at the minimum rate of 20 cfm (9.43 L/s) per person, and the central system shall have a minimum of 30 percent ASHRAE dust spot efficiency filter.

450.3.14.8 7.2 All outdoor air intakes shall be located a minimum of 3 feet (0.91 m) above surrounding surfaces and a minimum of 10 feet (3.05 m) horizontally from any exhaust air or plumbing vent. This requirement shall take priority over referenced standards.

450.3.14.9 All filters in systems in excess of 1,000 cfm (28.32 m³/min) capacity shall be installed with differential pressure gauges. The filter gauge shall have the range of acceptable filter operation clearly and permanently indicated.

450.3.14.10 Filter housings for MERV 13 efficiency filters shall be fully gasketed and sealed with mechanical latching devices capable of exerting and maintaining a continuous, uniform sealing pressure on the filter media when in the latched, closed position.

450.3.14.11 7.3 The transfer of air quantities through one space to an adjacent space is not permitted except that the transfer of air to maintain space relative pressure by the under cutting of doors is

permitted. The maximum allowable air quantity for door undercuts shall be 75 cfm (35.38 L/s) for single door widths up to 44 inches (1117 mm).

~~450.3.14.12 Space relative pressure requirements shall be maintained throughout the entire system control range where variable volume systems are utilized.~~

~~450.3.14.13 Spaces having exhaust hoods shall have sufficient make-up supply air such that the required pressure relationship will not be affected by the operation of the hood.~~

450.3.14.14 7.4 All supply, return and exhaust ventilation fans shall operate continuously. Dietary hood, laundry area, administrative areas that are separated from all resident areas and support areas and maintenance area supply and exhaust fans shall be exempted from continuous operation.

450.3.14.15 7.5 Cooling coil condensate shall be piped to a roof drain, floor drain or other approved location.

450.3.14.16 7.6 Each new resident sleeping room or resident sleeping area that is separated by a permanent partition and door shall be provided with a separate thermostat to provide individual adjustment of room or area temperature.

450.3.15 8 Exhaust. (See the Guidelines for additional requirements)

450.3.15.1 8.1 Exhaust fans and other fans operating in conjunction with a negative duct system pressure shall be located at the discharge end of the system. Fans located immediately within the building located at the end of all exhaust ducts shall be permitted. Existing, nonconforming systems need not be brought into compliance when equipment is replaced due to equipment failure.

450.3.15.2 8.2 Exhaust hoods in food preparation areas shall be listed or certified by a nationally recognized testing laboratory (NRTL).

450.3.16 9 Ducts. (See the Guidelines for additional requirements)

~~450.3.16~~ 9.1 All new facility construction shall have totally ducted supply, return, exhaust and outside air systems including areas of all occupancy classifications.

~~450.3.16.2~~ 9.2 In new construction, duct system risers penetrating more than one floor shall be installed in vertical fire-rated shafts. Horizontal offsets of the risers shall not be allowed. Fire/smoke dampers shall be installed at duct penetrations of the chase. Existing nonconforming systems shall be brought into compliance when remodel or renovation work is proposed.

~~450.3.17~~ 10 Fan and damper control during fire alarm (See the Guidelines for additional requirements)

~~450.3.17~~10.1 During an automatic fire alarm or the activation of a duct smoke detector, fan systems and fan equipment serving more than one room shall be stopped to prevent the movement of smoke by mechanical means from the zone in alarm to adjacent smoke zones.

~~450.3.17~~10.2 Air-handling and fan coil units serving exit access corridors for the zone in alarm shall shut down upon fire alarm.

~~450.3.17~~10.3 Smoke or fire/smoke dampers shall close upon fire alarm and upon manual shutdown of the associated supply, return or exhaust fan.

~~450.3.18~~ 11 Plumbing (See the Guidelines for additional requirements)

~~450.3.18.1~~ All plumbing fixtures provided in spaces shall conform to the requirements of Table ~~450.3.18.1~~ of plumbing fixtures and minimum trim.

~~450.3.18.2~~ The temperature of hot water supplied to resident and staff use lavatories, showers and bath shall be between 105°F (41°C) and 115°F (46°C) at the discharge end of the fixture.

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~~450.3.18.3~~ Wall-mounted water closets, lavatories, drinking fountains and hand-washing facilities shall be attached to floor-mounted carriers and shall withstand an applied vertical load of a minimum of 250 pounds (113.39 kg) to the front of the fixture.

~~450.3.18.4~~11.1 Grease interceptors shall be located outside of the building.

~~450.3.18.5~~ 11.2 Provide deep seal traps for floor drains in resident showers.

~~450.3.18.6~~ 11.3 Food preparation sinks, pot washing, dishwashers, janitor sinks, floor drains, and cart and can wash drains shall run through the grease trap. Garbage disposers shall not run through the grease trap.

~~450.3.18.7~~ 11.4 Ice machines, rinse sinks, dishwashers, and beverage dispenser drip receptacles shall be indirectly wasted.

~~450.3.18.8~~ 11.5 Each water service main, branch main, riser and branch to a group of fixtures shall have valves. Stop valves shall be provided for each fixture. Panels for valve access shall be provided at all valves.

~~450.3.18.9~~ Backflow preventers (vacuum breakers) shall be installed on bedpan rinsing attachments, hose bibs and supply nozzles used for connection of hoses or tubing in housekeeping sinks and similar applications.

~~450.3.18.10~~ 11.5 A backflow preventer shall be installed on the facility main water source(s).

~~450.3.18.11~~ 6 All piping, except control-line tubing, shall be identified. All valves shall be tagged, and a valve schedule shall be provided to the facility owner for permanent record and reference.

450.3.11.7 If eye wash stations are provided, they shall be installed in accordance with American National Standards Institute (ANSI) Z358.1 for Emergency Eyewash and Shower Equipment.

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~~450.3.19~~ 12 Medical gas and vacuum systems. (See the Guidelines for additional requirements)

~~450.3.19.1~~ Provide If provided, a medical gas and vacuum system shall be in conformance with the requirements for a nursing Home Category 2 Building System as described in NFPA 99, Health Care Facilities Code.

~~450.3.19.2 Provide a dedicated area for the location of the oxygen system emergency supply source with an impervious, noncombustible, nonpetroleum-based surface located adjacent to the emergency low pressure gaseous oxygen inlet connection. Provision shall be made for securing the vessel to protect it from accidental damage.~~

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450.3.20.13 Fire pump. (Where required.)

~~450.3.20.1 Fire pumps and ancillary equipment shall be separated from other functions by construction having a 2-hour fire-resistance rating. Where required by another section of this code, a new 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. 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.~~

~~450.3.20.2 The fire pump normal service disconnect shall be rated to hold locked rotor current. If the approved normal service disconnect is located on the exterior, it shall be supervised by connection to the fire pump remote annunciator and shall provide a separate fire alarm system trouble indication.~~

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~~450.3.20.3 When the fire pump is placed on the emergency system in addition to the normal supply, the emergency feeder protective device shall be sized in accordance with maximum rating or settings of Chapter 27 of the Florida Building Code, Building.~~

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~~450.3.20.4 The fire pump transfer switch may be either manual or automatic. If located on the line side of the controller as a separate unit, the switch must be rated for the pump motor locked rotor current indefinitely and must be located in the pump room.~~

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~~450.3.20.5 Combination fire pump controller and transfer switch units listed by the Underwriter's Laboratories, Inc., as prescribed by Chapter 27 of the Florida Building Code, Building are acceptable when the transfer switch has exposable and replaceable contacts, not circuit breaker types, rated for the available short-circuit current.~~

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~~450.3.20.6 The fire pump shall be installed in a readily accessible location. When it is located on the grade level floor, there shall be direct access from the exterior.~~

450.3.24 14 Electrical requirements (See the Guidelines for additional requirements)

~~450.3.24~~ 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.

~~450.3.24~~ 14.2 For purposes of this section, a resident room, a resident therapy area or an examination room shall be considered a "general patient care area" as described in NFPA 99 Health Care Facilities Code, and Chapter 27, Electrical Systems, of this code.

~~450.3.24~~ 14.3 Panels located in spaces subject to storage 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.

~~450.3.24~~ 14.4 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.

~~450.3.24~~ 14.5 There shall be documentation for equipotential grounding in all patient care areas, building service ground electrode systems, lightning protection ground terminals and special systems such as fire alarm, nurse call, paging, generator, emergency power and breaker coordination.

~~450.3.22~~ 15 Lighting (See the Guidelines for additional requirements)

~~450.3.22~~ 15.1 All spaces occupied by people, machinery and equipment within buildings, approaches to buildings and parking lots shall have electric lighting.

~~450.3.22~~ 15.2 Resident bedrooms shall have general lighting from ceiling mounted fixtures, floor lamp fixtures or table mounted fixtures. Separate fixed night lighting shall be provided. The night-light shall have a switch at the entrance to each resident's room or separate sleeping area. A reading light shall be provided for each resident. Resident reading lights and other fixed lights not switched at the door shall have switch controls convenient for use at the luminary. Wall-mounted switches for control of lighting in resident areas shall be of quiet operating type.

450.3.2215.3 All lighting in the resident use areas including corridors, shared spaces, treatment areas, sleeping areas, social areas and living areas shall meet the recommendations of ANSI/IES RP-28-07 Lighting and the Visual Environment for Senior Living as referenced in Chapter 35 of this code.

450.3.22 15.4 All general resident room lighting and all corridor lighting used by residents shall be designed to minimize glare such as indirect lighting.

450.3.23 Receptacles —

450.3.23.1 ~~Provide one general purpose duplex receptacle on another wall to serve each resident and one additional duplex receptacle at the head of the bed if a motorized bed is provided.~~

450.3.23.2 ~~Duplex receptacles for general use shall be installed in all general purpose corridors, approximately 50 feet (15.24 m) apart and within 25 feet (7.52 m) of corridor ends.~~

450.3.24 16 Fire alarm systems.

450.3.24 16.1 A fire alarm annunciator panel shall be provided at a single designated 24-hour monitored location. The panel shall indicate visually, the zone of actuation of the alarm and audibly and visually system trouble. ~~As a minimum, devices located in each smoke compartment shall be interconnected as a separate fire alarm zone. Annunciator wiring shall be supervised. The annunciator shall clearly indicate the zone location of the alarm. Each smoke compartment shall be annunciated as a separate fire alarm zone. A fire alarm system zone shall not include rooms or spaces in other smoke compartments and shall be limited to a maximum area of 22,500 square feet (2090 m²). Provide an adjacent~~ A zone location map to quickly locate alarm condition shall be provided at the fire alarm control panel.

450.3.16.2 In all resident care rooms, spaces and areas, including sleeping, treatment, diagnostic, and therapeutic, the private operating mode using visual signaling instead of audible signaling, 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.

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.

450.3.25-17 Nurse call systems. 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 be have been tested and approved by a national 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.

450.3.25 17.1 A nurse call system shall be provided that will register a call 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. 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 multicorridor nursing units, corridor zone lights shall be installed at corridor intersections in the vicinity of staff work areas.

450.3.25 17.2 An emergency calling station of the pull cord-type shall be provided and shall be conveniently located for resident use at each 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.

450.3.25 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.

450.3.25 17.4 Activation of an emergency call shall not cancel a normal call from the same room.

450.3.25 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.

450.3.26-18 Essential electrical system.

450.3.26-18.1 A Type 1 essential electrical system shall be provided in all new nursing homes as described in NFPA 99, Health Care Facilities. The emergency power for this system shall meet the requirements of a Level 1, Type 10, Class 48 generator as described in NFPA 110, Standard for Emergency and Standby Power Systems.

450.3.26 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.

450.3.26 18.3 ~~The~~ There shall be a generator remote alarm annunciator in accordance with the requirements of NFPA 110 ~~shall be~~ located at a designated on-site 24-hour staffed location.

450.3.26.4 ~~Switches for critical branch lighting shall be completely separate from normal switching. Critical branch switches may 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.~~

450.3.26.5 18.4 There shall be ~~selected life safety lighting provided at a minimum of 1 footcandle (10 lux) illumination of the means of egress in accordance with NFPA 101 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. 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.~~

450.3.26.6 18.5 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.~~

450.3.26.7 18.6 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 derangement panel~~ generator remote alarm annunciator as described in section 450.3.18.3

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

~~450.3.26.9 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.~~

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450.3.27 Lightning protection.

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

450.3.27.2 Where additions are constructed to existing buildings, the existing building's lightning protection system, if connected to the new lightning protection system, shall be inspected and brought into compliance with current standards.

450.3.27.3 There shall be surge protection for all normal and emergency electrical services.

450.3.27.4 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 appropriate IEEE Standards for the type of equipment protected.

450.3.27.5 All low-voltage system main or branch circuits entering or exiting the structure shall have surge suppressors installed for each pair of conductors and shall have visual indication for protector failure to the maximum extent feasible.

TABLE 450.3.18.1

PLUMBING FIXTURES AND MINIMUM TRIM

NOTES:

- ~~1. Mixing valves used in shower applications shall be of the balanced-pressure type design.~~
- ~~2. If eye wash stations are provided, they shall be installed in accordance with American National Standards Institute (ANSI) Z358.1 for Emergency Eyewash~~

and Shower Equipment.

ROOM/FUNCTION FIXTURE, FITTING, AND TRIM

Barber and beauty G-6

Bed pan sanitizer K-7

Clean utility room C-2

Per resident floor I-5

Eye wash station(s) L-5

Exam/treatment room A-2

Housekeeping/janitor's closet E-6

Laundry A-1; H-1

Medication preparation room C-2

Nourishment room C-2

Staff handwashing facilities C-2

Resident baths J-1

Resident bedrooms with three or more beds A-1

Resident room bath A-1; B-4; J-1

Resident toilet rooms A-1; B-4

Soiled utility room(s) D-2; F-3 AND 4; K-5

Therapy areas A-2

Toilet rooms, public A-1; B-5

FIXTURE LEGEND

A. Lavatory G. Sink, shampoo

B. Water closet H. Sink, laundry

C. Sink, single compartment I. Electric drinking fountain or water with cup dispenser

D. Sink, double compartment J. Bathing Facilities or shower (Note 1)

E. Sink or receptor, janitor K. Sanitizer w/ rinse water at 140°F (60°C) or chemical rinse. (If required by the

~~functional program of the facility.)~~

~~F. Sink, clinical service and rinsing device L. Eye wash fixtures~~

~~FIXTURE LEGEND~~

~~1. Hot and cold supplies~~

~~2. Hot and cold supplies with wrist blades from 3 1/2 inches (89 mm) to 4 1/2 inches (114 mm) in length or foot or knee control and a gooseneck~~

~~spout with discharge a minimum of 5 inches (127 mm) above the fixture rim~~

~~3. Hot and cold supplies with elbow blades a minimum of 6 inches (152 mm) long or foot or knee control~~

~~4. Bedpan rinsing attachment, cold water only (If required by the functional program of the facility.)~~

~~5. Cold supply~~

~~6. Hot and cold supplies with hose connection and backflow preventer~~

~~7. Hot water supply~~

450.3.24 14.2 For purposes of this section 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 considered reviewed as a "general patient care area" basic care room or space as described defined in NFPA 99 Health Care Facilities Code and Chapter 27, Electrical Systems, of this 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.

450.3.24 16.1A fire alarm annunciator panel shall be provided at a single designated 24-hour monitored location. The panel shall indicate visually, the zone of actuation of the alarm and audibly and visually system trouble. As a minimum, devices located in each smoke compartment shall be interconnected as a separate fire alarm zone. Annunciator wiring shall be supervised. The annunciator shall clearly indicate the zone location of the alarm. Each smoke compartment shall be annunciated as a separate fire alarm zone. A fire alarm system zone shall not include rooms or spaces in other smoke compartments, and shall be limited to a maximum area of 22,500 square feet (2090m²). Provide an adjacent A zone location map to quickly locate alarm condition shall be provided at the fire alarm control panel.

450.3.16.2 In all resident care rooms, spaces and areas, including sleeping, treatment, diagnostic, and therapeutic, the design and installation of the private operating mode fire alarm using visual signaling instead of audible signaling, 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.

450.3.25 ~~17.1~~ 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. 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 multicorridor nursing units, corridor zone lights shall be installed at corridor intersections in the vicinity of staff work areas.

450.3.25 ~~17.2~~ An 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.

450.3.11.7 If eye wash stations are provided, they shall be installed in accordance with American National Standards Institute (ANSI) Z358.1-2014 for Emergency Eyewash and Shower Equipment.

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Submitted**: 2

Total Mods for report: 8

Sub Code: Building

SP6936

3

Date Submitted	12/30/2015	Section	453.17.8	Proponent	Don Whitehead
Chapter	4	Affects HVHZ	No	Attachments	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments	Yes	Alternate Language	No
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Related Modifications

Summary of Modification

Require GFI receptacles in pre-kindergarten and kindergarten classrooms.

Rationale

To make the classroom safe.

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 material cost difference between a standard receptacle and a GFI receptacle is about \$10.00 per receptacle, which is very small relative to the cost of hospitalization. There is no labor cost difference between a standard receptacle and a GFI receptacle.

Impact to industry relative to the cost of compliance with code

Very small, since there is no labor cost difference and the material cost difference is minimal.

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

Installing GFI receptacles in pre-kindergarten and kindergarten classrooms will make the classrooms much safer.

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

This modification improves the code by requiring a better kind of product.

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

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

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period

Proponent	Bryan Holland	Submitted	5/12/2016	Attachments	No
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Comment:

I support the TAC recommendation to Approve as Submitted. GFCI protection of receptacle outlets has been proven to be one of the most effective ways to reduce shock and electrocution. This modification to the code will save lives and reduce the number injuries to children in the classroom setting.

SP6936-G2

1st Comment Period History

Proponent	Bryan Holland	Submitted	2/22/2016	Attachments	No
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Comment:

I fully support this proposed modification. GFCI protection of receptacle outlets has been proven to be one of the most effective ways to reduce shock and electrocution. This is especially true for small children in classroom and group settings.

SP6936-G1

Ground fault interrupter (GFI) receptacles. GFI receptacles shall be installed as required by NFPA 70 of Chapter 27 and in the following locations:

1. All elementary special needs, pre-kindergarten, and kindergarten classroom receptacles.
2. All building entry vestibule receptacles.
3. All mechanical, boiler and electrical room receptacles.

Date Submitted	11/6/2015	Section	35	Proponent	Bryan Holland
Chapter	35	Affects HVHZ	No	Attachments	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments**General Comments** Yes**Alternate Language** No**Related Modifications**

Yes. See Modification #6460

Summary of Modification

This modification updates and corrects the reference to the NFPA 780 - Standard for the Installation of Lightning Protection Systems.

Rationale

The 2004 NFPA 780 standard is three cycles behind the current 2014 edition. This modification will bring the installation of lightning protection systems, as required by Section 449, 450, 453, and Chapter 27, to the current national standard.

The 2014 NFPA 780 responds to industry developments with added coverage of new topics to increase protection against dangerous lightning hazards. Fully updated to reflect the latest protection methods, devices, and safety challenges, the 2014 NFPA 780 - Standard for the Installation of Lightning Protection Systems is essential for designers, installers, insurance professionals, AHJs, and anyone responsible for protecting lives and property from fire and related dangers associated with lightning events.

Underwriter's Laboratories offers lightning protection education for design professionals, installers, and enforcement officials. Systems installed under the provisions of NFPA 780 must be in compliance with UL96 and 96A. UL has been testing and certifying lightning protection equipment since 1908. UL issues inspection certificates for systems by inspecting system components and checking completed installations. Installations are required to comply with UL's internationally recognized Standards for lightning protection systems.

Fiscal Impact Statement**Impact to local entity relative to enforcement of code**

This modification has a minor impact on the local AHJ relative to enforcement of the code. Updating to the current standard ensures the regulatory process of permitting, plan review, and inspection are in line with the national standard and current practices in the field.

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

This modification ensures building and property owners are protected from lightning to the most current safety and product standards. This may reduce insurance premiums and the cost of downtime from a lightning strike or the cost of repair of lightning damaged systems and components.

Impact to industry relative to the cost of compliance with code

This modification does not increase the cost of compliance to the industry other than the cost to purchase the updated standard. However, it should be noted the NFPA offers the NFPA 780 to be viewed for free online.

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

This modification does not have a negative cost of compliance to small business. This modification ensures that small business entities are installing lightning protection systems to the current national standard.

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

The installation of lightning protection systems as required by the code or by choice should meet the most current national standard to ensure health, safety, and public welfare. Outdated standards do not contain the most current safety and product standards to properly protect the public.

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

This modification strengthens the code by bringing the installation of lightning protection systems to the current national standard. This includes better products, methods, and systems of construction.

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

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

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code but rather enhances the effectiveness of the code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?
YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?
NO

2nd Comment Period

SP6458-G3	Proponent	Bryan Holland	Submitted	5/12/2016	Attachments	No
	Comment: I support the TAC recommendation to Approve as Submitted. This modification to the code ensures lightning protection systems are installed to the most current edition of the nationally recognized consensus standard, which will result in a more effective and safe installation.					

1st Comment Period History

SP6458-G1	Proponent	Thomas Lasprogato	Submitted	2/3/2016	Attachments	No
	Comment: I SUPPORT					

1st Comment Period History

SP6458-G2	Proponent	Vincent Della Croce	Submitted	2/7/2016	Attachments	No
	Comment: Support					

NFPA

780-04 **14** Standard for the Installation of Lightning Protection Systems 449.3.15.1, 450.3.27.1, **453.17.7,**
2703.1

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **No Affirmative Recommendation with a Second**: 4

Total Mods for report: 8

Sub Code: Building

SP6623

5

Date Submitted	12/22/2015	Section	453.8.3	Proponent	Paul Coats
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

Removes construction type restrictions in Section 453 for public schools which conflict with construction type provisions for schools in Chapters 5 and 6 of the code.

Rationale

Whereas at one time these restrictions may have served a purpose, both the International Building Code and NFPA 5000 now have well established criteria for school buildings of Types III and V construction. They cover building size, fire resistance, fire sprinklers, fire alarm systems, means of egress, interior finishes, and many other safety features which work together to provide a safe environment for students.

Section 453 public school construction type restrictions are not related to safety and should therefore not be part of the state building code. Conflicting with Chapters 5 and 6 for other school buildings, they create a double standard for buildings of identical occupancy. Presumably this is based on the life expectancy or maintenance concerns of one state agency.

Of the very few states that have had similar restrictions, Arkansas, South Carolina, and Georgia have recently removed them from their school facilities manuals. Further, these never had restrictions in a state building code, but only by statute or policy.

Recent Florida state legislation requires that departures from the model building code must demonstrate a specific need of the state; it prohibits the code from discrimination against materials, methods, or systems of construction of demonstrated capability; and requires the elimination of obsolete, overly restrictive, and unnecessary regulations for schools. It should be incumbent on those desiring to retain these construction type restrictions for public schools to demonstrate the need for them.

Florida public school communities are foregoing significant advantages in cost, environmental sustainability, construction efficiency, energy savings, and desirable learning environments. The increase of smaller charter and community schools in recent years has heightened the need for these benefits. Approval of this proposal will greatly improve the code and remove barriers to these benefits for all school communities.

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

Cost savings. One study indicates a savings of between two and six dollars per square foot over post and beam steel structures.

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

Promotes welfare of communities through environmental sustainability, healthy learning environments, and economic benefits.
Does not diminish safety.

- Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**
Provides for equivalent safety, better environmental sustainability, improved efficiency of construction, and energy savings.
- Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**
Eliminates current discrimination against wood as a material of demonstrated capability when used in accordance with current model codes.
- Does not degrade the effectiveness of the code**
Does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period

SP6623-G8	Proponent	Paul Coats	Submitted	6/21/2016	Attachments	Yes
	Comment:	Please see attached uploaded General Comment				

1st Comment Period History

SP6623-G1	Proponent	Don Whitehead	Submitted	2/8/2016	Attachments	Yes
	Comment:	See attached file.				

1st Comment Period History

SP6623-G2	Proponent	William Telligman	Submitted	2/9/2016	Attachments	No
	Comment:	As a representative of the Southeastern Lumber Manufacturers Association, representing sawmills in throughout the Southeastern United States, including eight in Florida, I am writing in support of proposed code change SP6623-G2. From multi-family housing to tall wood buildings in large cities and school construction around the country, wood is being used as an environmentally friendly, economic and safe building material. As highlighted in the Rationale section of the proposed code modification, both international and national code bodies have recognized the safety of buildings constructed with wood when modern codes are adhered to in a proper manner. Not allowing the use of wood for school construction denies schools access to a safe, economic and environmentally friendly building product, while also hurting Florida's own wood products industry. I respectfully ask that the proposed code modifications be accepted.				

1st Comment Period History

SP6623-G3	Proponent	Caroline Dauzat	Submitted	2/9/2016	Attachments	No
	Comment:	As an owner of Rex Lumber with three sawmills, two of which are located in the panhandle of Florida, I am writing in support of proposed code change SP6623-G2. Wood is the most versatile and economical building material, being used in multi-family housing to tall wood buildings in large cities as well as school construction around the country. As highlighted in the Rationale section of the proposed code modification, both international and national code bodies have recognized the safety of buildings constructed with wood when modern codes are adhered to in a proper manner. Not allowing the use of wood for school construction denies schools access to a safe, economic and environmentally friendly building product, while also hurting our own wood products industry. Please accept the proposed code modifications.				

1st Comment Period History

SP6623-G4	Proponent	Alan Shelby	Submitted	2/18/2016	Attachments	No
	Comment:	As the Executive Vice President of the Florida Forestry Association, which represents all facets of the forest industry in Florida, I am writing in support of proposed code change SP6623-G2. Wood is safe, versatile, and cost efficient. It is used in a wide variety of construction projects, including schools around the country. Not allowing the use of wood for school construction denies our educational system access to a safe, economic and environmentally friendly building product, while also hurting our own wood products industry. On behalf of our more than 1300 members, I respectfully request that you accept the proposed code modifications.				

1st Comment Period History

Proponent	Montgomery Simpson	Submitted	2/18/2016	Attachments	Yes
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SP6623-G5

Comment:

Please see attached.

1st Comment Period History

Proponent	Steven Lieberman	Submitted	2/19/2016	Attachments	No
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SP6623-G6

Comment:

As an engineer for APA – The Engineered Wood Association, representing member manufacturers whose mills produce the majority of structural wood panel, glued laminated timber (glulam), wood I-joists, structural composite lumber and cross laminated timber products produced in North America, including the state of Florida, I am writing in support of the proposed code modification SP6623.

The Florida State Board of Education's ban on the use of wood in schools fails to recognize that wood structures are being engineered for all manner of structurally demanding situations including, but not limited to, tornado shelters. As a member of the design team, it is the job of the structural engineer to design a building to withstand the design loads specific to a given location. By leaving the choice of construction materials to the local school district and their designers, the overall cost of performance-qualified structural systems can be evaluated to determine the primary construction material that best meets the district's needs and budget, while still maintaining a high level of structural safety.

Today's wood school buildings are designed to be durable. They make use of decay-resistant or treated wood where needed and incorporate design details that provide layers of protection to help keep wood dry. Just as a structural engineer designs a wood building to resist local wind load requirements, the architect takes local conditions into account, such as high humidity, to design buildings that are both durable and long-lasting. The construction industry has many products available to the designer that, when properly designed and installed, protect buildings from bulk moisture problems whether they be constructed of wood, masonry or steel.

APA respectfully requests approval of Modification SP6623 as submitted.

Steve Lieberman, P.E.
Lithia, FL

1st Comment Period History

Proponent	Chris Mitton	Submitted	2/25/2016	Attachments	Yes
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SP6623-G7

Comment:

Please see attached.

453.8.3 Construction type. School board and Florida college buildings including auxiliary, ancillary and vocational facilities shall comply with the construction type provisions of the Florida Building Code. ~~the following:~~

~~**453.8.3.1 Noncombustible Type I, II or IV.** The minimum construction type for one- and two-story public educational facilities shall be noncombustible Type I, II or IV construction or better.~~

~~**453.8.3.1.1** Interior nonload-bearing wood studs or partitions shall not be used in permanent educational and auxiliary facilities or relocatable buildings.~~

~~**Exception:** Historic buildings to maintain the fabric of the historic character of the building.~~

~~**453.8.3.2 Type I.** Facilities three stories or more shall be Type I construction.~~

~~**453.8.3.3 Type IV.** When Type IV construction is used, wood shall be exposed and not covered by ceilings or other construction.~~

~~**453.8.3.4 Exceptions to types of construction:—**~~

- ~~1. — Covered walkways open on all sides may be Type V construction.~~
- ~~2. — Single story dugouts, press boxes, concession stands, related public toilet rooms, detached covered play areas, and nonflammable storage buildings that are detached from the main educational facility by at least 60 feet (1829 mm), may be Type V construction.~~

As staff to the State Board of Education, I would not be able to recommend acceptance of Modification SP6623. This code modification seeks to allow Type III and Type V construction, which would allow light weight wood construction in public educational facilities. Currently, the State Board of Education has not authorized light weight wood construction. This change proposes to eliminate a Florida-specific requirement that was adopted to promote the public health and safety of the schools in Florida. The ICC model codes do not take into account the unique situations in Florida as shown by the following explanations:

As directed by Section 1013.372 of the Florida Statutes, schools in Florida are often used as hurricane shelters. Hurricane shelters are required to meet much higher standards, to protect the occupants during a storm. These higher standards include design wind speeds in excess of 200 mph and missile impact speeds in excess of 80 mph. Using wood construction as the structure of a hurricane shelter would be very inefficient, because it would not only require more valuable classroom space, but it would require more taxpayer dollars.

Buildings constructed in Florida are vulnerable to termite damage and other wood destroying organisms, such as powderpost beetles and carpenter bees. Because the destruction is hidden below the surface, pest control inspections can only minimize the danger, but not completely eliminate it. Because concrete block is extremely durable, fire and termite resistant, and has a life expectancy of around 100 years, it is a popular building material in Florida. Because wood deteriorates more quickly with the high humidity in Florida, its life expectancy is about 25 years. Also, fire-retardant treated wood is expressly prohibited from being used in the construction of educational facilities by Rule 6A2.0010, of the Florida Administrative Code.

As an example of the potential hazard, allow me to share one school district's experience. Marion County School District was conducting an asbestos abatement of Anthony Elementary Cafetorium. During the asbestos abatement of the 9x9 floor tiles, one of the workers fell through the floor exposing the serious structural damage of the original wood floor framing system, which had been destroyed by powderpost beetles. Wood destroying organisms can cause structural failure without warning, and endanger the life safety of the occupants.

As staff to the State Board of Education, I urge the committee to not approve this code modification as submitted.

At Weyerhaeuser we are proud to manufacture 100% of our structural frame products in the U.S. and Canada from sustainably managed North American forests. We also bring many quality building products manufactured in the U.S. to market through our Distribution Centers. Since 1901 our forests, products and people have helped America build. We manufacture, distribute and sell Weyerhaeuser products from over 55 locations in the U.S. and Canada.

Weyerhaeuser supports comments submitted by American Wood Council proposed code change 6623.

Wood is an environmentally-friendly, energy-efficient building material approved for use in schools by the International Building Code (IBC). Safety and durability are critically important in school facilities, and wood delivers value on both counts. Wood is also cost effective, saving school districts time and money for both materials and installation costs.

Wood-frame buildings are energy efficient and, depending on the design, may result in operational savings for the school district over the entire life of the school. For example, because steel is less resistant to heat flow than wood, steel studs create a bridge for heat transfer through the building envelope. As a result, steel-frame buildings require more insulation to achieve the same thermal performance that wood buildings provide, and even then may cost more to heat and cool. If metal is not thermally isolated, the resulting thermal bridges can also become prime locations for moisture condensation.

Warmth is another reason architects and building designers like to use wood in schools. Many feel that exposed wood enhances learning by providing an inviting and enriching environment. Wood also provides visual interest and softens interior spaces. As a result, it makes learning more comfortable for students than steel or concrete, both of which can have a cold, institutional feel.

When it comes to building educational facilities, speed pays off. For many school districts and their contractors, the first day of school at a new facility looms large on the horizon. Faster completion and move-in saves school districts money. Speed is one of the key benefits of wood-frame construction. Wood products are readily available and usually delivered more quickly than steel, which is often shipped from overseas. Wood-frame assembly is fast. Plus, most communities tend to have a large pool of tradespeople with wood framing experience, which affects labor availability and contributes to local economies.

Why this matters: Removing any barrier to the use of wood grown by Florida landowners and milled by Florida manufacturers is good for the forestry economy and the continued sustainability of Florida's timberland. We would like design professionals and communities involved with the construction of Georgia schools to have dimensional wood framing as an option to consider.

In fact, the states of Arkansas, Georgia and South Carolina have taken similar action in the past 5 years.

A great deal of engineering and scientific study exists that supports the request that we are making. Wood framed schools are being built all across this country providing benefits of lower construction costs, energy efficiency, flexible design, use of local labor and suppliers – all of which are good for local communities.

There is another benefit that accrues to Florida from the use of wood in. Florida grown wood is a backbone of Florida's \$16.3 billion forest products industry and it contributes heavily to the wellbeing and viability of many Florida communities, especially in the rural areas of the state. Not only that, but the environmental benefits of these private forests are almost incalculable in terms of their impact on our water quality and supply, our air quality, our abundant wildlife, and the sheer beauty of our state. We would certainly miss them if they were gone.

Forests are not accidental; there are economic drivers that keep Florida Green and that keep tree farmers planting trees, often generation after generation.

On behalf of the American Forest and Paper Association¹ (AF&PA) and the more than 26,000 Floridians employed by the forest products industry in the state, I am writing in support of the proposed code change, SP6623-G2.

The paper and wood manufacturing industry views this opportunity before the Commission as a chance to broaden the variety of materials allowed for use in public school construction in the State of Florida. Wood is an environmentally-friendly, energy-efficient building material recognized by International Building Code (IBC) and approved for use in construction of public schools. Wood is among the most energy efficient and environmentally beneficial of all building materials in that it stores significant amounts of carbon while providing inherent energy-savings through its design flexibility and ease of construction.

AF&PA and its members are committed to reducing the environmental impact of buildings by encouraging energy-efficient, environmentally responsible choices in the design and building process. We encourage the commission to approve the proposed change before you, SP 6623-G2, to ensure a level-playing field for all building products while also supporting the state's forest products industry.

¹ AF&PA serves to advance a sustainable U.S. pulp, paper, packaging, and wood products manufacturing industry through fact-based public policy and marketplace advocacy. AF&PA member companies make products essential for everyday life from renewable and recyclable resources and are committed to continuous improvement through the industry's sustainability initiative - *Better Practices, Better Planet 2020*. In Florida, the forest products industry provides nearly 26,000 jobs, meeting a payroll of over \$1.3 billion annually and providing the state with \$188 million in tax receipts.

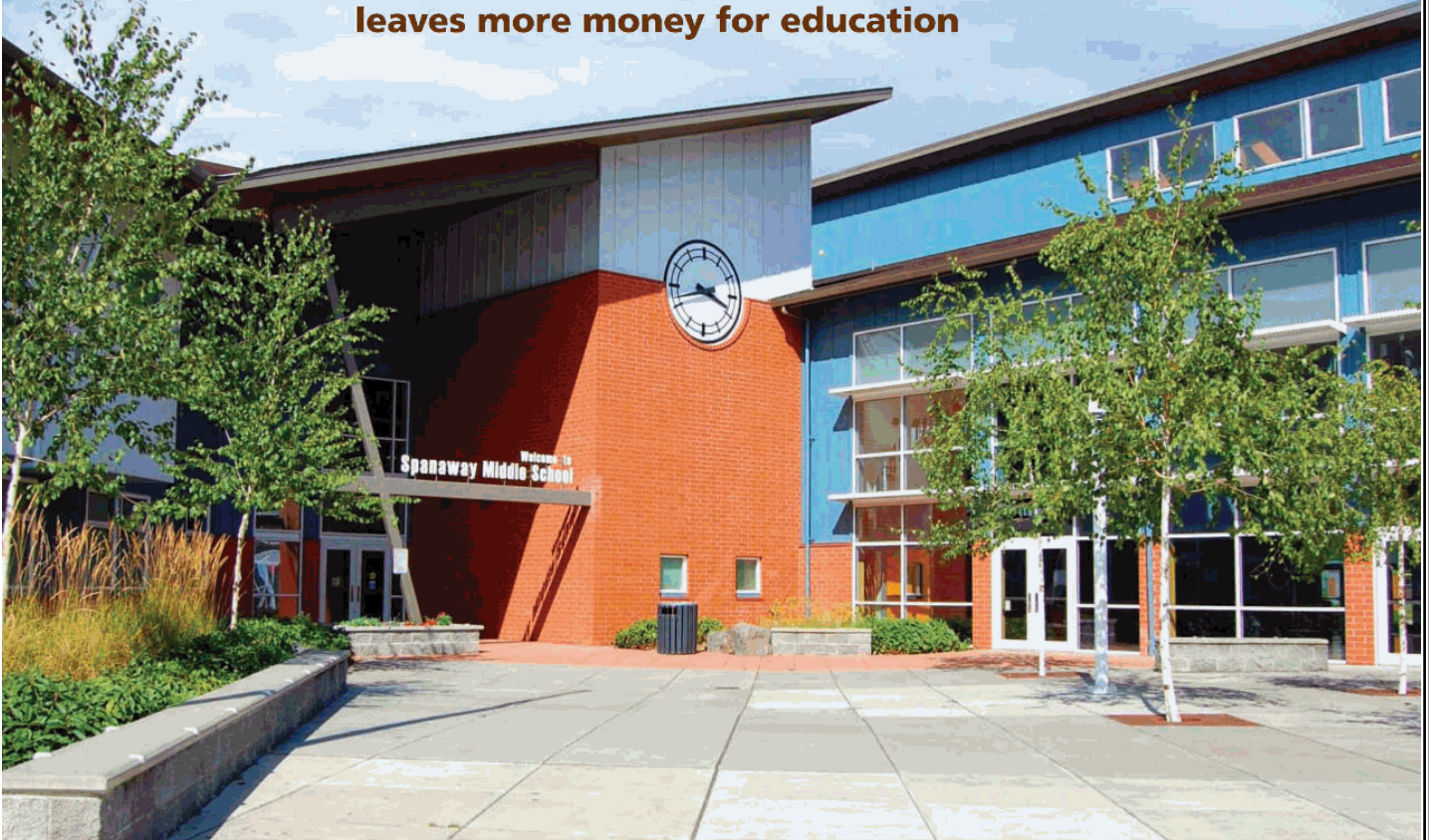
Public comment from Paul Coats, American Wood Council

The TAC recommended disapproval based on very few comments from committee members. In response to the comment that wood frame structures have not performed well in hurricane conditions in the past: past failure of buildings that were not designed using current wind design standards is not indicative of the performance of modern wood buildings built under current codes, and does not justify their prohibition. The next edition of the Florida Building Code will require design in accordance with the 2015 AWC National Design Specification for Wood Construction and the 2015 AWC Special Design Provisions for Wind and Seismic. These are state-of-the-art consensus engineering documents reflecting strict conformance to all current ASCE 7 wind load provisions, the same provisions applicable to buildings of other materials under the same environmental conditions. Consideration of this should rightly be considered by the Structural TAC, and we encourage the Special Occupancy TAC to refer this to them, even though the same request was denied the last cycle.

We believe the TAC's decision is inappropriate and violates the rules of the Florida Building Commission by prohibiting a material of demonstrated capability. This is evidenced by the Florida Building Code's own provisions for wood frame non-public schools and other occupancies not subject to the Section 453 restrictions. This modification does not require the use of wood, but rather would lift the current ban which applies even in circumstances that uniquely favor wood structures. The modification keeps intact all the normal material-related and other provisions unique to schools in the Florida Building Code, such as building size, fire resistance, life safety systems, and protection appropriate to the environment. Given the increasing advantages of wood for the reasons indicated in the substantiating materials already submitted to the TAC, and given what we believe to be a conflict with the rules of the Florida Building Commission as noted above, we respectfully urge reconsideration and approval of this modification.

Cost-Efficient Wood Framing Leads to Energy-Efficient Schools

**Practical decision to use wood
leaves more money for education**





Bethel School District (BSD) is proving they can save construction costs and build energy-efficient schools at the same time, leaving more money for educating students.

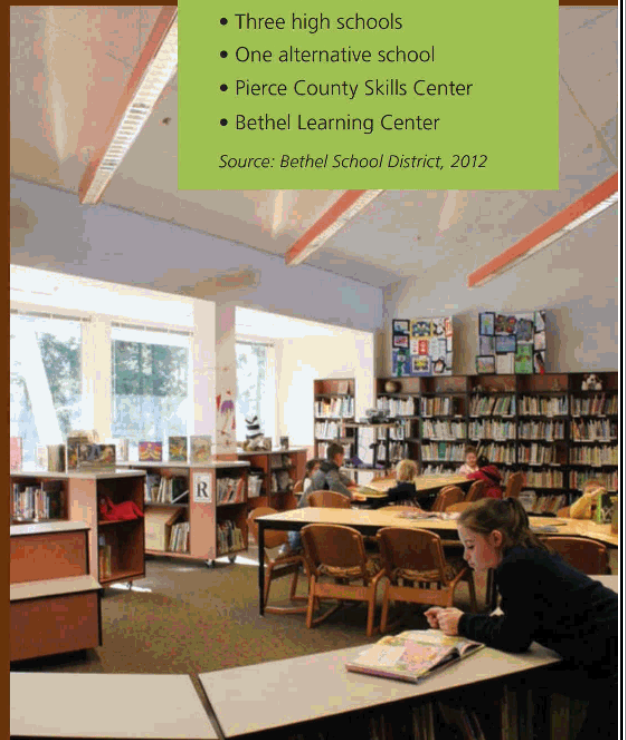
The District reports an 81 percent ENERGY STAR rating overall; several of their 17 elementary and six middle schools have ratings ranging from 95 to 98 percent. And, while size, configuration and age of the 23 facilities vary, one thing remains constant: each is wood-frame.

Wood-frame schools can be easily designed to meet or exceed the demanding energy-efficiency requirements of school districts—and they can do so cost effectively. BSD's Clover Creek Elementary, completed in 2012, was built at a cost of \$197.70 per square foot—a savings of more than \$50 per square foot over the average construction cost of an elementary school in Western Washington.

Bethel School District by the Numbers

- 215 square miles in unincorporated Pierce County, near Tacoma, Washington
- 17,500 students
- 17 elementary schools
- Six middle schools
- Three high schools
- One alternative school
- Pierce County Skills Center
- Bethel Learning Center

Source: Bethel School District, 2012



Energy Efficiency Funds Better Education

Cost efficiency is a key goal for Bethel School District Superintendent Tom Seigel, a former Navy commander. He challenges his operations team to run facilities as efficiently as possible, so they can put the savings in the classroom. "Half of our schools are new or completely modernized," said Seigel. "Our buildings are recognized as being energy efficient with excellent technology to support student learning. Exceptional staff, design innovation, accountability and conservation efforts have kept our construction and operations costs down."

Like school districts across America, BSD has a limited amount of money to spend on facilities. "If I can save money by using wood framing in our new building projects, I can then use that money to buy more expensive but more efficient mechanical or lighting systems," said James Hansen, BSD's Director of Construction and Planning. "And that, in the long term, helps us save money in the general fund. Our decision to improve energy efficiency in our schools wasn't driven by a commitment to the environment, although that's an added benefit. It was a very practical decision. We want to save money on the operation side so we can have more money for education."

Wood Costs Less and Reduces Construction Time

Bethel School District reports construction costs per square foot that are much lower than the average for other schools in the region. Hansen is quick to credit the fact that they consistently use wood framing, which saves them both in cost of materials and erection time.

"In Western Washington, wood studs cost almost half as much as metal," he said. "In 2012, our costs averaged \$0.53 per lineal foot for wood versus \$0.98 for metal studs. Plus, on a two-year project, I probably cut three to four months off construction time because wood framing goes up so much quicker."

Babbitt Neuman Construction Company builds both wood-frame and metal schools throughout the Pacific Northwest; they have built several of BSD's schools. "Scott Babbitt told me we save about 20 percent in materials and installation by using wood framing for a school," said Hansen. "So, if it's a \$10 million project, this can be a \$2 million savings, which is significant."

Wood Framing Improves Envelope Efficiency

BSD's construction philosophy is to reduce costs for framing, which allows them to invest in (among other things) better, more efficient lighting and HVAC systems. They also maximize their use of inexpensive batt insulation, which helps improve energy efficiency over time.

"Why put just six inches of insulation into a 12-inch cavity?" asked Wayne Lerch, principal with Erickson McGovern Architects, a Tacoma, Washington-based firm that has designed a number of BSD facilities. "Batt insulation is a cost-effective way to increase energy efficiency just by filling the spaces, and we take advantage of that with wood framing."

Wood studs do not transfer heat and cold in the same way metal studs do, so wood also helps improve the energy efficiency of the exterior envelope. "You can seal a wood-frame building tighter than you can a metal or a concrete building," said Hansen. "Plus, because wood-frame walls, floors and roofs easily accommodate batt insulation, it's simple and cost effective to over-insulate."

For example, Hansen said they typically use 12- to 14-inch-wide laminated strand lumber (LSL) studs in gymnasium walls. "We fill those cavities up to get an R-38 or an R-40 rating, whereas code requires only R-21," he said. "A lot of districts use concrete in the gym because they think they need it for durability, but concrete is hard to insulate. We can easily control temperature because we super insulate that space. And durability is no problem because we use medium density fiberboard (MDF) to protect the walls."

COMPARING THE COST OF NEW CONSTRUCTION

	Completion Date	Total Square Feet	Construction Cost per Square Foot	Average Cost*
BSD Elementary Schools				
• Nelson Elementary	2009	63,495	\$241.73	\$248.12
• Frederickson Elementary	2009	64,569	\$218.05	
• Clover Creek Elementary	2012	63,121	\$197.70	
BSD Junior High/Middle Schools				
• Liberty Middle School	2009	98,431	\$222.99	\$269.32
• Spanaway Middle School	2008	100,899	\$187.26	

Source: Office of Superintendent of Public Instruction, Washington State
 *Average Construction Cost for New Schools in Western WA; 2008 - 2012



Nelson Elementary

COMPLETED: September 2009
ARCHITECT: Erickson McGovern
STRUCTURAL ENGINEER: PCS Structural Solutions
GENERAL CONTRACTOR: Babbit Neuman Construction Company
AREA: 63,495 square feet
PROJECT COST: \$241.73 per square foot
GRADES: K-6
NUMBER OF STUDENTS: 600
CONSTRUCTION TYPE: Type VB construction

Nelson is located on a 100-acre site with a middle school and high school, designed to provide a campus-like setting. "It was a tight site though," recalled Lerch. "More than half the site is comprised of wetlands, so it had to be a compact structure."

The school is oriented to take advantage of direct north and south exposures; clerestory windows, exterior sun shades, and interior light shelves collect and control daylight to minimize additional lighting needs and maximize views of Mount Rainier. Lerch and his team conducted daylighting studies for the classrooms. They even built a model of the proposed classroom configuration options and tested the configurations at the Seattle Lighting Lab in order to meet their sustainability goals.

According to the Northwest Energy Efficiency Council, thermal bridging through framing components reduces envelope insulation performance by 15 to 20 percent in wood-frame construction, but by as much as 45 to 60 percent in metal-frame construction.

Source: Northwest Energy Efficiency Council



Thermal Breaks and Continuous Insulation

Wood framing offers a number of other thermal benefits. "Steel and concrete need separation between the structure and exterior envelope," said Lerch. "This separation is not required with wood because of its inherent thermal properties."

"In years past, the building code did not distinguish between wood and metal or concrete when it came to exterior walls and thermal breaks," explained Hansen. "However, we all know heat doesn't transfer through wood like it does through metal and concrete. In Washington State, the new energy code requires a thermal break between the exterior and interior walls if you use metal and concrete, which means a thicker wall, which therefore adds cost. Wood doesn't have this requirement, so the exterior skin can be directly attached to the wood stud."

Table 13-1 of the 2009 *Washington State Energy Code, Building Envelope Requirements* details the fact that metal and steel-framed buildings need a minimum R-value of R-13 + R-7.5 with continuous insulation on the above-grade walls. The minimum R-value for insulating a wood-framed non-residential building is R-21, and continuous insulation is not required.

Cost to provide that extra layer of continuous insulation is significant. Lerch estimates that it doubles the amount of time required to insulate an average school, which would add about 30 percent to the cost of insulation versus a single layer of standard R-21.

Savings from the Roof Down

When it comes to saving money on school design and construction, Hansen said they start with the roof and work their way down.

"We typically look at a 40- to 50-year life cycle for our schools, so we use sloped roofs with shingles," said Hansen. "That allows us to get a 40-year shingle that is, in my opinion, the best value. A metal roof will last 50 years, but if I replace or remodel a school in 40 years, it means I paid five times more than I needed to for a roof that I just tore off."

Hansen said they also super-insulate their wood roof structures with batt insulation to a rating of R-40 or R-50, depending on the size of the rafters. "If I tried to do that with a concrete or steel building, it would cost quite a bit more. Batt just costs less than rigid insulation. That's why we can save so much energy; it's the little things we do during construction."

Lerch cited lighting as another area where they're able to save on infrastructure costs. By continuously searching for improved lighting systems that diffuse light better and provide more uniform illumination, he said they've been able to reduce the overall height of the building by 6 inches per floor. "Older indirect light fixtures required that the fixture be hung 18 inches below the ceiling to achieve a uniform illumination," said Lerch.

Energy Savings Specific to Bethel School District

While researching the comparative efficiencies of various school districts, energy consultant Fritz Feiten with Ameresco Quantum, Inc. stumbled upon some interesting facts. "When you compare Western Washington school districts with 15,000 to 20,000 full-time students each, the Bethel School District operates at the lowest total utility cost per student," he said.

"Bethel spends 34 percent less per student than the average for all peer districts, and 52 percent less than the highest cost peer," Feiten added. "Interestingly, both Bethel and the highest cost school district peer use mechanical cooling in most if not all their schools. While this is admittedly a rough measure of efficiency, I think it speaks volumes about the great job Bethel School District is doing to minimize energy costs in their District."

DISTRICT	Issaquah	Bethel	Everett	Highline	Bellevue	Northshore	Edmonds	Puyallup	AVERAGE*
FTEs**	16,557	17,016	17,744	17,852	18,156	18,444	19,802	20,623	19,380
Utility Cost	\$4,694,760	\$2,743,345	\$4,200,651	\$5,478,627	\$6,067,571	\$4,070,702	\$4,004,658	\$5,437,839	\$4,718,712
Utility Cost/FTE	\$284	\$161	\$237	\$307	\$334	\$221	\$202	\$264	\$244
High Schools	4	4	4	4	4	3	5	4	
Middle Schools	5	5	5	5	5	6	4	7	
Elementary Schools	15	17	18	18	15	21	21	21	
Total Schools	24	26	27	27	24	30	30	32	

Source: 2011/2012 budgets, Office of Superintendent of Public Instruction, Washington State

*Average includes data for three school districts not shown

**Full-time equivalent

Bethel School District is an ENERGY STAR



Of BSD's 25 eligible buildings, 19 have earned the ENERGY STAR label. The District has received national recognition from the U.S. Environmental Protection Agency as an ENERGY STAR Leader.

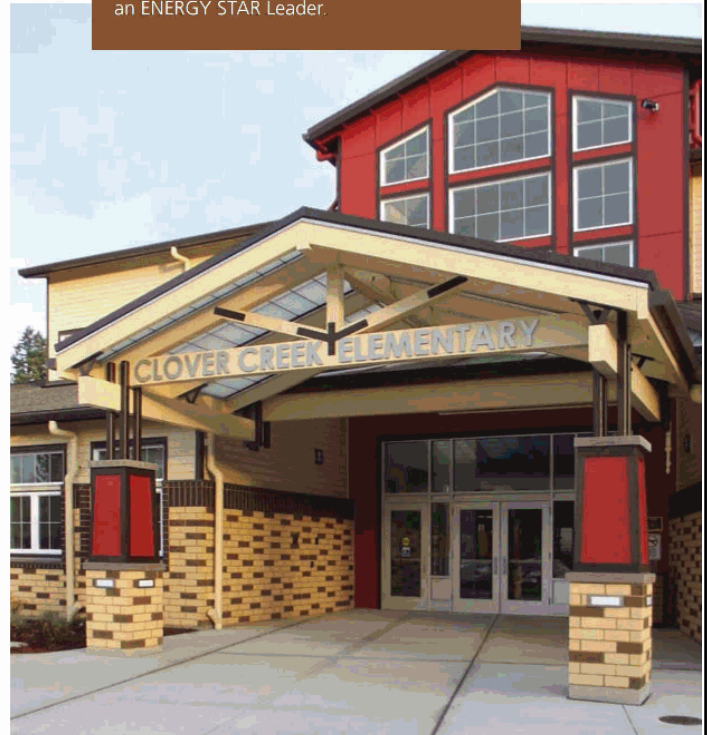
"New technology, using T5 lamps, allows us to achieve the same results with fixtures hung just 12 inches from the ceiling. So we can cut costs by adjusting the overall height of the building."

Design Versatility

Ninety-five percent of the work Erickson McGovern Architects does is school design, and Lerch says wood is well-accepted by all the districts they work with. "Because it is a versatile framing material, wood allows us to be as creative as we want in terms of design," he said.

At the same time, simplicity and functionality are priorities. "This is a blue-collar community," said Hansen, "so we work to give families a good solid building that is not overbuilt. We want our schools to fit into the surroundings. Most of our schools are in single-family residential zones, so we use sloped roofs and natural but durable materials on the exterior."

Wood lends itself well to surface treatments. "Kids like color, and a good bucket of paint costs \$30 or \$35 a gallon," said Hansen. "If it's applied correctly, that paint will last 12 to 15 years or longer. If you want to change it or update to a more current color scheme, it's relatively inexpensive to do. If you paint on metal or concrete, it becomes a long-term maintenance issue, since neither holds paint as well as wood. Plus, both metal and concrete surfaces feel cold. Wood is a product people like because it has warmth."





Bethel Learning Center

COMPLETED: November 2012

ARCHITECT: Erickson McGovern

STRUCTURAL ENGINEER: PCS Structural Solutions

GENERAL CONTRACTOR: Jones & Roberts

AREA: 5,567 square feet

PROJECT COST: \$349.66 per square foot

CONSTRUCTION TYPE: Type VB construction, blast-resistant design

At slightly more than 5,500 square feet, the Bethel Learning Center is a small structure that had big requirements. Built for the Bethel School District, this multi-functional facility is also used as a neighborhood community center. "We wanted to feature the warmth of wood, so we left wood beams and trusses exposed throughout," said Lerch.

The facility's location was selected because of its proximity to the center of the District. The project is near an elementary school, middle school and high school. However, it is also located adjacent to a natural gas pipeline, so the structure needed to be designed to withstand a natural gas blast. "We had specific structural minimums for blast protection, including 8-inch stud spacing and laminated glazing requirements," added Lerch. "In all, we have a lot of variety in a small building, which drove the cost per square foot up. But it's a facility that will serve the District well now and in the future."

\$4.3 Million in Utility Savings

In 2011, the Bethel School District was recognized by the U.S. Environmental Protection Agency (EPA) as an ENERGY STAR Leader. Between 2004 and 2011, BSD reduced kilowatt usage by more than 7.6 million kilowatts and saved \$4.3 million in utility costs—equivalent to the cost of electricity for 15 of the District's elementary schools for one year. Through the EPA's Portfolio Manager, BSD has shown a nearly 15 percent increase in energy efficiency, with an average overall portfolio rating of 82 for 25 buildings. In 2008, 10 of the District's schools received the ENERGY STAR for superior energy efficiency.

Source: ENERGY STAR, U.S. Environmental Protection Agency



Speed of Construction

When BSD assesses the advantages that wood-frame construction provides in terms of construction timing, they first consider two factors: availability of the raw material and how the product goes together.

"Wood is a relatively easy product to get; we don't have long lead times like we would with other materials," said Hansen. "Plus, we tend to use products that help the local community because it helps provide jobs. Wood does that here in Washington. The people who live in our District pay taxes in our District, and like to see their products stay in their District. Plus, they're also parents whose children attend school here."

Regardless of whether it's a structural member or a trim product, Hansen said they can normally get wood products within a week or two, where steel and masonry products often require more time. "And time on the job is money," he added. "It costs a general contractor about \$80,000 to \$100,000 per month to be on site. The faster you can get the job done, the more money you can save."

Carpenters can work with simple tools in all types of weather. The contractor usually requires less heavy-duty equipment because wood members are lighter and easier to erect. "It's just a simpler process to erect a wood building," said Hansen, "and simpler usually means less expensive."

Looking Ahead

Through its financial assistance program, Washington State provides funding toward school construction or remodeling every 30 years. Therefore, schools are remodeled in the Bethel School District every 30 to 40 years. By using wood, they've made the process easier for years to come.

"It's simpler and more cost effective to go back and modify a wood structure than a concrete or steel building," noted Hansen. "I don't think many people look ahead 30 or 40 years, but I look at what people are going to be left with when I'm gone. From the time you start planning a bond issue until you get a school built, it's a long process with a public agency. A wood building will be easier to modify and maintain years from now."

Durability and maintenance are both key considerations for school districts. "I encourage my colleagues to pay attention to the details," Hansen said. "For example, if I use brick on a facility, I have to apply moisture sealant and anti-graffiti coatings, which run over \$180 a gallon. We need to reapply that every 12 to 15 years, just like paint.

So, if you're tracking your maintenance costs, a bucket of paint costs \$30 and sealant and anti-graffiti costs \$180. Over time, I believe you can save money with wood versus concrete or masonry as long as you're doing proper maintenance and paying attention to the details."

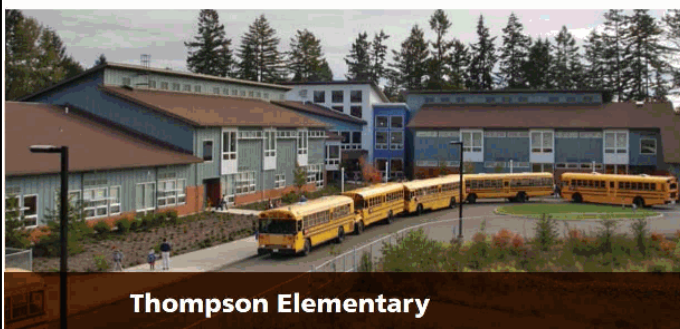
Using Wood to Manage Money

Lerch said that his firm looks at all aspects of a school design project. "We work to balance cost, energy efficiency, maintainability, functionality and many other factors. Schedules are also a consideration; everyone needs their school built as soon as possible, and it has to be done on time. We know wood is less expensive; it's a natural material and people are naturally drawn to it. We think wood is just a better product for schools."

Hansen encourages other districts to have the conversation with their architects about using wood in schools. "Districts can save up front in construction costs over the long term by super-insulating to save utility costs.

And, by saving money with the framing, you can install more energy-efficient mechanical and lighting systems, which provide long-term operational savings."

The fact that they can use wood to build good quality school buildings without overspending is important, emphasized Hansen. "We need people to believe we do a good job, not only educating their children but managing their money. Our decision to use wood has a very practical basis. We're focused on becoming more energy efficient, which is good for the environment. Going green is the right thing to do, but our decision was really about saving energy, which saves money. Constructing our schools with wood allows us to do both."



Thompson Elementary

COMPLETED: December 2006
ARCHITECT: Erickson McGovern
STRUCTURAL ENGINEER: PCS Structural Solutions
GENERAL CONTRACTOR: Babbitt Neuman Construction Company
AREA: 64,926 square feet
PROJECT COST: \$169.42 per square foot
GRADES: K-6
NUMBER OF STUDENTS: 550
CONSTRUCTION TYPE: Type VB construction

Selected to be one of the pilot schools for the Washington Sustainable Schools Protocol (WSSP), the design for Thompson Elementary focuses on sustainability and efficiency. What began as a remodel to a 40,000-square-foot building ended up becoming a 64,000-square-foot new building.

"When we developed the systems for this project," recalls Lerch, "we looked at everything from wainscoting on the walls to framing systems, light fixtures and HVAC options. Everything was planned around our goal of finding a better way to do things. For example, we developed a mezzanine system for mechanicals that was built into the sloped roof attic space. The system gave us easy access and the sloped wood roof helped us better blend the school into the surrounding neighborhood."



Spanaway Middle School

COMPLETED: September 2008
ARCHITECT: Erickson McGovern
STRUCTURAL ENGINEER: PCS Structural Solutions
GENERAL CONTRACTOR: Babbitt Neuman Construction Company
AREA: 100,899 square feet
PROJECT COST: \$187.26 per square foot
GRADES: 7-9
NUMBER OF STUDENTS: 1,000
CONSTRUCTION TYPE: Type VB construction

Spanaway Middle School shares its site with Thompson Elementary, and since Thompson served as a pilot school for the WSSP, Spanaway includes a number of similar sustainable features. "This was one of the earlier projects, where we really studied the different wood systems and then applied the most cost-effective design options," said Lerch. "The fact that this school has three grades dictated the design, so we have three separate wings with a shared hub."

Classroom wings are organized around a central commons with a stage that also serves as a music classroom. The commons also opens out to the front entry plaza, creating well-utilized indoor and outdoor student gathering spaces. Rain gardens, located in the courtyards between classroom wings, integrate the school's science curriculum and the natural environment. Gym walls were designed with 12-inch-thick LSL, which allowed them to increase the R-value of the insulation from R-21 to R-38.



Clover Creek Elementary

COMPLETED: September, 2012
ARCHITECT: Erickson McGovern
STRUCTURAL ENGINEER: PCS Structural Solutions
GENERAL CONTRACTOR: Jody Miller Construction, Inc.
AREA: 63,121 square feet
TOTAL PROJECT COST: \$197.70 per square foot
GRADES: K-6
NUMBER OF STUDENTS: 645
CONSTRUCTION TYPE: Type VB construction



Built to replace an existing school, history played an important role in Clover Creek's design as architects worked to blend modern technologies with historical features, including a cupola from the old school. The two-story wood-frame structure features two classroom wings and a third common area with performance/assembly space. To meet sustainability goals, architects used strategic window placement and other daylighting techniques to reduce electrical usage. They also used modern heat recovery technologies to improve efficiency of the heating and ventilation systems.

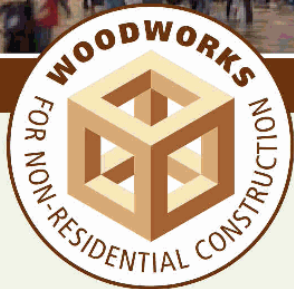
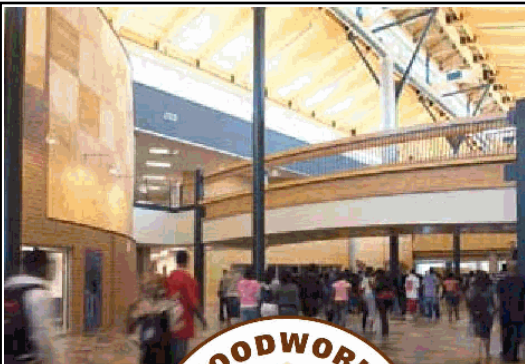
Outside, they incorporated a rain garden to collect stormwater runoff from downspouts and other hard surface areas at the school, while also providing a natural learning environment. An elevated wooden boardwalk leads students through the rain garden to the historic cupola, salvaged from one of the original school buildings from 1938.



WoodWorks is an initiative of the Wood Products Council, a cooperative venture of major North American wood associations.

Neither the Wood Products Council nor its contractors make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of and/or reference to the information included in this publication. Consult your local jurisdiction or design professional to assure compliance with code, construction and performance requirements.

WoodWorks Case Study WW-010 • Bethel School District • ©2012 WoodWorks • Photo credits: Erickson McGovern Architects and Bethel School District



As demand grows and budgets shrink for new educational facilities, many school districts are turning to wood-frame construction for its cost effectiveness. However, they're also finding that, in addition to less expensive material costs, wood offers other advantages—such as speed of construction, design versatility and the ability to meet green building goals—while creating positive learning environments and meeting all code and safety requirements.

Earn one AIA/CES LU (HSW/SD) by reading this document and taking a short online quiz. For details and learning objectives, visit the Online Training Library at woodworks.org. WoodWorks is an approved AIA provider.



woodworks.org

Designing Wood Schools

WOOD DESIGN & BUILDING SERIES

When it comes to designing an educational facility, architects and designers must balance the reality of limited financial resources with the desire to provide students with an exceptional learning environment that is warm and enriching. As a result, many are choosing to use wood as both a structural and finish material.

SHW Group, recognized by *Engineering News-Record* as one of the top five education design firms in America, likes to use wood in schools as often as possible. "Our mantra is that learning happens everywhere, not just in the classroom," said Konrad Judd, a lead designer and principal at the firm's Dallas office. "The environments we create outside the classroom are just as critical for learning. That's why we often use wood in common, public spaces which are used for casual and informal learning because we think exposed wood has a positive effect on the overall learning environment."

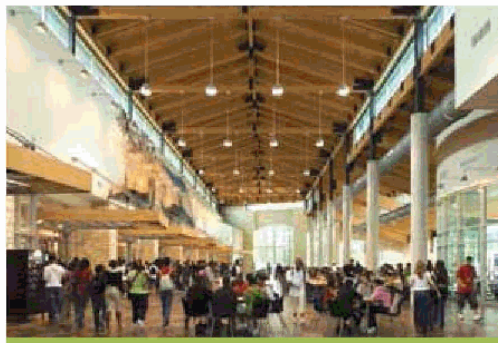
Wood is an environmentally-friendly, energy-efficient building material approved for use in schools by the International Building Code (IBC). Safety and durability are critically important in school facilities, and wood delivers value on both counts. Wood is also cost effective, saving school districts time and money for both materials and installation costs.

Green Building is Red Hot for Schools

A study released in 2007 by McGraw-Hill Construction found that the education sector was the fastest growing market for green building. The report also noted "an increasingly widespread adoption of policies that require public buildings to have green characteristics."

Widely recognized for its environmental attributes, wood is well-positioned to help schools meet their green building requirements.

Wood is the only major building material that is both renewable and sustainable over the long term—and the only material with third-party certification programs in place to verify that products being sold originate from a sustainably managed resource.



At Andy Dekaney High School in Houston, Texas (above and top of page), architects from SHW Group used exposed wood to create a warm learning environment that positively affects students' sense of community. Credit: Richard Payne Photography

School Construction and the IBC

Wood is approved by the International Building Code (IBC) for use in school construction.

- **Building Types I and II** allow the use of Heavy Timber (HT) construction in roof construction and secondary members, which is often used to add visual interest in school entryways, libraries, auditoriums, gymnasiums and other public spaces. Fire-retardant-treated (FRT) wood can also be used in certain applications.
- **Type III** construction allows wood roof and floor systems as well as interior wood-frame walls. FRT wood is required to frame exterior wood-frame walls.
- **Type IV**, also known as Heavy Timber construction, allows use of solid or laminated wood members such as glued laminated timber (glulam), wood decking and structural sheathing when there are no concealed spaces. FRT wood can be used to frame exterior walls.
- **Type V** is the most common type of wood construction, and is allowed for school design. Type V is typically the least expensive type of construction, particularly when load-bearing walls are wood. The IBC allows use of untreated wood throughout a Type V structure. Under the IBC, one-story Type V schools can be up to 87,875 square feet and two-story schools may be as large as 138,750 square feet. If additional square footage is required, two-hour fire-resistance-rated fire walls can be used.

Designing Schools with Wood from APA – The Engineered Wood Association details the approved use of wood in school construction by IBC Building Type. For additional details, refer to the WoodWorks information sheet, *Wood and Building Codes*, available at woodworks.org.

North America has more certified forests than any other jurisdiction and, according to *State of the World's Forests*¹ reports published by the United Nations Food and Agriculture Organization, has as much forested land now as it did 100 years ago.

Independent life cycle assessment (LCA) studies show that wood has significantly less embodied energy than materials such as steel and concrete. Embodied energy is the energy needed to extract, process, manufacture, transport and maintain a material or product. Wood also outperforms other materials in terms of air and water pollution and greenhouse gas emissions, and offers more efficient resource use. And, because wood continues to store the carbon absorbed by growing trees (it is 50 percent carbon by weight), it's an important tool in the fight against climate change.

To better understand the life cycle impacts of their building material choices, designers are increasingly using online tools such as the ATHENA® *EcoCalculator for Assemblies*, which provides LCA data on hundreds of common building assemblies. The *EcoCalculator* is available free of charge from the Athena Institute (www.athenasmi.ca).

Another tool is the carbon calculator, available from the website, *Build Carbon Neutral* (<http://buildcarbonneutral.org>). David Mount of Mahlum Architects in Seattle uses this site to evaluate the embodied energy of various structural systems. "We enter the school's project parameters, and the calculator gives us a ballpark number of the energy required to build that structure, from the raw material to the building site," said Mount. "Wood always outperforms everything else in our analyses."

How important is the move to use environmentally-sensitive products within school construction projects? "It's very important to us, and to an increasing number of clients," said SHW Group's Judd. "It is important from the standpoint of doing what's right and best for our environment, and to give students who are learning in these environments a sense of its importance. Wood plays into that well, as a renewable, natural resource."

For more information on wood and green building, a variety of materials are available on the WoodWorks website.



Pre-engineered glulam beams were methodically assembled on-site for the Gunter Primary School in Gunter, Texas. At nearly 60,000 square feet, wood-frame construction for the school cost just under \$100/square foot. Credit: APA – The Engineered Wood Association

¹ *State of the World's Forests*, 2009, 2007, 2001, 1997, United Nations Food and Agriculture Organization

Wood is Energy Efficient

Wood-frame buildings are energy efficient and, depending on the design, may result in operational savings for the school district over the entire life of the school.

For example, because steel is less resistant to heat flow than wood, steel studs create a bridge for heat transfer through the building envelope. As a result, steel-frame buildings require more insulation to achieve the same thermal performance that wood buildings provide, and even then may cost more to heat and cool. If metal is not thermally isolated, the resulting thermal bridges can also become prime locations for moisture condensation.

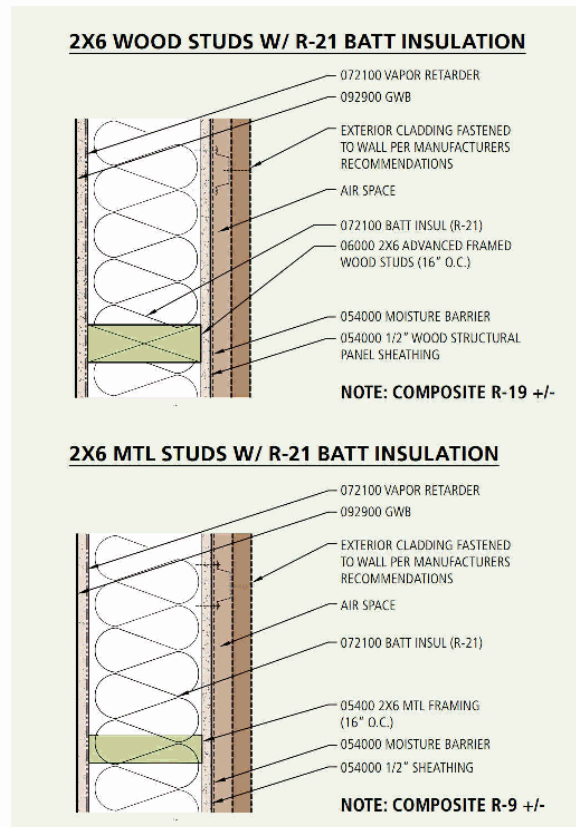
Mahlum's Mount said his firm gives strong consideration to wood-frame construction for thermal reasons. "We're seeing a huge difference between steel stud walls and wood stud walls in terms of thermal performance, which reinforces wood's importance in terms of energy conservation. Our office has tested different framing systems in a spreadsheet

that measures the energy consumption of an individual classroom. We have not yet translated this to measure the impact on a whole building and total cost savings. However, the differences between wood and other framing materials are big enough to capture our attention."

To illustrate his point, Mount cited two wall assembly drawings used by his firm (see Figure 1). "While they both use R-21 batt insulation, the overall composite R-value for steel studs is R-9, whereas the wood stud wall has a composite R-value of 19. This is a difference just too big to ignore."

According to a study by Keith Kothmann, CPE, *Steel v. Wood, a Cost Analysis of Superstructures*, exterior wall systems also offer thermal benefits when using wood studs instead of metal. Depending on wall height, a metal drywall system can accelerate thermal conductance for 12 to 15 percent of the wall surface, regardless of the amount or thickness of insulation in the wall.

Figure 1



This detail was supplied by Seattle-based Mahlum Architects to demonstrate the thermal properties of wood versus steel. Designers should check with the American Wood Council (e.g., WCD-1 – Details for Conventional Wood Frame Construction) or their local code officials for information on appropriate detailing for specific projects.



Exposed glulam highlights an expansive interior space and provides a finished surface that coordinates with materials used elsewhere in Albert Lea High School, Albert Lea, Minnesota. Credit: APA – The Engineered Wood Association

Warmth of Wood Promotes Learning

Warmth is another reason architects and building designers like to use wood in schools. Many feel that exposed wood enhances learning by providing an inviting and enriching environment. Wood also provides visual interest and softens interior spaces. As a result, it makes learning more comfortable for students than steel or concrete, both of which can have a cold, institutional feel.

Joseph Martinez is principal architect with Martinez+Cutri Corporation in San Diego, California. "The natural warmth of wood does factor into our decision to use it in the public assembly areas of a school," he said. "We want to create a setting where there is some serenity and tranquility. Wood does that, probably the best of any material and certainly better than metal and steel and even painted drywall. Wood has richness and warmth in its grain that tends to put people at ease."

In a three-year study of 700 schools, Japanese researchers studied how the educational environment is shaped by the type of materials used for school buildings, surveying teachers and students to measure their impression of wood versus reinforced concrete. Both groups had similar, favorable impressions of wood schools over concrete. Results also showed that teachers and students in wood buildings felt less fatigue, and that students perceived schools with larger areas of wooden interiors to be brighter than reinforced concrete structures.

A 'warm learning environment' is one of the top requests from parents and other advisors in the school design process. According to Mount, the project architect for Rosa Parks Elementary School in Redmond, Washington, "Wood's natural beauty factored significantly in our decision to use it, particularly given the context of this school and its natural environment."

Industry Trends Favor Wood for Future School Design

Most education experts agree that a school's design affects how well students learn and, by extension, how well the school serves its community. A number of current trends favor wood design:

- There is a clear movement toward smaller schools, which are thought by many to promote more effective learning. Type V construction, which allows wood framing throughout the structure, can be a particularly cost-effective option, especially for single-story structures which are less than 87,875 square feet.
- Schools are increasingly used for community events. Wood's natural beauty provides a welcoming environment for public gatherings while instilling civic pride.
- Most architects take a collaborative approach to the design process, seeking input from school and community leaders as well as parents. When asked, most parents say they prefer the warmth of wood for their child's educational surroundings.
- Educators are increasingly grouping students by learning styles, which results in the need for flexible building configurations to accommodate classrooms of various sizes. Wood's design versatility is well-suited to this requirement.



Rosa Parks Elementary School is located in Redmond, Washington, within a new residential development committed to environmental sensitivity. Mahlum Architects left the plywood and wood roof joists exposed to naturally express clear access and openness within its spaces. Credit: Benjamin Benschneider

Wood Construction is Faster

When it comes to building educational facilities, speed pays off. For many school districts and their contractors, the first day of school at a new facility looms large on the horizon. Faster completion and move-in saves school districts money.

Speed is one of the key benefits of wood-frame construction. Wood products are readily available and usually delivered more quickly than steel, which is often shipped from overseas. Wood-frame assembly is fast. Plus, most communities tend to have a large pool of tradespeople with wood framing experience, which affects labor availability and contributes to local economies.

"Wood works particularly well when a project has a tight construction schedule," said Mark Batten, SE, with Burkett & Wong Engineers in San Diego, California. "Contractors can get started right away without waiting for steel shop drawings or steel fabrication. When we design a wood-framed school, we do so primarily because of cost, schedule and speed of construction."

"School construction schedules always seem to be fast track," said Fred Sahs, principal with SAI Architects and the architect and construction manager for the 59,700-square-foot Gunter Primary School in Texas. "With wood, the deliveries are fast and frame assembly moves quickly." Once shop drawings were approved, Sahs said the engineered wood products for Gunter Primary were on the ground in about four weeks.

Stuart Schichtl is with Nabholz Construction, the construction manager and general contractor for Fountain Lake Elementary in Little Rock, Arkansas. "Wood definitely saves time during construction," he said. "We can use local suppliers and local labor, which means greater savings to the district and a benefit for our community. Plus, with a school, it's always important that we meet our move-in deadline."



SHW Group designed the exterior of the two-story Career and Technical Education Center to complement the traditional architectural fabric of Frisco, Texas while presenting a contemporary face for the interior. Credit: Terry Wier Photography

Wood Teaches a \$2.7 Million Economics Lesson at Fountain Lake Middle School

When the Fountain Lake School District of Hot Springs, Arkansas made plans to build a new middle school and renovate an existing high school, they had a long wish list but limited financial resources for the 63,362-square-foot project.

According to school board member Bruce Westerman, initial estimates for a masonry and steel building came in over budget, at \$150 per square foot including site work and architect/engineering fees. With help from APA – The Engineered Wood Association, the district's Hot Springs-based design team, including architects from Arnold & Associates and structural engineers from B & F Engineering, decided to consider wood framing.

Bids came in for the new wood-frame, two-story middle school and high school renovations at \$107 per square foot, saving the district \$2.7 million.

Westerman, a practicing Professional Engineer himself, said, "Since we already had voter approval for the project, we really had to make this work and meet our budget. So economics drove the decision to initially consider wood. If we'd been at budget, to be honest, we may not have ever considered a change. But now, we're significantly under budget, thanks to our switch to wood."

Safety First for Schools

Regardless of whether they're built in wood, steel or concrete, schools house our most precious citizens, so safety is paramount.

- Per IBC 903.2.3, sprinklers are required in areas larger than 12,000 square feet in Occupancy Group E building types. Most schools fall into this category. In addition, local building code amendments typically require sprinkler systems and other fire control measures in school construction, regardless of size or framing type.
- Wood has proven superior performance over steel beams in controlled fire tests. Heavy timbers char, which slows combustion and allows extra time for occupants to leave the building.

In some parts of the country, seismic safety is also critically important. It's interesting to note that, in California, one of the most highly regulated states in the U.S. in terms of seismic requirements, roughly 60 percent of schools use wood-frame construction.

"Wood responds well during an earthquake; it provides a lot of flexibility," explained Martinez, who works on projects throughout southern California. "A lot of the schools we've done here use wood-frame construction because wood is well-suited to deal with lateral loads and California's seismic requirements."

Wood Schools Offer Decades of Durable Performance

Schools get a lot of abuse, so durability of finish materials is important. While numbers vary around the country, elementary schools typically have an expected lifespan of 50 or more years. In many cases, interior and exterior finishes serve as the primary drivers of the structural framing material choice. For example, painted masonry is perceived as the most durable choice for interior common areas like corridors. However, the results often have a cold, institutional feel.

"We need to balance a facility's maintenance needs with good design ethics," said architect Mount. "Unfortunately, some districts have a mistaken impression that a school has to be indestructible. We have seen plenty of examples of schools where their seeming only goal was to minimize maintenance, but they did not promote learning."

Versatility is also important. "Wood framing allows you to use a variety of architectural finishes and treatments that you can't use with a masonry wall," said Batten. "There are many affordable options for treating and protecting surfaces."

Westerman of the Fountain Lake Middle School in Arkansas said the only legitimate hurdle they ran into regarding durability using wood was for interior corridors. "We worried about kids knocking holes in the gypsum wallboard," he explained. "We easily overcame that by installing OSB (oriented strand board) over the wood studs and then covering it with impact-resistant gypsum to provide protection."



The inviting entrance to Chloe Clark Elementary in DuPont, Washington welcomes children while complementing the surrounding community. Credit: APA – The Engineered Wood Association

Extra Credit Benefits of Wood

In the quest to balance all the demands of a school facility, several other benefits of wood come into play.

- Wood offers design flexibility, allowing designers to cost-effectively achieve long spans for open spaces or shorter spans for more intimate spaces.
- Structural versatility is important, since school additions and alterations have traditionally outpaced new construction by a ratio of 4 to 1, according to McGraw-Hill Construction. Wood framing is easy to modify, whereas steel and concrete may require demolition and/or major retrofitting, at considerable expense.
- Wood surfaces provide good sound absorption, a feature school administrators appreciate. Wood has more sound damping capacity than many other structural materials. Excellent levels of noise control can be achieved with good acoustical design in wood-frame structures surfaced with wood structural panels.
- Insurance for wood buildings may be considerably less than for other structures. "We were surprised to discover that our facility insurance would cost less with the wood-frame alternative," said Fountain Lake School District's Westerman. "Our buildings are insured based on replacement cost of the structure itself and, since this school will cost \$2.7 million less to build, we'll save money on insurance for years to come."

Lessons Learned

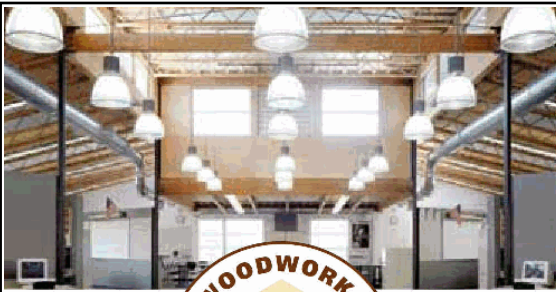
Warm and friendly interiors, environmentally-friendly materials, long-term energy savings, speedy construction, safe and durable schools—wood provides many advantages for school districts seeking to maximize their facilities budgets.

"Wood provides a very rich and enlightened environment for learning," said Martinez. "Whether it is featured as an architectural element in the library, or used for the structure in a multipurpose room, wood is very soothing."

Westerman added, "Here in Hot Springs, we made a rational observation and made a logical choice to use wood for Fountain Lake Middle School. We saved millions of dollars for the district by switching to a wood-frame structure. I now also look back and think that, even if price had been the same, wood offers enough other advantages that we might still have gone this way."



Wood's design versatility complemented the traditional styling of Brook Hill Elementary in Bullard, Texas. The 31,000-square-foot structure was built at a cost of \$127 per square foot in 2006.
Credit: APA – The Engineered Wood Association



The Economics of Wood in School Design and Construction

woodworks.org

As school districts' construction budgets tighten, education and community leaders find themselves increasingly pressured to provide enriching learning spaces that are environmentally friendly, safe, easy to maintain and affordable. Wood-frame construction meets all of these requirements, and is proving to be a cost-effective option for school districts, both in terms of initial construction and lower energy costs that can be realized over the life of the structure.

Cost Comparison: Wood-frame vs. Steel-frame

To see how the cost of a wood-frame school compared to steel, Keith Kothmann prepared a cost analysis for a one-story, 73,557-square-foot elementary school which had been built in 2002 in Flower Mound, Texas. Kothmann is a Certified Professional Estimator, an engineer and former general contractor from Fort Worth, Texas, with more than 25 years of construction experience.

To provide a fair comparison with no design or appearance changes except the gym ceiling, Kothmann compared three wood framing options to the as-built post and beam steel structure.

His results showed that the initial cost of construction could be substantially reduced by changing the superstructure of the school from steel to wood. Kothmann's study also determined that the life cycle savings realized from the additional thermal resistance provided by the wood roof system would save the district \$15,000 or more per year in energy costs, which is in addition to the reduced energy consumption from the wood-framed walls.

KOTHMANN REPORT FINDINGS

	Savings per Square Foot	Total Savings	% Savings over Steel	Annual Energy Savings with Wood Walls	Completion Time Savings
Option A: Wood roof framing with metal studs (Type IIIA) <ul style="list-style-type: none"> Steel columns remain Change from steel to glulam beams Change from steel bar joists to wood I-joists Change from metal deck to rated sheathing 	\$2.36	\$173,797	13.92%		Saves 2 weeks
Option B: Wood roof framing with wood studs (Type VA) <ul style="list-style-type: none"> Steel columns remain Change from steel to glulam beams Change from steel bar joists to wood I-joists Change from metal deck to rated sheathing 	\$2.82	\$207,160	16.6%	\$1,300	Saves 5 weeks
Option C: Wood roof system with load-bearing wood stud walls (Type VA) <ul style="list-style-type: none"> Change from post and beam framing to wood I-joists bearing on top of wood stud exterior and interior walls Change from metal deck to rated sheathing 	\$6.07	\$446,284	35.76%	\$1,300	Saves 12 weeks

Cost of Materials

Results from the Kothmann study were based on June 2005 numbers. According to the Construction Materials Price Index, published by the U.S. Department of Labor – Bureau of Labor Statistics, the difference between wood and steel increased by a factor of 3.5 between 2005 and 2008, making the \$446,284 savings from Option C calculated in June 2005 worth more than \$1.5 million dollars in 2008. Since the cost of building materials fluctuates with the market, actual savings realized by switching to a wood-frame structure may be different today.

Speed of Construction

Duration of construction is another key consideration in facilities planning. The Kothmann study analyzed the direct cost of reducing construction time by building a wood-frame rather than steel-frame or concrete facility.

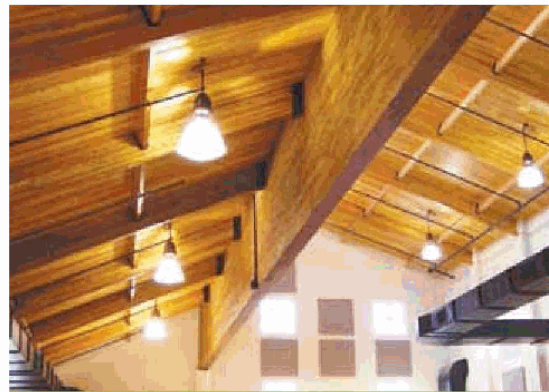
The study found that the project duration of the wood-frame Option A is two weeks less than a conventional steel structure. Wood-frame Option B saved five weeks, and Option C resulted in completion 12 weeks earlier than a steel-frame building. While the study did not calculate the benefits of earlier occupancy, there are obvious financial benefits associated with a shorter construction schedule.

Wood-frame construction is faster than steel for a number of reasons. Most wood building materials are locally available, requiring no long lead times for delivery. Plus, wood-frame assembly is fast; contractors can often install wood members using boom trucks and other readily available construction equipment instead of cranes, which speeds construction and further reduces cost.

Life Cycle Costs

The Kothmann Study also compared the life cycle costs of the various structural systems in terms of HVAC operational costs, and found that wood framing provided significant energy savings over the life of the building.

Wood is naturally more resistant to heat flow than steel, which makes it more energy efficient. Additional energy savings were realized from reduced roof insulation. In low-sloped roofs, dead air space offers insulation which lowers the required R value of the rigid insulation used on top. However, if R19 rigid insulation is still used with a wood roof structure, the project will realize additional energy savings. Lower energy bills would save a building owner \$15,500 per year, according to Kothmann. When amortized over the life of the building, savings from using wood framing in a school become significant. If radiant barrier sheathing is used over the dead air space in a roof structure, savings may be even more, particularly in warm climates, because it reduces heat flow in and out of the conditioned space.



Gunter Primary School in Gunter, Texas includes exposed beams in the cafeteria and gymnasium for a visually stunning effect. Credit: APA – The Engineered Wood Association

IBC CONSTRUCTION TYPES AND ICC BUILDING VALUATION DATA

Under the International Building Code, Type V Construction (the most common type of wood construction) can be used for school design and construction and allows use of untreated wood throughout the structure. Type V construction requirements allow total building areas up to 87,875 square feet for single-story and 138,750 square feet for two-story structures. These buildings must be sprinklered, have one-hour fire-resistive-rated walls/floors/roofs, and have a minimum 30-foot setback on all sides. Two-hour fire walls can be used if additional square footage is required for Type V buildings.

The International Code Council (ICC) provides members with periodic updates for their Building Valuation Data (BVD). The BVD data details average construction costs per square foot for various types of construction. Data clearly shows the economic advantages of Type V construction.

Square Foot Construction Costs / 2006 IBC

Group		Type of Construction								
		IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
E	Educational	\$176.25	\$170.31	\$165.46	\$158.26	\$148.32	\$140.74	\$153.03	\$130.54	\$125.61

Source: Building Safety Journal, January-February 2009

Front page photo: Designed to serve at-risk teens, the 23,300-square-foot Truman High School in Federal Way, Washington had a tight construction budget, so Mahlum Architects balanced an exposed structure with the warmth of wood to create a vibrant common space. Credit: Benjamin Benschneider

SOURCES AND OTHER MATERIALS

Wood Schools

APA – The Engineered Wood Association, www.apawood.org

- Case Study: *Albert Lea High School case study (Form No. EWS B115)*
- Case Study: *Gunter Primary School (Form No. G170)*
- Case Study: *Las Vegas Elementary School (Form No. F120)*
- Case Study: *Liberty High School (Form No. Y115)*
- Case Study: *National Heritage Academy (Form No. A110)*
- *Engineered Wood Construction Guide (Form No. E30)*
- *Engineered Wood in School Design (Form No. B210)*
- *Wood Construction Nets \$2.7M Savings for Arkansas School District (News Release)*
- *Wood Facts: Designing Schools with Wood (Form No. J335)*

Other Sources

- *Approaching the Design and Planning for School Capital Program with Wood*, Mikio Moronuki, Director, Research Center for Educational Facilities, Tomoe Corporation, Japan
- International Code Council *Building Valuation Data*, January-February 2009
- McGraw-Hill Construction Education *Green Building SmartMarket Report*, 2007
- *Steel v. Wood, a Cost Analysis of Superstructures*, Keith Kothmann, CPE, Construction Cost Management Co.
- U.S. Department of Labor *Construction Materials Price Index*

Additional Information

American Wood Council/American Forest & Paper Association, www.awc.org

Canadian Wood Council, www.cwc.ca

Forestry Innovation Investment, www.naturallywood.com

FPInnovations – Forintek Division, www.forintek.ca

Natural Resources Canada, <http://canadaforests.nrcan.gc.ca/?lang=en>

Southern Pine Council, www.southernpine.com

USDA Forest Service, <http://www.fs.fed.us/>

Western Wood Products Association, www2.wvpa.org

Life Cycle Assessment and Sustainability

Athena Institute, www.athenasmi.ca

Build Carbon Neutral, www.buildcarbonneutral.org

Consortium for Research on Renewable Industrial Materials, www.corrim.org

State of the World's Forests, 2009, 2007, 2001, 1997, United Nations Food and Agriculture Organization

The State of America's Forests, M. Alvarez, 2007, Society of American Foresters

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Date Submitted	12/29/2015	Section	449.3	Proponent	skip gregory
Chapter	4	Affects HVHZ	No	Attachments	No
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments**General Comments** No**Alternate Language** Yes**Related Modifications**

None

Summary of Modification

Clarifies and makes editorial modifications to the architectural details for hospitals.

Rationale

Revises this section to make it clearer to the user and inspector the detail requirements for hospitals. Gives a range of acceptable separation of ductwork and provides a construction process detail regarding the construction of fire rated walls and smoke barriers.

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 cost of compliance

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to 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**

Yes.

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

Is the proposed code modification part of a prior code version? No

2nd Comment Period

6887-A5

Proponent	skip gregory	Submitted	6/4/2016	Attachments	Yes
Rationale					
This comment revises paragraph 449.3.4.1. in accordance with the TAC's rejection of the modification. This comment with new language makes it clear the atrium must be visually open to the exterior of the building. It also exempts new born nurseries and the NICU rooms because daylight is harmful to the eyes of an infant and because the referenced FGI Guidelines already requires daylight in these areas for the staff and families but not directly on the infant. This comment is in support of the other revisions of the original modification.					
Fiscal Impact Statement					
Impact to local entity relative to enforcement of code					
There is no impact to localt enities					
Impact to building and property owners relative to cost of compliance with code					
There is no impact to building and proprety owners.					
Impact to industry relative to the cost of compliance with code					
There is no impact to industry					
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 comment has a reasonable and substantial to health of patients					
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction					
This comment strengthens and improves the code.					
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities					
This comment does not discriminate agains any product or material or method					
Does not degrade the effectiveness of the code					
This comment does not degrade the code.					
Is the proposed code modification part of a prior code version? No					

449.3.4 Architectural details, surfaces, and furnishings. (Reference The Guidelines for other requirements.)

449.3.4.1 Each patient sleeping room shall have a window(s) with a view to the ~~outside of the building exterior or to an atrium that is visible from the patient's bed except when a cubicle curtain is closed.~~ The clear opening of the patient room window's width and height shall have a minimum of 20 feet (6.10m) unobstructed vista to any permanent structure or equipment, and a minimum of 15 feet (4.57 m) unobstructed vista to any vehicular driveway parking area or to the property line measured horizontally from the plane of the window.

449.3.4.2 Ceilings in rooms with ceiling-mounted surgical light fixtures and in kitchens 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 the doors are not required to be equipped with closers, a door coordinator is not required.

449.3.4.4 Toilet compartment partitions and urinal screens shall be constructed of products that do not rust, corrode or delaminate.

449.3.4.5 All fire walls, smoke barriers, horizontal exits and exit passageway partitions shall be constructed prior to the construction of all intervening walls. Where rated walls, barriers or partitions intersect, the continuity of the higher priority wall, barrier, or partition shall be maintained through the intersection.

449.3.4.6 Smoke barriers shall be constructed so as to provide a continuous smoke-tight membrane from exterior wall to exterior wall and from the floor to the

underside of the floor or roof deck above. This includes interstitial space and the area above solid monolithic fire-tested rated ceiling membranes. Roof trusses shall be permitted to penetrate portions of the smoke barrier located above the fire-rated ceiling membrane where the annular space between the penetrating truss member and the smoke barrier is sealed to limit the transfer of smoke.

449.3.4.7 Where it is not possible to visually inspect a fire-rated partition, wall or barrier or a smoke barrier that extends through the attic or interstitial space to the roof or floor deck above because of the location of a monolithic ceiling membrane, ceiling access panel(s) shall be installed adjacent to each side of the partition, wall or barrier at intervals not exceeding 30 feet (9.00 m) and in such locations as necessary to view all surfaces of the partition, wall or barrier. Other ceiling access panels shall only be installed as required by other sections of the code. Partitions, walls and barriers requiring protected openings or penetrations shall be identified in accordance with Section 703 of this code.

449.3.4.8 Where electrical conduits, cable trays, ducts and utility pipes pass through the smoke barrier, the utilities shall be located so that access is maintained to adjacent wall surfaces and to all damper access panels.

The details shall show the studs and reinforcing half studs so that proper support is provided for the wall surfacing material. There shall be a minimum clearance of 4 6 inches (152102 mm) between all conduits, piping and duct work insulation that are located parallel or adjacent to all a fire rated wall and fire/smoke-rated walls or to a smoke barrier to facilitate the inspection of these walls.

449.3.4.9 The use of pocket sliding or folding doors to patient use toilet, baths, or showers rooms shall not be permitted. A sliding door equipped with sliding door hardware located on the patient room side of the wall and not equipped with a bottom door track shall be permitted.

449.3.4 Architectural details, surfaces, and furnishings. (Reference The Guidelines for other requirements.)

449.3.4.1 Each patient sleeping room, except for new born nurseries and neonatal intensive care units or rooms, shall have a window(s) with a view, visible from the patients bed, to the outside of the building exterior of the building or to an atrium that is visually open to the exterior of the building. ~~that is visible from the patients bed except when a cubicle curtain is closed.~~

.The clear opening of the patient room window's width and height shall have a minimum of 20 feet (6.10m) unobstructed vista to any permanent structure or equipment, and a minimum of 15 feet (4.57 m) unobstructed vista to any vehicular driveway parking area or to the property line measured horizontally from the plane of the window.

449.3.4.2 Ceilings in rooms with ceiling-mounted surgical light fixtures and in kitchens 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 the doors are not required to be equipped with closers, a door coordinator is not required.

449.3.4.4 Toilet compartment partitions and urinal screens shall be constructed of products that do not rust, corrode or delaminate.

449.3.4.5 All fire walls, smoke barriers, horizontal exits and exit passageway partitions shall be constructed prior to the construction of all intervening walls. Where rated walls, barriers or partitions intersect, the continuity of the higher priority wall, barrier, or partition shall be maintained through the intersection.

449.3.4.6 Smoke barriers shall be constructed so as to provide a continuous smoke-tight membrane from exterior wall to exterior wall and from the floor to the

underside of the floor or roof deck above. This includes interstitial space and the area above solid monolithic fire-tested rated ceiling membranes. Roof trusses shall be permitted to penetrate portions of

the smoke barrier located above the fire-rated ceiling membrane where the annular space between the penetrating truss member and the smoke barrier is sealed to limit the transfer of smoke.

449.3.4.7 Where it is not possible to visually inspect a fire-rated partition, wall or barrier or a smoke barrier that extends through the attic or interstitial space to the roof or floor deck above because of the location of a monolithic ceiling membrane, ceiling access panel(s) shall be installed adjacent to each side of the partition, wall or barrier at intervals not exceeding 30 feet (9.00 m) and in such locations as necessary to view all surfaces of the partition, wall or barrier. Other ceiling access panels shall only be installed as required by other sections of the code. Partitions, walls and barriers requiring protected openings or penetrations shall be identified in accordance with Section 703 of this code.

449.3.4.8 Where electrical conduits, cable trays, ducts and utility pipes pass through the smoke barrier, the utilities shall be located so that access is maintained to adjacent wall surfaces and to all damper access panels.

The details shall show the studs and reinforcing half studs so that proper support is provided for the wall surfacing material. There shall be a minimum clearance of 4 6 inches (152102 mm) between all conduits, piping and duct work insulation that are located parallel or adjacent to all a fire rated wall and fire/smoke-rated walls or to a smoke barrier to facilitate the inspection of these walls.

449.3.4.9 The use of pocket sliding or folding doors to patient use toilet, baths, or showers rooms shall not be permitted. A sliding door equipped with sliding door hardware located on the patient room side of the wall and not equipped with a bottom door track shall be permitted.

Date Submitted	12/30/2015	Section	453.25.4	Proponent	Don Whitehead
Chapter	4	Affects HVHZ	No	Attachments	No
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments**General Comments** Yes**Alternate Language** Yes**Related Modifications****Summary of Modification**

Remove a portion of the code and reference a portion of ICC 500 regarding wind load requirements.

Rationale

The ICC 500 provides an updated structural standard for wind loads. Since the HVAC equipment wind load requirements are not addressed in ICC 500, that portion shall be retained.

Fiscal Impact Statement**Impact to local entity relative to enforcement of code**

The ICC 500 will be much easier to enforce.

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

The difference in the cost of compliance with the wind load requirements of ICC 500 and the current wind load requirements is negligible.

Impact to industry relative to the cost of compliance with code

Virtually 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**

The wind load requirements of the ICC 500 are more widely understood and easier to enforce, which will substantially improve the health, safety, and welfare of the occupants.

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

The referencing of the wind load requirements of the ICC 500 will improve the understanding of the code.

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

The wind load requirements of the ICC 500 do not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

The wind load requirements of the ICC 500 do not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period

6910-A2	Proponent	Don Whitehead	Submitted	5/26/2016	Attachments	Yes
	Rationale					
	Add year of ICC 500 and require hurricane wind loads.					
	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.					
6910-A1	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					
	Defines safety requirements for a storm shelter.					
	Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction					
	Strengthens the code by using a national standard for storm shelter requirements.					
	Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities					
	National standard does not discriminate.					
	Does not degrade the effectiveness of the code					
	National standard does not degrade.					
6910-A1	Is the proposed code modification part of a prior code version? No					

1st Comment Period History

6910-A1	Proponent	Don Whitehead	Submitted	2/2/2016	Attachments	Yes
	Rationale					
	Retain Section 453.25.4.3.2, which is not addressed in ICC 500.					
	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					
6910-A1	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					
	Retaining existing language.					
	Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction					
	Retaining existing language.					
	Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities					
	Retaining existing language.					
	Does not degrade the effectiveness of the code					
	Retaining existing language.					
6910-A1	Is the proposed code modification part of a prior code version? No					

2nd Comment Period

SP6910-G2	Proponent	James Bell	Submitted	6/21/2016	Attachments	No
	Comment: At the very least the requirements found in the ICC-500 compared to the current EHPA would require exterior component & cladding companies to re-test to the higher pressure and impact requirements which would increase the cost to comply with the code.					

1st Comment Period History

SP6910-G1	Proponent	James Bell	Submitted	2/24/2016	Attachments	No
	Comment: ICC500 is titled Standard For The Design And Construction Of Storm Shelters. Within the Standard are separate Structural Design Criteria, and Others, for Tornado Shelters and for Hurricane Shelters. To minimize conflict, the Code should specifically indicate whether EHPAs are to comply with Tornado Shelter design or Hurricane Shelter design. Considerable research on the subject can be found at: http://www.floridadisaster.org/Response/engineers/SESPPlans/2012SESPPlan/documents/2012-SESP-Final_Appx%20G_1-31-12.pdf . At this time adoption of ICC500 is transitioning from one Edition (date) to the next; again to minimize conflict, applicable Edition (date) should be stated in the Code. It is reasonable to expect significant cost increases for Building Envelope Products, changing from the current EHPA Standard to ICC500, primarily resulting from the need to resist much higher Missile Impact Energy (Windborne Debris), as well as the Wind Load.					

453.25.4 Structural standard for wind loads. At a minimum, EHPAs shall be designed for wind loads in accordance with ASCE 7, Minimum Design Loads for Buildings and Other Structures, Risk Category IV (Essential Buildings) ICC 500 Standard for the Design and Construction of Storm Shelters. Openings shall withstand the impact of wind-borne debris missiles in accordance with the impact and cyclic loading criteria per ASTM E-1886, and ASTM E-1996 or SBC/SSTD-12. Based on a research document, *Emergency Shelter Design Criteria for Educational Facilities*, by the University of Florida for the DOE, it is highly recommended by the department that the shelter be designed using the map wind speed plus 40 mph.

453.25.4.1 Missile impact criteria. The building enclosure, including walls, roofs, glazed openings, louvers and doors, shall not be perforated or penetrated by a flying object. For walls and roofs, the missile criteria are as provided in ASTM E-1886 and ASTM E-1996 or SBC/SSTD-12.

453.25.4.1.1 Materials used for walls, roofs, windows, louvers, and doors shall be certified for resistance to missile impact criteria.

453.25.4.1.2 The glazed openings or permanent protective systems over glazed openings shall be designed for cyclic loading.

453.25.4.2 Roofs. Roof decks shall be cast-in-place 4 inch (102 mm) or more, normal weight concrete. Concrete decks shall be waterproof. Systems other than cast-in-place concrete shall have adequate bearing, anchorage against wind uplift, diaphragm action, and resistance to rain that are equivalent to a cast-in-place system.

Exception: Structural precast concrete roofs, composite metal decks with normal weight concrete roofs, or other systems and materials that meet the wind load and missile impact criteria may be used.

453.25.4.2.1 Light weight concrete or insulating concrete may be used on roof decks of EHPAs provided the roof decks are at least 4 inch (102 mm) cast-in-place normal weight concrete or other structural systems of equivalent strength.

453.25.4.2.2 Roof openings (e.g., HVAC fans, ducts, skylights) shall be designed to meet the wind load and missile impact criteria.

453.25.4.2.3 Roof coverings shall be specified and designed according to the latest ASTM and Factory Mutual Standards for materials and wind uplift forces. Roofs shall be inspected by a licensed engineer/architect and a representative of the roofing manufacturer.

453.25.4.2.4 Roofs shall have adequate slope and drains sized for normal use and shall have emergency overflow scuppers.

453.25.4.2.5 Parapets shall satisfy the wind load and missile impact criteria; roof overhangs shall resist uplift forces.

453.25.4.3 Windows. All unprotected window assemblies and their anchoring systems shall be designed and installed to meet the wind load and missile impact criteria.

453.25.4.3.1 Windows may be provided with permanent protective systems, provided the protective system is designed and installed to meet the wind load and missile impact criteria and completely covers the window assembly and anchoring system.

~~453.25.4.3.2 EHPAs shall have mechanical ventilation systems. Ventilation shall be provided at a minimum rate of 2 cfm per square foot (0.6 m³/min. per square meter) of EHPA floor area. The mechanical ventilation system shall be connected to the EHPA's emergency power.~~

~~453.25.4.4 Doors. All exterior and interior doors subject to possible wind exposure and/or missile impact shall have doors, frames, anchoring devices, and vision panels designed and installed to resist the wind load and missile impact criteria or such doors, frames, anchoring devices, and vision panels shall be covered with permanent protective systems designed and installed to resist the wind load and missile impact criteria.~~

453.25.4.51 Exterior envelope. The exterior envelope, louvers over air intakes and vents, and gooseneck type intakes and vents of EHPAs shall be designed and installed to meet the wind load and missile impact criteria.

453.25.4.51.1 HVAC equipment mounted on roofs and anchoring systems shall be designed and installed to meet the wind load criteria.

453.25.4.51.2 Roof mounted HVAC equipment shall have a 12-inch-high (305 mm) curb around the roof opening and be designed to prevent the entry of rain water.

453.25.4.6 Foundations and floor slabs. Foundations shall be designed to resist all appropriate loads and load combinations, including overturning moments due to wind. The floor elevation and necessary life safety and other emergency support systems of EHPAs shall be elevated above the maximum storm surge inundation elevation associated with a Category 4 hurricane event. Storm surge elevations shall be identified by the most current edition of the regional Sea Lake and Overland Surges from Hurricanes (SLOSH) studies and atlases.

453.25.4 Structural standard for wind loads. At a minimum, EHPAs shall be designed for wind loads in accordance with ASCE 7, Minimum Design Loads for Buildings and Other Structures, Risk Category IV (Essential Buildings) ICC 500 Standard for the Design and Construction of Storm Shelters. Openings shall withstand the impact of wind-borne debris missiles in accordance with the impact and cyclic loading criteria per ASTM E-1886, and ASTM E-1996 or SBC/SSTD-12. Based on a research document, *Emergency Shelter Design Criteria for Educational Facilities*, by the University of Florida for the DOE, it is highly recommended by the department that the shelter be designed using the map wind speed plus 40 mph.

453.25.4.1 Missile impact criteria. The building enclosure, including walls, roofs, glazed openings, louvers and doors, shall not be perforated or penetrated by a flying object. For walls and roofs, the missile criteria are as provided in ASTM E-1886 and ASTM E-1996 or SBC/SSTD-12.

453.25.4.1.1 Materials used for walls, roofs, windows, louvers, and doors shall be certified for resistance to missile impact criteria.

453.25.4.1.2 The glazed openings or permanent protective systems over glazed openings shall be designed for cyclic loading.

453.25.4.2 Roofs. Roof decks shall be cast in-place 4-inch (102 mm) or more, normal weight concrete. Concrete decks shall be waterproof. Systems other than cast-in-place concrete shall have adequate bearing, anchorage against wind uplift, diaphragm action, and resistance to rain that are equivalent to a cast-in-place system.

Exception: Structural precast concrete roofs, composite metal decks with normal weight concrete roofs, or other systems and materials that meet the wind load and missile impact criteria may be used.

453.25.4.2.1 Light weight concrete or insulating concrete may be used on roof decks of EHPAs provided the roof decks are at least 4-inch (102 mm) cast-in-place normal weight concrete or other structural systems of equivalent strength.

453.25.4.2.2 Roof openings (e.g., HVAC fans, ducts, skylights) shall be designed to meet the wind load and missile impact criteria.

453.25.4.2.3 Roof coverings shall be specified and designed according to the latest ASTM and Factory Mutual Standards for materials and wind uplift forces. Roofs shall be inspected by a licensed engineer/architect and a representative of the roofing manufacturer.

453.25.4.2.4 Roofs shall have adequate slope and drains sized for normal use and shall have emergency overflow scuppers.

453.25.4.2.5 Parapets shall satisfy the wind load and missile impact criteria; roof overhangs shall resist uplift forces.

453.25.4.3 Windows. All unprotected window assemblies and their anchoring systems shall be designed and installed to meet the wind load and missile impact criteria.

453.25.4.3.1 Windows may be provided with permanent protective systems, provided the protective system is designed and installed to meet the wind load and missile impact criteria and completely covers the window assembly and anchoring system.

453.25.4.3.2 EHPAs shall have mechanical ventilation systems. Ventilation shall be provided at a minimum rate of 2 cfm per square foot (0.6 m³/min. per square meter) of EHPA floor area. The mechanical ventilation system shall be connected to the EHPA's emergency power.

~~**453.25.4.4 Doors.** All exterior and interior doors subject to possible wind exposure and/or missile impact shall have doors, frames, anchoring devices, and vision panels designed and installed to resist the wind load and missile impact criteria or such doors, frames, anchoring devices, and vision panels shall be covered with permanent protective systems designed and installed to resist the wind load and missile impact criteria.~~

453.25.4.51 Exterior envelope. The exterior envelope, louvers over air intakes and vents, and gooseneck type intakes and vents of EHPAs shall be designed and installed to meet the wind load and missile impact criteria.

453.25.4.51.1 HVAC equipment mounted on roofs and anchoring systems shall be designed and installed to meet the wind load criteria.

453.25.4.51.2 Roof mounted HVAC equipment shall have a 12-inch-high (305 mm) curb around the roof opening and be designed to prevent the entry of rain water.

453.25.4.6 Foundations and floor slabs. Foundations shall be designed to resist all appropriate loads and load combinations, including overturning moments due to wind. The floor elevation and necessary life safety and other emergency support systems of EHPAs shall be elevated above the maximum storm surge inundation elevation associated with a Category 4 hurricane event. Storm surge elevations shall be identified by the most current edition of the regional Sea Lake and Overland Surges from Hurricanes (SLOSH) studies and atlases.

453.25.4 Structural standard for wind loads. At a minimum, EHPAs shall be designed for hurricane wind loads in accordance with ASCE 7, Minimum Design Loads for Buildings and Other Structures, Risk Category IV (Essential Buildings) ICC 500-2014 Standard for the Design and Construction of Storm Shelters. Openings shall withstand the impact of wind-borne debris missiles in accordance with the impact and cyclic loading criteria per ASTM E-1886, and ASTM E-1996 or SBC/SSTD-12. Based on a research document, *Emergency Shelter Design Criteria for Educational Facilities*, by the University of Florida for the DOE, it is highly recommended by the department that the shelter be designed using the map wind speed plus 40 mph.

453.25.4.1 Missile impact criteria. The building enclosure, including walls, roofs, glazed openings, louvers and doors, shall not be perforated or penetrated by a flying object. For walls and roofs, the missile criteria are as provided in ASTM E-1886 and ASTM E-1996 or SBC/SSTD-12. **Enclosure classifications.** Enclosure classifications for EHPAs shall be determined in accordance with ASCE 7-10, Section 26.2.

453.25.4.1.1 Materials used for walls, roofs, windows, louvers, and doors shall be certified for resistance to missile impact criteria.

453.25.4.1.2 The glazed openings or permanent protective systems over glazed openings shall be designed for cyclic loading.

453.25.4.2 Roofs. Roof decks shall be cast in place 4 inch (102 mm) or more, normal weight concrete. Concrete decks shall be waterproof. Systems other than cast in place concrete shall have adequate bearing, anchorage against wind uplift, diaphragm action, and resistance to rain that are equivalent to a cast in place system.

Exception: Structural precast concrete roofs, composite metal decks with normal weight concrete roofs, or other systems and materials that meet the wind load and missile impact criteria may be used.

453.25.4.2.1 Light weight concrete or insulating concrete may be used on roof decks of EHPAs provided the roof decks are at least 4 inch (102 mm) cast in place normal weight concrete or other structural systems of equivalent strength.

453.25.4.2.2 Roof openings (e.g., HVAC fans, ducts, skylights) shall be designed to meet the wind load and missile impact criteria.

453.25.4.2.3 Roof coverings shall be specified and designed according to the latest ASTM and Factory Mutual Standards for materials and wind uplift forces. Roofs shall be inspected by a licensed engineer/architect and a representative of the roofing manufacturer.

~~453.25.4.2.4~~ Roofs shall have adequate slope and drains sized for normal use and shall have emergency overflow scuppers.

~~453.25.4.2.5~~ Parapets shall satisfy the wind load and missile impact criteria; roof overhangs shall resist uplift forces.

~~453.25.4.3~~ **Windows.** All unprotected window assemblies and their anchoring systems shall be designed and installed to meet the wind load and missile impact criteria.

~~453.25.4.3.1~~ Windows may be provided with permanent protective systems, provided the protective system is designed and installed to meet the wind load and missile impact criteria and completely covers the window assembly and anchoring system.

453.25.4.3.2 Mechanical ventilation. EHPAs shall have mechanical ventilation systems. Ventilation shall be provided at a minimum rate of 2 cfm per square foot (0.6 m³/min. per square meter) of EHPA floor area. The mechanical ventilation system shall be connected to the EHPA's emergency power.

~~453.25.4.4~~ **Doors.** All exterior and interior doors subject to possible wind exposure and/or missile impact shall have doors, frames, anchoring devices, and vision panels designed and installed to resist the wind load and missile impact criteria or such doors, frames, anchoring devices, and vision panels shall be covered with permanent protective systems designed and installed to resist the wind load and missile impact criteria.

453.25.4.53 Exterior envelope. The exterior envelope, louvers over air intakes and vents, and gooseneck type intakes and vents of EHPAs shall be designed and installed to meet the wind load and missile impact criteria.

453.25.4.53.1 HVAC equipment mounted on roofs and anchoring systems shall be designed and installed to meet the wind load criteria.

453.25.4.53.2 Roof mounted HVAC equipment shall have a 12-inch-high (305 mm) curb around the roof opening and be designed to prevent the entry of rain water.

~~453.25.4.6 Foundations and floor slabs.~~ Foundations shall be designed to resist all appropriate loads and load combinations, including overturning moments due to wind. The floor elevation and necessary life safety and other emergency support systems of EHPAs shall be elevated above the maximum storm surge inundation elevation associated with a Category 4 hurricane event. Storm surge elevations shall be identified by the most current edition of the regional Sea Lake and Overland Surges from Hurricanes (SLOSH) studies and atlases.

Date Submitted	12/31/2015	Section	3109	Proponent	Rebecca Quinn obo FL Dept Emerg Mg
Chapter	39	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments**General Comments** Yes**Alternate Language** Yes**Related Modifications****Summary of Modification**

Revises Sec 3109 to align with coastal high hazard areas requirements (Zone V) of ASCE 24-14 Flood Resistant Design and Construction (referenced Sec 1612), while retaining specific requirements for CCCL that flow from Ch 161, FS or were requested by DEP.

Rationale

Submitted on behalf of Steve Martin, State Floodplain Manager, Florida Division of Emergency Management. This proposal revises Sec 3109 to align with the coastal high hazard areas requirements (Zone V) of ASCE 24, Section 1612 while retaining more restrictive or specific requirements that flow from Chapter 161 FS or were requested by DEP. GIS analysis indicates 90% of land seaward of the Coastal Construction Control Line is also FEMA-designated special flood hazard area. Structures located both seaward of the CCCL and in a flood hazard area must comply with the more restrictive of the two sets of requirements. The benefits of resolving inconsistencies to the extent feasible include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs, local plan review will be easier, and property owners will realize savings.

In 2009 a Commission workgroup that recommended this action to resolve differences between CCCL and Zone V to minimize case-by-case resolutions. FDEM, designated by the Governor to coordinate the National Flood Insurance Program, worked with FDEP to develop the proposal.

A complete reason statement is attached. Attached to the complete reason statement are a comparison of the foundation requirements of Sec 3109 and ASCE 24, a "clean" copy of the proposal, and a side-by-side comparison of the existing 3109 text and the proposed revision.

The complete reason statement includes notes on the changes, including why some provisions are not retained and why some definitions are added. The proposal requires use of the higher of the DEP 100-year storm elevation or the elevation required by ASCE 24 or the jurisdiction. It incorporates some recent declaratory statements for consistency across all jurisdictions with CCCL.

Fiscal Impact Statement**Impact to local entity relative to enforcement of code**

Facilitates plan review by minimizing differences between CCCL and flood requirements. See attached document with text for required fields.

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

Owners will realize savings because RDPs and plan reviewers will not have to each determine the more restrictive of CCCL and flood requirements. See attached document with text for required fields.

Impact to industry relative to the cost of compliance with code

The design and construction industry will have a clearer path to compliance with both CCCL and flood requirements. See attached document with text for required fields.

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

Small business property and small business industry companies will have a clearer path to compliance with both CCCL and flood requirements. See attached document with text for required fields.

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

Preserves the requirements for structures seaward of the CCCL and flood hazard area requirements, thus no change to health, safety and welfare of the general public.

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

Improves the code by elimination of confusing and conflicting requirements. See attached document with text for required fields.

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

Proposal does not alter the materials, products, methods or systems of construction.

Does not degrade the effectiveness of the code

Improves the effectiveness of the code by eliminating confusing and conflicting requirements.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

OTHER

Explanation of Choice

Not appropriate in the foundation code because the Coastal Construction Control Line is unique to Florida.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

The Coastal Construction Control Like is unique to Florida.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

OTHER

Explanation of Choice

Not appropriate in the foundation code because the Coastal Construction Control Like is unique to Florida.

2nd Comment Period

6883-A4	Proponent	Rebecca Quinn obo FL Dept Em	Submitted	6/21/2016	Attachments	Yes
	<p>Rationale</p> <p>Submitted on behalf of Steve Martin, State Floodplain Manager, Florida Division of Emergency Management. This public comment revises/replaces proposal SP6883. It modifies the proposal to revise Sec 3109 to align more closely with the coastal high hazard areas requirements (Zone V) of ASCE 24, Section 1612 while retaining more restrictive or specific requirements that flow from Chapter 161 FS, were requested by DEP, or are on declaratory statements. GIS analysis indicates 90% of land seaward of the Coastal Construction Control Line is also FEMA-designated special flood hazard area. Structures located both seaward of the CCCL and in a flood hazard area must comply with the more restrictive of the two sets of requirements. The benefits of resolving inconsistencies to the extent feasible include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs, local plan review will be easier, and property owners will realize savings. In 2009 a Commission workgroup that recommended this action to resolve differences between CCCL and Zone V to minimize case-by-case resolutions. FDEM, designated by the Governor to coordinate the National Flood Insurance Program, worked with FDEP to develop the proposal. A complete reason statement is attached along with a "clean" copy of the proposal and a side-by-side comparison of the existing 3109 text and the proposed revision. Attached to the original proposal is a comparison of the foundation requirements of Sec 3109 and ASCE 24. The complete reason statement includes notes on the changes. The proposal requires use of the higher of the DEP 100-year storm elevation or the elevation required by ASCE 24 or the jurisdiction. It incorporates some recent declaratory statements for consistency across all jurisdictions with CCCL.</p> <p>Fiscal Impact Statement</p> <p>Impact to local entity relative to enforcement of code</p> <p>Facilitates plan review by minimizing differences between CCCL and flood requirements. See attached document with text for required fields.</p> <p>Impact to building and property owners relative to cost of compliance with code</p> <p>Owners will realize savings if RDPs and plan reviewers do not have to each determine the more restrictive of CCCL and flood requirements. See attached document with text for required fields.</p> <p>Impact to industry relative to the cost of compliance with code</p> <p>The industry will have a clearer path to compliance with both CCCL and flood requirements. See attached document with text for required fields.</p> <p>Impact to Small Business relative to the cost of compliance with code</p> <p>Small business property and small business industry companies will have a clearer path to compliance with both CCCL and flood requirements. See attached document with text for required fields.</p> <p>Requirements</p> <p>Has a reasonable and substantial connection with the health, safety, and welfare of the general public</p> <p>Preserves the requirements for structures seaward of the CCCL and flood hazard area requirements, thus no change to health, safety and welfare of the general public.</p> <p>Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction</p> <p>Improves the code by minimizing confusing and conflicting requirements. See attached document with text for required fields.</p> <p>Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities</p> <p>Proposal does not alter materials, products, methods, or systems of construction of demonstrated capabilities.</p> <p>Does not degrade the effectiveness of the code</p> <p>Improves effectiveness by minimizing confusing and conflicting requirements.</p> <p>Is the proposed code modification part of a prior code version? No</p>					

1st Comment Period History

6883-A2	Proponent	Rebecca Quinn obo FL Dept Em	Submitted	1/12/2016	Attachments	Yes
	<p>Rationale</p> <p>The Department of Environment Protection advises the proposed allowance of nonhabitable uses (as defined in this proposal) in spaces above the FEMA required elevation and below the 100-year storm elevation has only been approved in tall buildings. The proposal uses the term "low-rise building." Thus the modification is to clarify that nonhabitable uses (as defined in this proposal) are allowed in the "inbetween" space only for buildings other than low-rise buildings (i.e., buildings with mean roof height of more than 60 ft). This brings the proposal in-line with the intent of Commission declaratory statements.</p> <p>Fiscal Impact Statement</p> <p>Impact to local entity relative to enforcement of code</p> <p>Does not change the impact described for the original proposal.</p> <p>Impact to building and property owners relative to cost of compliance with code</p> <p>Does not change the impact described for the original proposal.</p> <p>Impact to industry relative to the cost of compliance with code</p> <p>Does not change the impact described for the original proposal.</p>					

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

Small business property and small business industry companies will have a clearer path to compliance with both CCCL and flood requirements. See attached document with text for required fields.

Requirements

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

Does not change the impact described for the original proposal.

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

Does not change the impact described for the original proposal.

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

Does not change the impact described for the original proposal.

Does not degrade the effectiveness of the code

Does not change the impact described for the original proposal.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

OTHER

Explanation of Choice

No change from statement for original proposal.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

No change from statement for original proposal.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

OTHER

Explanation of Choice

No change from statement for original proposal.

2nd Comment Period

Proponent	Christy Brush	Submitted	6/21/2016	Attachments	No
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Comment:

I support the amended language submitted on 6/21/2016 by Ms. Rebecca Quinn on behalf of the Florida Division of Emergency Management. The amended language more clearly explains regulatory criteria for the design and construction of habitable structures that are seaward of the DEP's CCCL and also in a flood hazard area.

SP6883-G1

SECTION 3109 STRUCTURES SEAWARD OF A COASTAL CONSTRUCTION CONTROL LINE

3109.1 General. The provisions of this section shall apply to the design and construction of new construction of habitable structures, buildings, and portions of buildings and structures, and substantial improvement or repair of substantial damage of such buildings and structures that extend wholly or partially seaward of the coastal construction control line, or seaward of the 50-foot setback line, whichever is applicable. This section does not apply to structures that are not habitable structures, as defined in this section, and that extend seaward of the coastal construction control line or seaward of the 50-foot setback line. Section 1612 shall apply to structures that are not habitable structures if located in flood hazard areas established in Section 1612.3.

3109.1.1 Scope. ~~The provisions of Section 3109 shall ensure that structures located seaward of the coastal construction control line are designed to resist the predicted forces associated with a 100-year storm event and shall apply to the following:~~

- ~~1. All habitable structures which extend wholly or partially seaward of a coastal construction control line (CCCL) or 50-foot (15.3 m) setback line.~~
- ~~2. Substantial improvement of or additions to existing habitable structures.~~
- ~~3. Swimming pools that are located in close proximity to a habitable structure or armoring.~~

3109.1.1 Modification, maintenance or repair of existing buildings and structures. The requirements of Section 3109.1 do not apply to the modification, maintenance or repair of existing buildings and structures, provided all of the following apply to the modification, maintenance, or repair:

1. Is within the limits of the existing foundation.
2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation.
3. Does not include lateral additions or the construction of enclosures below the lowest floor or deck.

Exception. If the modification or repair is determined to be substantial improvement or substantial damage, and if the building is located in a flood hazard area (Zone A and Zone V) established in Section 1612.3, the requirements of Section 1612 and ASCE 24 applicable to coastal high hazard areas shall apply.

3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose requiring special siting considerations to protect the beach-dune system, or proposed or existing structures, and public beach access and , is required prior to the start of construction. The environmental permit may condition the nature, timing and sequence of construction of permitted activities. The Department may require submittal and approval of lighting plans to provide protection to nesting sea turtles and hatchlings and their habitat, including review, submittal and approval of lighting plans.

Exception: ~~The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance or repair to any existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.~~

3109.1.2 3 Elevation certification. As part of the permit process, upon placement of the lowest horizontal structural member of the lowest floor and prior to further vertical construction, the applicant shall submit to the building official certification of the elevation of the bottom of the lowest horizontal structural member of the lowest floor shall be submitted to the building official, as built in relation to National Geodetic Vertical Datum (N.G.V.D.). Said

~~certification shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer or architect and certified by same and be submitted prior to commencing any addition work. Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building official's review shall be at the applicant's risk. The building official shall review the submitted elevation data, and any deficiencies found shall be corrected by the permit holder immediately and prior to any further work being permitted to proceed.~~

3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.

~~ARMORING. A manmade structure designed to either prevent erosion of the upland property or protect upland structures from the effects of coastal wave and current action. Armoring includes certain rigid coastal structures such as geotextile bags or tubes, seawalls, revetments, bulkheads, retaining walls or similar structures, but does not include jetties, groins or other construction whose purpose is to add sand to the beach and dune system, alter the natural coastal currents or stabilize the mouths of inlets.~~

~~BREAKAWAY WALL. A partition independent of supporting structural members that is intended to withstand design wind forces but to collapse from a water load less than that which would occur during a 100-year storm event without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.~~

~~COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.~~

~~DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified registered design professional or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line." caused by the 100-year storm.~~

~~FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.~~

~~HABITABLE STRUCTURE. Structures and buildings designed primarily for human occupancy. Structures that are not habitable include, but are not limited to, detached garages, detached accessory structures, dune walkovers, parking structures and garages, and structures without walls and roofs.~~

~~LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft. and are potential locations for shelter from storms. Typically included within this category are residences, hotels and restaurants.~~

~~LOWEST HORIZONTAL STRUCTURAL STRUCTURE MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation and is the lowest such member. Any shore-parallel structural member which supports floor, wall or column loads and transmits them to the pile foundation.~~

~~NONHABITABLE USE. For the purpose of Section 3109, use of enclosures above the elevation specified in ASCE 24 and below the 100-year storm elevation, including only parking of vehicles, storage, building access, retail shops, pool bars and other bars, snack bars, grills with portable cooking equipment, dining areas where the permanent kitchen is located landward of the coastal construction control line or above the lowest horizontal structural~~

member, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, and service/storage/back-of-house facilities.

ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave set-up of a 100-year (one-percent-annual chance) storm. This 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and an analysis of topographic and other site specific data. An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the location of the applicant's proposed structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, the Administrative Procedures Act, Florida Statutes.

REBUILDING. See definition of "Substantial improvement."

SUBSTANTIAL DAMAGE. See Section 202.

SUBSTANTIAL IMPROVEMENT. See Section 202 ~~4612~~.

3109.3 Design and construction. The design and construction of *habitable* buildings, structures and portions of buildings and structures, including substantial improvement and repair of substantial damage to buildings and structures, shall be in accordance with this section, Section 1612 and ASCE 24 for coastal high hazard areas, regardless of how such areas are designated on a Flood Insurance Rate Map. Buildings, structures and portions of buildings and structures shall be designed to minimize the potential for wind- and water-borne debris during storms.

Exception. Additions, repairs, and alterations that, when combined with all other work on a building or structure, do not constitute substantial improvement or repair of substantial damage, and provided all of the following apply:

1. The work is consistent with previously issued permits.
2. Any addition does not advance the seaward limits of the existing building or structure.

3109.3.3 Elevation standards. The bottom of the *lowest horizontal structural member* of the *lowest floor* shall be at or above the higher of one of the following:

1. The elevation specified in ASCE 24 Chapter 4;
2. The elevation specified by the jurisdiction; or

3. The ~~All habitable structures shall be elevated at or above an elevation which places the lowest horizontal structural member above the~~ 100-year storm elevation determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition). ~~the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the~~ applicant's proposed structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, Florida Statutes.

Exceptions:

- ~~1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.~~

2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:

2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.

2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure, or loss of material from beneath or behind the armoring.

2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.

2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.

3. A higher elevation standard is required by either the National Flood Insurance Program (NFIP), as found on a community's Flood Insurance Rate Map (FIRM), or the local flood damage prevention ordinance. In such instances, the higher elevation standard shall apply.

3109.4 Construction standards.

3109.3.2 Foundations. 3109.4.1 Pile foundations. All habitable Buildings and structures shall be elevated on, and securely anchored to, piles or columns that comply with this section. The space below elevated buildings and structures shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4. an adequate pile foundation. Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated erosion, scour and loads resulting from a 100-year storm including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads. All habitable structures should be anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement. The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural components. Design ratio or pile spacing to pile diameter should not be less than 8:1 for individual piles located above the design grade. Pile caps shall be set below the design grade unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.

3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Chapter 4 for pile and columns foundations:

1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the design grade, unless justified by a geotechnical analysis and the foundation design.

2. The tops of grade beams and pile caps shall be at or below the natural grade and below the design grade unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the design grade.

3. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.

Exceptions:

1. ~~Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.~~
2. ~~Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:~~
 - 2.1. ~~The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.~~
 - 2.2. ~~The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure or loss of material from beneath or behind the armoring.~~
 - 2.3. ~~The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.~~
 - 2.4. ~~The armoring must withstand the static and hydrodynamic forces of the design storm.~~

3109.3.2.2 Shear walls. In addition to the requirements of ASCE 24 Chapter 4 for shear walls:

1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline.
2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore.

Exception. Buildings and structures other than *low-rise buildings* are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent and the following design documentation is submitted:

- a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.
- b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the 100-year erosion limit, which shall be determined in consultation with the Florida Department of Environmental Protection.

3109.3.4 Enclosures below the flood elevation. Enclosures below the applicable flood elevation shall comply with all of the following:

1. Walls of enclosures shall comply with the breakaway wall requirements of ASCE 24 Section 4.6.
2. Walls of enclosures shall have flood openings in accordance with ASCE 24 Section 4.6.2, except shear walls designed in accordance with Section 3109.3.2.2.
3. If located in flood hazard areas established in Section 1612.3:
 - a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage.
 - b. Enclosures above the elevation specified in ASCE 24 or above the elevation specified by the jurisdiction and below the 100-year storm elevation shall be limited to nonhabitable use as defined in this section.
4. If not located in flood hazard areas established in Section 1612.3 (Zone X), enclosures below the 100-year storm elevation shall be limited to nonhabitable use as defined in this section.

~~3109.4.2 Walls below the 100-year storm elevation.~~ ~~No substantial walls or partitions shall be constructed below the level of the first finished floor of habitable structures. All other walls shall be designed to break away.~~

Exceptions:

- ~~1. Stairways and stairwells;~~
- ~~2. Shear walls perpendicular to the shoreline;~~
- ~~3. Shear walls parallel to the shoreline, which are limited to a maximum of 20 percent of the building length in the direction running parallel to the shore;~~
- ~~4. Shear walls parallel to the shoreline, which exceed 20 percent of the total building length (including any attached major structure) when they meet the following criteria:~~
 - ~~4.1. A certification is provided by a Florida-registered professional engineer that certifies that the increased length of shear walls, over 20 percent, are located landward of the 100-year erosion limit;~~
 - ~~4.2. A hydraulic analysis is provided and certified by a Florida-registered professional engineer that evaluates the potential impact of flow increase on the subject parcel and adjacent properties;~~
 - ~~4.3. The hydraulic analysis demonstrates that although the overall shearwall coverage is more than 20 percent, the increased shear-wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures; and~~
 - ~~4.4. The provisions under Section 3109.4.2 (Exception 4) do not include any low-rise building as defined in Section 1609.2.~~
- ~~5. Wind or sand screens constructed of fiber or wire mesh;~~
- ~~6. Light, open lattice partitions with individual, wooden lattice strips not greater than 3/4 inch (19 mm) thick and 3 inches (76 mm) wide;~~
- ~~7. Elevator shafts;~~
- ~~8. Small mechanical and electrical rooms; and~~

9. Break-away or frangible walls.

3109.5.3.1 Flood loads during a 100-year storm. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the *design grade* at the location and the higher of:

1. The stillwater elevation specified in the applicable Flood Insurance Study; or
2. The *100-year storm elevation* published by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific *100-year storm elevation* (see definition).

3109.5.1 Load basis. The structural design shall be based on the 100-year storm as determined by the Florida Department of Environmental Protection in studies published as part of the coastal construction control line establishment process. Breaking, broken and nonbreaking waves shall be considered as applicable. Design wave loading analysis shall consider vertical uplift pressures and all lateral pressures to include impact, as well as dynamic loading and the harmonic intensification resulting from repetitive waves.

3109.5.2 Hydrostatic load. Habitable structures shall be designed in consideration of the hydrostatic loads which would be expected under the conditions of maximum inundation associated with a 100-year storm event. Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed on the design storm surge with dynamic wave set-up. Both free and confined hydrostatic loads shall be considered. Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined. Vertical hydrostatic loads shall be considered as forces acting both vertically downward and upward on horizontal or inclined surfaces of major structures (e.g., floors, slabs, roofs, walls). Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces of major structures and coastal or shore protection structures. Hydrostatic loads on irregular or curving geometric surfaces may be determined in consideration of separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.

3109.5.3 Hydrodynamic loads. Habitable structures shall be designed in consideration of the hydrodynamic loads which would be expected under the conditions of a 100-year storm event. Calculations for hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with a 100-year storm event. Full intensity loading shall be applied on all structural surfaces above the design grade which would affect the flow velocities.

3109.6 Wind loads. All habitable structures shall be designed in accordance with Chapter 16.

3109.7 Swimming pools. Swimming pools located in close proximity to an existing habitable structure or armoring shall be designed with an adequate pile foundation for the erosion and scour conditions of a 100-year storm event.

3109.8 Storm debris. All structures will be designed to minimize the potential for wind- and water-borne debris during a storm.

3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared and sealed by a Florida-registered professional engineer and submitted to the building official:

1. For site-specific determination of *design grade*, a report of the assumptions and methods used.
2. For shear walls, the certifications required in Section 3109.3.2.

Modify by adding in proposed 3109.3.4 Enclosures below the flood elevation.

3109.3.4 Enclosures below the flood elevation. Enclosures below the applicable flood elevation shall comply with all of the following:

1. Walls of enclosures shall comply with the breakaway wall requirements of ASCE 24 Section 4.6.
2. Walls of enclosures shall have flood openings in accordance with ASCE 24 Section 4.6.2, except shear walls designed in accordance with Section 3109.3.2.2.
3. If located in flood hazard areas established in Section 1612.3:
 - a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage.
 - b. In buildings and structures other than low-rise buildings, Enclosures above the elevation specified in ASCE 24 or above the elevation specified by the jurisdiction and below the 100-year storm elevation shall be limited to nonhabitable use as defined in this section.
4. If not located in flood hazard areas established in Section 1612.3 (Zone X), in buildings and structures other than low-rise buildings, enclosures below the 100-year storm elevation shall be limited to nonhabitable use as defined in this section.

SECTION 3109 STRUCTURES SEAWARD OF A COASTAL CONSTRUCTION CONTROL LINE

3109.1 General. The provisions of this section shall apply to the design and construction of *habitable structures*, and *substantial improvement* or repair of *substantial damage* of such structures, that are entirely seaward of, and portions of such structures that extend seaward of, the *coastal construction control line* or seaward of the *50-foot setback line*, whichever is applicable. This section does not apply to structures that are not *habitable structures*, as defined in this section. Section 1612 shall apply to *habitable structures* and structures that are not *habitable structures* if located in whole or in part in *special flood hazard areas* established in Section 1612.3.

3109.1.1 Scope. The provisions of Section 3109 shall ensure that structures located seaward of the coastal construction control line are designed to resist the predicted forces associated with a 100-year storm event and shall apply to the following:

1. — All habitable structures which extend wholly or partially seaward of a coastal construction control line (CCCL) or 50-foot (15.3 m) setback line.
2. — Substantial improvement of or additions to existing habitable structures.
3. — Swimming pools that are located in close proximity to a habitable structure or armoring.

3109.1.1 Modification, maintenance or repair of existing *habitable structures*. The requirements of Section 3109 do not apply to the modification, maintenance or repair of existing *habitable structures*, provided all of the following apply to the modification, maintenance, or repair:

1. Is within the limits of the existing foundation.
2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation.
3. Does not include any additions or enclosures added, constructed, or installed below the lowest floor or deck.

Advisory Note. If the modification or repair is determined to be *substantial improvement* or *substantial damage*, and if the building is located in a *special flood hazard area* (Zone A and Zone V) established in Section 1612.3, the requirements of *Florida Building Code, Existing Building* applicable to *flood hazard areas* shall apply.

3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose, requiring special siting considerations to protect the beach-dune system, or proposed or existing structures, and public beach access, and is required prior to the start of construction. The environmental permit may condition the nature, timing and sequence of construction of permitted activities to provide protection to nesting sea turtles and hatchlings and their habitat, including review, submittal and approval of lighting plans.

Exception: The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance or repair to any existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.

3109.1.2 3 Elevation Certification. As part of the permit process, and upon placement of the *lowest horizontal structural member of the lowest floor* and prior to further vertical construction, ~~the applicant shall submit to the building official certification of the elevation of the bottom of the lowest horizontal structural member of the lowest floor shall be submitted to the building official, as built in relation to National Geodetic Vertical Datum (N.G.V.D.).~~ Said certification shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer or architect and certified by same and be submitted prior to commencing any addition work. Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building official's review shall be at the applicant's risk. ~~The building official shall review the submitted elevation data, and any deficiencies found shall be corrected by the permit holder immediately and prior to any further work being permitted to proceed.~~

3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.

ALLOWED USE. For the purpose of Section 3109.3.4, use of enclosures above, or with *dry floodproofing* to, the elevation specified in ASCE 24 and below the *100-year storm elevation* includes, but is not limited to use for parking of vehicles, storage, building access, small mechanical and electrical rooms, retail shops, commercial pool bars and other bars, snack bars, commercial grills with portable cooking equipment, commercial dining areas where the permanent kitchen is located landward of the *coastal construction control line* or above the *100-year storm elevation*, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, commercial service/storage/back-of-house facilities; and uses of a similar nature that are not spaces for living, sleeping or cooking.

ARMORING. A manmade structure designed to either prevent erosion of the upland property or protect upland structures from the effects of coastal wave and current action. Armoring includes certain rigid coastal structures such as geotextile bags or tubes, seawalls, revetments, bulkheads, retaining walls or similar structures, but does not include jetties, groins or other construction whose purpose is to add sand to the beach and dune system, alter the natural coastal currents or stabilize the mouths of inlets.

BREAKAWAY WALL. A partition independent of supporting structural members that is intended to withstand design wind forces but to collapse from a water load less than that which would occur during a 100-year storm event without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.

COASTAL A ZONE. See Section 202.

COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.

COASTAL HIGH HAZARD AREA. See Section 202.

COMBINED TOTAL STORM TIDE ELEVATION (VALUE). The elevation of combined total tides including storm surges, astronomical tide and dynamic wave set-up which occurs primarily inside the wave breaking zone. The combined total storm tide elevations (values) for various return periods are determined by the Florida Department of Environmental Protection for each coastal county with an established coastal construction control lines and published in reports for each county titled "Revised Combined Total Storm Tide Frequency Analysis."

DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The

design grade shall be determined by a site-specific analysis prepared by a qualified registered design professional or the design grade may be determined by the Florida Department of Environmental Protection in the report titled “One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line” (1999). ~~caused by the 100-year storm.~~

DRY FLOODPROOFING. See Section 202.

FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.

FLOOD HAZARD AREA. See Section 202.

HABITABLE STRUCTURE. Structures designed primarily for human occupancy and are potential locations for shelter from storms. Typically included within this category are residences, hotels and restaurants.

LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft.

LOWEST FLOOR. For the purpose of Section 3109, the lowest floor of the lowest enclosed area, excluding any enclosure that complies with the requirements and limitations of Section 3109.3.4 applicable to enclosures below the flood elevation.

LOWEST HORIZONTAL STRUCTURAL STRUCTURE MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation. ~~Any shore-parallel structural member which supports floor, wall or column loads and transmits them to the pile foundation.~~

100 ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave setup of a 100-year (one-percent-annual chance) storm. This 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and an analysis of topographic and other site specific data and found in the report “One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line” (1999). An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the location of the applicant’s proposed structure as part of the environmental permit application process.

REBUILDING. See definition of “Substantial improvement.”

SPECIAL FLOOD HAZARD AREA. See Section 202.

SUBSTANTIAL DAMAGE. See Section 202.

SUBSTANTIAL IMPROVEMENT. See Section 202. See definition in Section 161.54(12), Florida Statutes.

3109.3 Design and construction. The design and construction of *habitable structures*, including *substantial improvement* and repair of *substantial damage* to such structures, shall be in accordance with this section and with Section 1612 and ASCE 24, as applicable. *Habitable structures* subject to this section shall be designed to minimize the potential for wind and water-borne debris during storms.

Exception. Additions, repairs, and alterations that, when combined with all other work on a structure, do not constitute *substantial improvement* or repair of *substantial damage*, and provided all of the following apply:

- a. The work does not violate the terms of previously issued permits.
- b. Any addition does not advance the seaward limits of the existing structure.

3109.3.3 Elevation standards. The bottom of the lowest horizontal structural member of the lowest floor shall be at or above the higher of one of the following:

- 1. The elevation specified in ASCE 24 Chapter 4 if the structure is in a coastal high hazard area or Coastal A Zone;
- 2. The elevation specified by the jurisdiction; or
- 3. The All habitable structures shall be elevated at or above an elevation which places the lowest horizontal structural member above the 100-year storm elevation determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition). the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the applicant's proposed habitable structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, Florida Statutes.

Exceptions:

- 1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.
- 2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:
 - 2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.
 - 2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure, or loss of material from beneath or behind the armoring.
 - 2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.
 - 2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.
- 3. A higher elevation standard is required by either the National Flood Insurance Program (NFIP), as found on a community's Flood Insurance Rate Map (FIRM), or the local flood damage prevention ordinance. In such instances, the higher elevation standard shall apply.

3109.4 Construction standards.

3109.3.2 Foundations. *Habitable structures* shall be elevated and supported on piles or columns that are designed to comply with this section. The space below elevated *habitable structures* shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4. Foundations shall be designed to comply with ASCE 24 Section 4.5, except shallow foundations and stemwalls are not permitted.

3109.4.1 Pile foundations. All habitable structures shall be elevated on, and securely anchored to, an adequate pile foundation. Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated erosion, scour and loads resulting from a 100-year storm including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads. All habitable structures should be anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement. The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural components. Design ratio or pile spacing to pile diameter should not be less than 8:1 for individual piles located above the design grade. Pile caps shall be set below the design grade unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.

Exceptions:

1. — Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.
2. — Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:
 - 2.1. — The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.
 - 2.2. — The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure or loss of material from beneath or behind the armoring.
 - 2.3. — The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.
 - 2.4. — The armoring must withstand the static and hydrodynamic forces of the design storm.

3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Section 4.5 for pile and columns foundations:

1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the *design grade*, unless justified by a geotechnical analysis and the foundation design.

2. The tops of grade beams and pile caps shall be at or below the natural grade and below the *design grade* unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the *design grade*.

3. Pile penetration shall take into consideration the anticipated loss of soil above the *design grade*.

3109.3.2.2 Shear walls. Shear walls shall comply with one of the following:

1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline.

2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore and wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts.

Exception. *Habitable structures other than low-rise buildings* are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent, wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts, and the following design documentation is submitted:

a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.

b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the predicted 100-year storm erosion limit.

3109.3.4 Walls and enclosures below the flood elevation. Walls and enclosures below the elevation required by Section 3109.3.3 and above the *design grade* elevation shall comply with all of the following, as applicable:

1. Walls seaward of the CCCL shall comply with the breakaway wall requirements of ASCE 24 Section 4.6 using the lesser of the flood loads specified by Section 3109.3.1.

2. Elevator shafts and stairways shall comply with ASCE 24.

3. For nonresidential buildings located outside of a *coastal high hazard area* (Zone V):

a. Small mechanical and electrical rooms with *dry floodproofing* to the elevation specified in ASCE 24 or by the jurisdiction are not required to be breakaway.

b. Stairwells are not required to be breakaway provided the walls have flood openings in accordance with this section.

4. In *special flood hazard areas* (Zone V and Zone A), all breakaway walls below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall have flood openings in accordance with ASCE 24 Section 4.6.2. Flood openings are not required in:

a. Shear walls designed in accordance with Section 3109.3.2.2.

b. Walls of enclosures below buildings not located in *special flood hazard areas (Zone X)*.

c. Walls that are designed and constructed in conformance with the *dry floodproofing* requirements of ASCE 24 in areas other than *coastal high hazard areas*.

5. In *special flood hazard areas (Zone V and Zone A)*:

a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage unless enclosures are designed and constructed in accordance with the *dry floodproofing* requirements of ASCE 24.

b. Enclosures above the elevation specified in ASCE 24 or by the jurisdiction and below the *100-year storm elevation*, or enclosures with *dry floodproofing* to the elevation specified in ASCE 24 or by the jurisdiction, shall be limited to *allowed use* as defined in this section.

6. In *habitable structures* not located in *special flood hazard areas (Zone X)*, uses of enclosures below the *100-year storm elevation* shall be limited to *allowed use* as defined in this section.

3109.4.2 Walls below the 100-year storm elevation. No substantial walls or partitions shall be constructed below the level of the first finished floor of habitable structures. All other walls shall be designed to break away.

Exceptions:

1. — Stairways and stairwells;

2. — Shear walls perpendicular to the shoreline;

3. — Shear walls parallel to the shoreline, which are limited to a maximum of 20 percent of the building length in the direction running parallel to the shore;

4. — Shear walls parallel to the shoreline, which exceed 20 percent of the total building length (including any attached major structure) when they meet the following criteria:

4.1. — A certification is provided by a Florida-registered professional engineer that certifies that the increased length of shear walls, over 20 percent, are located landward of the 100-year erosion limit;

4.2. — A hydraulic analysis is provided and certified by a Florida-registered professional engineer that evaluates the potential impact of flow increase on the subject parcel and adjacent properties;

4.3. — The hydraulic analysis demonstrates that although the overall shearwall coverage is more than 20 percent, the increased shear-wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures; and

4.4. — The provisions under Section 3109.4.2 (Exception 4) do not include any low-rise building as defined in Section 1609.2.

5. — Wind or sand screens constructed of fiber or wire mesh;

6. — Light, open lattice partitions with individual, wooden lattice strips not greater than 3/4 inch (19 mm) thick and 3 inches (76 mm) wide;

- 7. — Elevator shafts;
- 8. — Small mechanical and electrical rooms; and
- 9. — Break-away or frangible walls.

3109.5 ~~3.1~~ Flood loads during a 100-year storm. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the *design grade* at the location and the higher of:

- 1. The stillwater elevation specified in the applicable Flood Insurance Study referenced to the datum on the Flood Insurance Rate Map, if the structure is also in a *coastal high hazard area* (Zone V); or
- 2. The *combined total storm tide elevation (value)* for the 100-year return period identified by the Florida Department of Environmental Protection in reports titled “Revised Combined Total Storm Tide Frequency Analysis” prepared for each county with an established *coastal construction control lines*.

3109.5.1 Load basis. The structural design shall be based on the 100-year storm as determined by the Florida Department of Environmental Protection in studies published as part of the coastal construction control line establishment process. Breaking, broken and nonbreaking waves shall be considered as applicable. Design wave loading analysis shall consider vertical uplift pressures and all lateral pressures to include impact, as well as dynamic loading and the harmonic intensification resulting from repetitive waves.

3109.5.2 Hydrostatic load. Habitable structures shall be designed in consideration of the hydrostatic loads which would be expected under the conditions of maximum inundation associated with a 100-year storm event. Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed on the design storm surge with dynamic wave set-up. Both free and confined hydrostatic loads shall be considered. Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined. Vertical hydrostatic loads shall be considered as forces acting both vertically downward and upward on horizontal or inclined surfaces of major structures (e.g., floors, slabs, roofs, walls). Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces of major structures and coastal or shore protection structures. Hydrostatic loads on irregular or curving geometric surfaces may be determined in consideration of separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.

3109.5.3 Hydrodynamic loads. Habitable structures shall be designed in consideration of the hydrodynamic loads which would be expected under the conditions of a 100-year storm event. Calculations for hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with a 100-year storm event. Full intensity loading shall be applied on all structural surfaces above the design grade which would affect the flow velocities.

3109.6 Wind loads. All habitable structures shall be designed in accordance with Chapter 16.

3109.7 Swimming pools. Swimming pools located in close proximity to an existing habitable structure or armoring shall be designed with an adequate pile foundation for the erosion and scour conditions of a 100-year storm event.

3109.8 Storm debris. All structures will be designed to minimize the potential for wind and water borne debris during a storm.

3109.3.5 Structural slabs below the 100-year storm elevation. Structural slabs below the *100-year storm elevation* and below the *lowest floor* are not required to be breakaway provided the slabs are designed by a qualified Florida-registered professional engineer to withstand the flood loads specified by Section 3109.3.1.

3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared, signed, and sealed by a qualified Florida-registered professional engineer and submitted to the building official:

1. For site-specific determination of *design grade*, a report of the assumptions and methods used.
2. For shear walls, the certifications required in Section 3109.3.2.

S6883 Public Comment

Proponent: Steve Martin, Florida Division of Emergency Management (steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM, rcquinn@earthlink.net).

SECTION 3109 STRUCTURES SEAWARD OF A COASTAL CONSTRUCTION CONTROL LINE

3109.1 General. The provisions of this section shall apply to the design and construction of *habitable structures*, and *substantial improvement* or repair of *substantial damage* of such structures, that are entirely seaward of, and portions of such structures that extend seaward of, the *coastal construction control line* or seaward of the *50-foot setback line*, whichever is applicable. This section does not apply to structures that are not *habitable structures*, as defined in this section. Section 1612 shall apply to *habitable structures* and structures that are not *habitable structures* if located in whole or in part in *special flood hazard areas* established in Section 1612.3.

~~**3109.1.1 Scope.** The provisions of Section 3109 shall ensure that structures located seaward of the coastal construction control line are designed to resist the predicted forces associated with a 100-year storm event and shall apply to the following:~~

- ~~1. All *habitable structures* which extend wholly or partially seaward of a coastal construction control line (CCCL) or 50-foot (15.3 m) setback line.~~
- ~~2. Substantial improvement of or additions to existing *habitable structures*.~~
- ~~3. Swimming pools that are located in close proximity to a *habitable structure* or armoring.~~

3109.1.1 Modification, maintenance or repair of existing *habitable structures*.

The requirements of Section 3109 do not apply to the modification, maintenance or repair of existing *habitable structures*, provided all of the following apply to the modification, maintenance, or repair:

1. Is within the limits of the existing foundation.
2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation.
3. Does not include any additions or enclosures added, constructed, or installed below the lowest floor or deck.

Advisory Note. If the modification or repair is determined to be *substantial improvement* or *substantial damage*, and if the building is located in a *special flood hazard area* (Zone A and Zone V) established in Section 1612.3, the requirements of *Florida Building Code, Existing Building* applicable to *flood hazard areas* shall apply.

3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose, requiring special siting considerations to

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protect the beach-dune system, ~~or proposed or existing structures,~~ and public beach access, and ~~is required prior to the start of construction.~~ The environmental permit may condition the nature, timing and sequence of construction of permitted activities to provide protection to nesting sea turtles and hatchlings and their habitat, including ~~review,~~ submittal and approval of lighting plans.

Exception: ~~The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance or repair to any existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.~~

3109.1.2 3 Elevation Certification. As part of the permit process, ~~and upon placement of the lowest horizontal structural member of the lowest floor and prior to further vertical construction,~~ the applicant shall submit to the building official certification of the elevation of the bottom of the lowest horizontal structural member of the lowest floor shall be submitted to the building official. ~~as built in relation to National Geodetic Vertical Datum (N.G.V.D.). Said certification shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer or architect and certified by same and be submitted prior to commencing any addition work.~~ Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building official's review shall be at the applicant's risk. ~~The building official shall review the submitted elevation data, and any deficiencies found shall be corrected by the permit holder immediately and prior to any further work being permitted to proceed.~~

3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.

ALLOWED USE. For the purpose of Section 3109.3.4, use of enclosures above, or with dry floodproofing to, the elevation specified in ASCE 24 and below the 100-year storm elevation includes, but is not limited to use for parking of vehicles, storage, building access, small mechanical and electrical rooms, retail shops, commercial pool bars and other bars, snack bars, commercial grills with portable cooking equipment, commercial dining areas where the permanent kitchen is located landward of the coastal construction control line or above the 100-year storm elevation, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, commercial service/storage/back-of-house facilities; and uses of a similar nature that are not spaces for living, sleeping or cooking.

ARMORING. A manmade structure designed to either prevent erosion of the upland property or protect upland structures from the effects of coastal wave and current action. Armoring includes certain rigid coastal structures such as geotextile bags or tubes, seawalls, revetments, bulkheads, retaining walls or similar structures, but does not include jetties, groins or other construction whose purpose is to add sand to the beach and dune system, alter the natural coastal currents or stabilize the mouths of inlets.

~~BREAKAWAY WALL. A partition independent of supporting structural members that is intended to withstand design wind forces but to collapse from a water load less than that which would occur during a 100-year storm event without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.~~

COASTAL A ZONE. See Section 202.

COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes , and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.

COASTAL HIGH HAZARD AREA. See Section 202.

COMBINED TOTAL STORM TIDE ELEVATION (VALUE). The elevation of combined total tides including storm surges, astronomical tide and dynamic wave set-up which occurs primarily inside the wave breaking zone. The combined total storm tide elevations (values) for various return periods are determined by the Florida Department of Environmental Protection for each coastal county with an established coastal construction control lines and published in reports for each county titled "Revised Combined Total Storm Tide Frequency Analysis."

DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified registered design professional or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). ~~caused by the 100-year storm.~~

DRY FLOODPROOFING. See Section 202.

FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.

FLOOD HAZARD AREA. See Section 202.

~~HABITABLE STRUCTURE. Structures designed primarily for human occupancy and are potential locations for shelter from storms. Typically included within this category are residences, hotels and restaurants.~~

LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft.

LOWEST FLOOR. For the purpose of Section 3109, the *lowest floor* of the lowest enclosed area, excluding any enclosure that complies with the requirements and limitations of Section 3109.3.4 applicable to enclosures below the flood elevation.

LOWEST HORIZONTAL STRUCTURAL STRUCTURE MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation. ~~Any shore-parallel structural member which supports floor, wall or column loads and transmits them to the pile foundation.~~

100 ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave setup of a 100-year (one-percent-annual chance) storm. This 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and an analysis of topographic and other site specific data and found in the report "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the location of the applicant's proposed structure as part of the environmental permit application process.

REBUILDING. ~~See definition of "Substantial improvement."~~

SPECIAL FLOOD HAZARD AREA. See Section 202.

SUBSTANTIAL DAMAGE. See Section 202.

SUBSTANTIAL IMPROVEMENT. See Section 202. ~~See definition in Section 161.54(12), Florida Statutes.~~

3109.3 Design and construction. The design and construction of *habitable structures*, including *substantial improvement* and repair of *substantial damage* to such structures, shall be in accordance with this section and with Section 1612 and ASCE 24, as applicable. *Habitable structures* subject to this section shall be designed to minimize the potential for wind and water-borne debris during storms.

Exception. Additions, repairs, and alterations that, when combined with all other work on a structure, do not constitute *substantial improvement* or repair of *substantial damage*, and provided all of the following apply:

- a. The work does not violate the terms of previously issued permits.
- b. Any addition does not advance the seaward limits of the existing structure.

3109.3.3 Elevation standards. The bottom of the *lowest horizontal structural member* of the *lowest floor* shall be at or above the higher of one of the following:

1. The elevation specified in ASCE 24 Chapter 4 if the structure is in a *coastal high hazard area* or *Coastal A Zone*;
2. The elevation specified by the jurisdiction; or
3. ~~The All habitable structures shall be elevated at or above an elevation which places the lowest horizontal structural member above the 100-year storm elevation determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition). the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the applicant's proposed habitable structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, Florida Statutes.~~

Exceptions:

1. ~~Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.~~
2. ~~Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:~~
 - 2.1. ~~The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.~~
 - 2.2. ~~The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure, or loss of material from beneath or behind the armoring.~~
 - 2.3. ~~The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.~~
 - 2.4. ~~The armoring must withstand the static and hydrodynamic forces of the design storm.~~
3. ~~A higher elevation standard is required by either the National Flood Insurance Program (NFIP), as found on a community's Flood Insurance Rate Map (FIRM), or the local flood damage prevention ordinance. In such instances, the higher elevation standard shall apply.~~

3109.4 Construction standards.

3109.3.2 Foundations. Habitable structures shall be elevated and supported on piles or columns that are designed to comply with this section. The space below elevated

habitable structures shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4. Foundations shall be designed to comply with ASCE 24 Section 4.5, except shallow foundations and stemwalls are not permitted.

3109.4.1 Pile foundations. All habitable structures shall be elevated on, and securely anchored to, an adequate pile foundation. Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated erosion, scour and loads resulting from a 100-year storm including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads. All habitable structures should be anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement. The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural components. Design ratio of pile spacing to pile diameter should not be less than 8:1 for individual piles located above the design grade. Pile caps shall be set below the design grade unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.

Exceptions:

1. — Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.
2. — Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:
 - 2.1. — The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.
 - 2.2. — The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure or loss of material from beneath or behind the armoring.
 - 2.3. — The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.
 - 2.4. — The armoring must withstand the static and hydrodynamic forces of the design storm.

3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Section 4.5 for pile and columns foundations:

1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the *design grade*, unless justified by a geotechnical analysis and the foundation design.
2. The tops of grade beams and pile caps shall be at or below the natural grade and below the *design grade* unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the *design grade*.
3. Pile penetration shall take into consideration the anticipated loss of soil above the *design grade*.

3109.3.2.2 Shear walls. Shear walls shall comply with one of the following:

1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline.
2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore and wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts.

Exception. *Habitable structures other than low-rise buildings* are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent, wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts, and the following design documentation is submitted:

- a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.
- b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the predicted 100-year storm erosion limit.

3109.3.4 Walls and enclosures below the flood elevation. Walls and enclosures below the elevation required by Section 3109.3.3 and above the *design grade* elevation shall comply with all of the following, as applicable:

1. Walls seaward of the CCCL shall comply with the breakaway wall requirements of ASCE 24 Section 4.6 using the lesser of the flood loads specified by Section 3109.3.1.
2. Elevator shafts and stairways shall comply with ASCE 24.
3. For nonresidential buildings located outside of a *coastal high hazard area* (Zone V):
 - a. Small mechanical and electrical rooms with *dry floodproofing* to the elevation specified in ASCE 24 or by the jurisdiction are not required to be breakaway.

b. Stairwells are not required to be breakaway provided the walls have flood openings in accordance with this section.

4. In special flood hazard areas (Zone V and Zone A), all breakaway walls below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall have flood openings in accordance with ASCE 24 Section 4.6.2. Flood openings are not required in:

- a. Shear walls designed in accordance with Section 3109.3.2.2.
- b. Walls of enclosures below buildings not located in special flood hazard areas (Zone X).
- c. Walls that are designed and constructed in conformance with the dry floodproofing requirements of ASCE 24 in areas other than coastal high hazard areas.

5. In special flood hazard areas (Zone V and Zone A):

- a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage unless enclosures are designed and constructed in accordance with the dry floodproofing requirements of ASCE 24.
- b. Enclosures above the elevation specified in ASCE 24 or by the jurisdiction and below the 100-year storm elevation, or enclosures with dry floodproofing to the elevation specified in ASCE 24 or by the jurisdiction, shall be limited to allowed use as defined in this section.

6. In habitable structures not located in special flood hazard areas (Zone X), uses of enclosures below the 100-year storm elevation shall be limited to allowed use as defined in this section.

~~3109.4.2 Walls below the 100-year storm elevation.~~ No substantial walls or partitions shall be constructed below the level of the first finished floor of habitable structures. All other walls shall be designed to break away.

Exceptions:

- ~~1. Stairways and stairwells;~~
- ~~2. Shear walls perpendicular to the shoreline;~~
- ~~3. Shear walls parallel to the shoreline, which are limited to a maximum of 20 percent of the building length in the direction running parallel to the shore;~~
- ~~4. Shear walls parallel to the shoreline, which exceed 20 percent of the total building length (including any attached major structure) when they meet the following criteria:~~
 - ~~4.1. A certification is provided by a Florida-registered professional engineer that certifies that the increased length of shear walls, over 20 percent, are located landward of the 100-year erosion limit;~~
 - ~~4.2. A hydraulic analysis is provided and certified by a Florida-registered professional engineer that evaluates the potential impact of flow increase on the subject parcel and adjacent properties;~~
 - ~~4.3. The hydraulic analysis demonstrates that although the overall shearwall coverage is more than 20 percent, the increased shear wall length will not result in~~

substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures; and

4.4. ~~The provisions under Section 3109.4.2 (Exception 4) do not include any low-rise building as defined in Section 1609.2.~~

5. ~~Wind or sand screens constructed of fiber or wire mesh;~~

6. ~~Light, open lattice partitions with individual, wooden lattice strips not greater than 3/4 inch (19 mm) thick and 3 inches (76 mm) wide;~~

7. ~~Elevator shafts;~~

8. ~~Small mechanical and electrical rooms; and~~

9. ~~Break-away or frangible walls.~~

3109.5 3.1 Flood loads during a 100-year storm. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the *design grade* at the location and the higher of:

1. The stillwater elevation specified in the applicable Flood Insurance Study referenced to the datum on the Flood Insurance Rate Map, if the structure is also in a coastal high hazard area (Zone V); or

2. The combined total storm tide elevation (value) for the 100-year return period identified by the Florida Department of Environmental Protection in reports titled "Revised Combined Total Storm Tide Frequency Analysis" prepared for each county with an established coastal construction control lines.

3109.5.1 Load basis. ~~The structural design shall be based on the 100-year storm as determined by the Florida Department of Environmental Protection in studies published as part of the coastal construction control line establishment process. Breaking, broken and nonbreaking waves shall be considered as applicable. Design wave loading analysis shall consider vortical uplift pressures and all lateral pressures to include impact, as well as dynamic loading and the harmonic intensification resulting from repetitive waves.~~

3109.5.2 Hydrostatic load. ~~Habitable structures shall be designed in consideration of the hydrostatic loads which would be expected under the conditions of maximum inundation associated with a 100-year storm event. Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed on the design storm surge with dynamic wave set-up. Both free and confined hydrostatic loads shall be considered. Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined. Vertical hydrostatic loads shall be considered as forces acting both vertically downward and upward on horizontal or inclined surfaces of major structures (e.g., floors, slabs, roofs, walls). Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces of major structures and coastal or shore protection structures. Hydrostatic loads on irregular or curving geometric surfaces may be determined in consideration of separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.~~

3109.5.3 Hydrodynamic loads. Habitable structures shall be designed in consideration of the hydrodynamic loads which would be expected under the conditions of a 100-year storm event. Calculations for hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with a 100-year storm event. Full intensity loading shall be applied on all structural surfaces above the design grade which would affect the flow velocities.

3109.6 Wind loads. All habitable structures shall be designed in accordance with Chapter 16.

3109.7 Swimming pools. Swimming pools located in close proximity to an existing habitable structure or armoring shall be designed with an adequate pile foundation for the erosion and scour conditions of a 100-year storm event.

3109.8 Storm debris. All structures will be designed to minimize the potential for wind and water borne debris during a storm.

3109.3.5 Structural slabs below the 100-year storm elevation. Structural slabs below the *100-year storm elevation* and below the *lowest floor* are not required to be breakaway provided the slabs are designed by a qualified Florida-registered professional engineer to withstand the flood loads specified by Section 3109.3.1.

3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared, signed, and sealed by a qualified Florida-registered professional engineer and submitted to the building official:

1. For site-specific determination of *design grade*, a report of the assumptions and methods used.
2. For shear walls, the certifications required in Section 3109.3.2.

Proponent: Steve Martin, Florida Division of Emergency Management and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM).

The following is the existing Section 3109 modified to show the proposal. Significant portions of text are retained but moved. These preserved texts appear as new text (underlined) and are shown deleted (strike-thru) in their original locations. See the reason statement for details explaining changes and texts that are not retained.

SECTION 3109 STRUCTURES SEAWARD OF A COASTAL CONSTRUCTION CONTROL LINE

3109.1 General. The provisions of this section shall apply to the design and construction of new construction of *habitable structures*, buildings, and portions of buildings and structures, and substantial improvement or repair of substantial damage of such buildings and structures that extend wholly or partially seaward of the *coastal construction control line*, or seaward of the *50-foot setback line*, whichever is applicable. This section does not apply to structures that are not *habitable structures*, as defined in this section, and that extend seaward of the *coastal construction control line* or seaward of the *50-foot setback line*. Section 1612 shall apply to structures that are not *habitable structures* if located in flood hazard areas established in Section 1612.3.

~~**3109.1.1 Scope.** The provisions of Section 3109 shall ensure that structures located seaward of the coastal construction control line are designed to resist the predicted forces associated with a 100-year storm event and shall apply to the following:~~

- ~~1. All *habitable structures* which extend wholly or partially seaward of a coastal construction control line (CCCL) or 50-foot (15.3 m) setback line.~~
- ~~2. Substantial improvement of or additions to existing *habitable structures*.~~
- ~~3. Swimming pools that are located in close proximity to a *habitable structure* or armoring.~~

3109.1.1 Modification, maintenance or repair of existing buildings and structures.

The requirements of Section 3109.1 do not apply to the modification, maintenance or repair of existing buildings and structures, provided all of the following apply to the modification, maintenance, or repair:

1. Is within the limits of the existing foundation.

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2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation.

3. Does not include lateral additions or the construction of enclosures below the lowest floor or deck.

Exception. If the modification or repair is determined to be substantial improvement or substantial damage, and if the building is located in a flood hazard area (Zone A and Zone V) established in Section 1612.3, the requirements of Section 1612 and ASCE 24 applicable to coastal high hazard areas shall apply.

3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose requiring special siting considerations to protect the beach-dune system, or proposed or existing structures, and public beach access and , is required prior to the start of construction. The environmental permit may condition the nature, timing and sequence of construction of permitted activities, The Department may require submittal and approval of lighting plans to provide protection to nesting sea turtles and hatchlings and their habitat, including review, submittal and approval of lighting plans.

Exception: ~~The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance or repair to any existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.~~

3109.1.2 3 Elevation certification. As part of the permit process, upon placement of the lowest horizontal structural member of the lowest floor and prior to further vertical construction, the applicant shall submit to the building official certification of the elevation of the bottom of the lowest horizontal structural member of the lowest floor shall be submitted to the building official, as built in relation to National Geodetic Vertical Datum (N.G.V.D.). Said certification shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer or architect and certified by same and be submitted prior to commencing any addition work. Any work undertaken prior to

submission of the certification or subsequent to submission and prior to the building official's review shall be at the applicant's risk. ~~The building official shall review the submitted elevation data, and any deficiencies found shall be corrected by the permit holder immediately and prior to any further work being permitted to proceed.~~

3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.

~~ARMORING. A manmade structure designed to either prevent erosion of the upland property or protect upland structures from the effects of coastal wave and current action. Armoring includes certain rigid coastal structures such as geotextile bags or tubes, seawalls, revetments, bulkheads, retaining walls or similar structures, but does not include jetties, groins or other construction whose purpose is to add sand to the beach and dune system, alter the natural coastal currents or stabilize the mouths of inlets.~~

~~BREAKAWAY WALL. A partition independent of supporting structural members that is intended to withstand design wind forces but to collapse from a water load less than that which would occur during a 100-year storm event without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.~~

COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.

DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified registered design professional or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line." ~~caused by the 100-year storm.~~

FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.

HABITABLE STRUCTURE. Structures and buildings designed primarily for human occupancy. Structures that are not habitable include, but are not limited to, detached garages, detached accessory structures, dune walkovers, parking structures and garages, and structures without walls and roofs.

LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft. and are potential locations for shelter from storms. Typically included within this category are residences, hotels and restaurants.

LOWEST HORIZONTAL STRUCTURAL STRUCTURE MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation and is the lowest such member. Any shore-parallel structural member which supports floor, wall or column loads and transmits them to the pile foundation.

NONHABITABLE USE. For the purpose of Section 3109, use of enclosures above the elevation specified in ASCE 24 and below the 100-year storm elevation, including only parking of vehicles, storage, building access, retail shops, pool bars and other bars, snack bars, grills with portable cooking equipment, dining areas where the permanent kitchen is located landward of the coastal construction control line or above the lowest horizontal structural member, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, and service/storage/back-of-house facilities.

ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave set-up of a 100-year (one-percent-annual chance) storm. This 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and an analysis of topographic and other site specific data. An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the location of the applicant's proposed structure as part of the environmental permit application process. The elevation will be provided as part of the

applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, the Administrative Procedures Act, Florida Statutes.

REBUILDING. See definition of "Substantial improvement."

SUBSTANTIAL DAMAGE. See Section 202.

SUBSTANTIAL IMPROVEMENT. See Section 202 1612.

3109.3 Design and construction. The design and construction of *habitable* buildings, structures and portions of buildings and structures, including substantial improvement and repair of substantial damage to buildings and structures, shall be in accordance with this section, Section 1612 and ASCE 24 for coastal high hazard areas, regardless of how such areas are designated on a Flood Insurance Rate Map. Buildings, structures and portions of buildings and structures shall be designed to minimize the potential for wind- and water-borne debris during storms.

Exception. Additions, repairs, and alterations that, when combined with all other work on a building or structure, do not constitute substantial improvement or repair of substantial damage, and provided all of the following apply:

1. The work is consistent with previously issued permits.
2. Any addition does not advance the seaward limits of the existing building or structure.

3109.3.3 Elevation standards. The bottom of the *lowest horizontal structural member* of the *lowest floor* shall be at or above the higher of one of the following:

1. The elevation specified in ASCE 24 Chapter 4;
2. The elevation specified by the jurisdiction; or
3. The ~~All habitable structures shall be elevated at or above an elevation which places the lowest horizontal structural member above the 100-year storm elevation determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition).~~ the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the applicant's proposed structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, Florida Statutes.

Exceptions:

1. ~~Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.~~

2. ~~Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:~~

2.1. ~~The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.~~

2.2. ~~The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure, or loss of material from beneath or behind the armoring.~~

2.3. ~~The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.~~

2.4. ~~The armoring must withstand the static and hydrodynamic forces of the design storm.~~

3. ~~A higher elevation standard is required by either the National Flood Insurance Program (NFIP), as found on a community's Flood Insurance Rate Map (FIRM), or the local flood damage prevention ordinance. In such instances, the higher elevation standard shall apply.~~

3109.4 Construction standards.

3109.3.2 Foundations. ~~3109.4.1 Pile foundations.~~ All habitable Buildings and structures shall be elevated on, and securely anchored to, piles or columns that comply with this section. The space below elevated buildings and structures shall be free of

~~obstructions and walls, if any, shall comply with Section 3109.3.4. an adequate pile foundation. Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated erosion, scour and loads resulting from a 100-year storm including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads. All habitable structures should be anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement. The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural components. Design ratio or pile spacing to pile diameter should not be less than 8:1 for individual piles located above the design grade. Pile caps shall be set below the design grade unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.~~

3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Chapter 4 for pile and columns foundations:

1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the design grade, unless justified by a geotechnical analysis and the foundation design.
2. The tops of grade beams and pile caps shall be at or below the natural grade and below the design grade unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the design grade.
3. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.

Exceptions:

- ~~1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.~~
- ~~2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The~~

~~applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:~~

- ~~2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.~~
- ~~2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure or loss of material from beneath or behind the armoring.~~
- ~~2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.~~
- ~~2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.~~

3109.3.2.2 Shear walls. In addition to the requirements of ASCE 24 Chapter 4 for shear walls:

1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline.
2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore.

Exception. Buildings and structures other than *low-rise buildings* are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent and the following design documentation is submitted:

- a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result

in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.

b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the 100-year erosion limit, which shall be determined in consultation with the Florida Department of Environmental Protection.

3109.3.4 Enclosures below the flood elevation. Enclosures below the applicable flood elevation shall comply with all of the following:

1. Walls of enclosures shall comply with the breakaway wall requirements of ASCE 24 Section 4.6.

2. Walls of enclosures shall have flood openings in accordance with ASCE 24 Section 4.6.2, except shear walls designed in accordance with Section 3109.3.2.2.

3. If located in flood hazard areas established in Section 1612.3:

a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage.

b. Enclosures above the elevation specified in ASCE 24 or above the elevation specified by the jurisdiction and below the 100-year storm elevation shall be limited to nonhabitable use as defined in this section.

4. If not located in flood hazard areas established in Section 1612.3 (Zone X), enclosures below the 100-year storm elevation shall be limited to nonhabitable use as defined in this section.

~~**3109.4.2 Walls below the 100-year storm elevation.** No substantial walls or partitions shall be constructed below the level of the first finished floor of habitable structures. All other walls shall be designed to break away.~~

Exceptions:

~~1. Stairways and stairwells;~~

~~2. Shear walls perpendicular to the shoreline;~~

~~3. Shear walls parallel to the shoreline, which are limited to a maximum of 20 percent of the building length in the direction running parallel to the shore;~~

- ~~4. Shear walls parallel to the shoreline, which exceed 20 percent of the total building length (including any attached major structure) when they meet the following criteria:~~
- ~~4.1. A certification is provided by a Florida-registered professional engineer that certifies that the increased length of shear walls, over 20 percent, are located landward of the 100-year erosion limit;~~
- ~~4.2. A hydraulic analysis is provided and certified by a Florida-registered professional engineer that evaluates the potential impact of flow increase on the subject parcel and adjacent properties;~~
- ~~4.3. The hydraulic analysis demonstrates that although the overall shearwall coverage is more than 20 percent, the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures; and~~
- ~~4.4. The provisions under Section 3109.4.2 (Exception 4) do not include any low-rise building as defined in Section 1609.2.~~
- ~~5. Wind or sand screens constructed of fiber or wire mesh;~~
- ~~6. Light, open lattice partitions with individual, wooden lattice strips not greater than 3/4 inch (19 mm) thick and 3 inches (76 mm) wide;~~
- ~~7. Elevator shafts;~~
- ~~8. Small mechanical and electrical rooms; and~~
- ~~9. Break-away or frangible walls.~~

3109.5 3.1 Flood loads during a 100-year storm. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the *design grade* at the location and the higher of:

1. The stillwater elevation specified in the applicable Flood Insurance Study; or
 2. The *100-year storm elevation* published by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999).
- An applicant may request determination of a site-specific *100-year storm elevation* (see definition).

3109.5.1 Load basis. The structural design shall be based on the 100-year storm as determined by the Florida Department of Environmental Protection in studies published as part of the coastal construction control line establishment process. Breaking, broken and nonbreaking waves shall be considered as applicable. Design wave loading analysis shall consider vertical uplift pressures and all lateral pressures to include impact, as well as dynamic loading and the harmonic intensification resulting from repetitive waves.

3109.5.2 Hydrostatic load. Habitable structures shall be designed in consideration of the hydrostatic loads which would be expected under the conditions of maximum inundation associated with a 100-year storm event. Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed on the design storm surge with dynamic wave set-up. Both free and confined hydrostatic loads shall be considered. Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined. Vertical hydrostatic loads shall be considered as forces acting both vertically downward and upward on horizontal or inclined surfaces of major structures (e.g., floors, slabs, roofs, walls). Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces of major structures and coastal or shore protection structures. Hydrostatic loads on irregular or curving geometric surfaces may be determined in consideration of separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.

3109.5.3 Hydrodynamic loads. Habitable structures shall be designed in consideration of the hydrodynamic loads which would be expected under the conditions of a 100-year storm event. Calculations for hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with a 100-year storm event. Full-intensity loading shall be applied on all structural surfaces above the design grade which would affect the flow velocities.

3109.6 Wind loads. All habitable structures shall be designed in accordance with Chapter 16.

~~**3109.7 Swimming pools.** Swimming pools located in close proximity to an existing habitable structure or armoring shall be designed with an adequate pile foundation for the erosion and scour conditions of a 100-year storm event.~~

~~**3109.8 Storm debris.** All structures will be designed to minimize the potential for wind- and water-borne debris during a storm.~~

3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared and sealed by a Florida-registered professional engineer and submitted to the building official:

1. For site-specific determination of *design grade*, a report of the assumptions and methods used.
2. For shear walls, the certifications required in Section 3109.3.2.

DEM Proposal – simple legislative format (12/28/2015)

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Modified for Public Comment (6/20/2016)

Proponent: Steve Martin, Florida Division of Emergency Management
(steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of
FDEM, rcquinn@earthlink.net).

*Impact to local entity relative to enforcement of code (553.73(9)(b), F.S.)**

Eases interpretation of the CCCL requirements when buildings are also located in FEMA-mapped flood hazard areas. The flood requirements of ASCE 24 apply, with relatively few additional requirements for CCCL, retained for consistency with Florida Statute, at the request of the Department of Environmental Protection, and for consistency with Declaration Statements. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Impact to building and property owners relative to cost of compliance with code (553.73(9)(b), F.S.)**

The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Impact to industry relative to the cost of compliance with code (553.73(9)(b), F.S.)**

The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Impact to small business relative to the cost of compliance with code (553.73(9)(b), F.S.)**

The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings

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for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Has a reasonable and substantial connection with the health, safety, and welfare of the general public (553.73(9)(a)2,F.S.)**

Preserves the requirements for structures seaward of the CCCL and flood hazard area requirements, thus no change to health, safety and welfare of the general public.

*Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction (553.73(9)(a)3,F.S.)**

Improves the code by minimizing confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities (553.73(9)(a)4,F.S.)**

Proposal does not alter the materials, products, methods or systems of construction.

*Does not degrade the effectiveness of the code (553.73(9)(a)5,F.S.)**

Improves the effectiveness by minimizing confusing and conflicting requirements.

The provisions contained in the proposed amendment are addressed in the International Code?

Not appropriate in the foundation code because the Coastal Construction Control Line is unique to Florida.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

The Coastal Construction Control Line is unique to Florida.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the FBC amendment process?

Not appropriate in the foundation code because the Coastal Construction Control Line is unique to Florida.

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(6/21/16)

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Proponent: Steve Martin, Florida Division of Emergency Management (steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM, rcquinn@earthlink.net).

*Impact to local entity relative to enforcement of code (553.73(9)(b), F.S.)**

Eases interpretation of the CCCL requirements when buildings are also located in FEMA-mapped flood hazard areas. The flood requirements of ASCE 24 apply, with relatively few additional requirements for CCCL, retained at the request of the Department of Environmental Protection. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Impact to building and property owners relative to cost of compliance with code (553.73(9)(b), F.S.)**

The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Impact to industry relative to the cost of compliance with code (553.73(9)(b), F.S.)**

The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Impact to small business relative to the cost of compliance with code (553.73(9)(b), F.S.)**

The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Has a reasonable and substantial connection with the health, safety, and welfare of the general public (553.73(9)(a)2,F.S.)**

Preserves the requirements for structures seaward of the CCCL and flood hazard area requirements, thus no change to health, safety and welfare of the general public.

*Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction (553.73(9)(a)3,F.S.)**

Improves the code by elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

*Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities (553.73(9)(a)4,F.S.)**

Proposal does not alter the materials, products, methods or systems of construction.

*Does not degrade the effectiveness of the code (553.73(9)(a)5,F.S.)**

Improves the effectiveness of the code by eliminating confusing and conflicting requirements.

The provisions contained in the proposed amendment are addressed in the International Code?

Not appropriate in the foundation code because the Coastal Construction Control Like is unique to Florida.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

The Coastal Construction Control Like is unique to Florida.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the FBC amendment process?

Not appropriate in the foundation code because the Coastal Construction Control Like is unique to Florida.

S6883 Public Comment

Proponent: Steve Martin, Florida Division of Emergency Management (steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM, rcquinn@earthlink.net).

SECTION 3109 STRUCTURES SEAWARD OF A COASTAL CONSTRUCTION CONTROL LINE

3109.1 General. The provisions of this section shall apply to the design and construction of *habitable structures*, and *substantial improvement* or repair of *substantial damage* of such structures, that are entirely seaward of, and portions of such structures that extend seaward of, the *coastal construction control line* or seaward of the *50-foot setback line*, whichever is applicable. This section does not apply to structures that are not *habitable structures*, as defined in this section. Section 1612 shall apply to *habitable structures* and structures that are not *habitable structures* if located in whole or in part in *special flood hazard areas* established in Section 1612.3.

3109.1.1 Modification, maintenance or repair of existing *habitable structures*.

The requirements of Section 3109 do not apply to the modification, maintenance or repair of existing *habitable structures*, provided all of the following apply to the modification, maintenance, or repair:

1. Is within the limits of the existing foundation.
2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation.
3. Does not include any additions or enclosures added, constructed, or installed below the lowest floor or deck.

Advisory Note. If the modification or repair is determined to be *substantial improvement* or *substantial damage*, and if the building is located in a *special flood hazard area* (Zone A and Zone V) established in Section 1612.3, the requirements of *Florida Building Code, Existing Building* applicable to *flood hazard areas* shall apply.

3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose special siting considerations to protect the beach-dune system, proposed or existing structures, and public beach access, and may condition the nature, timing and sequence of construction of permitted activities to provide protection to nesting sea turtles and hatchlings and their habitat, including submittal and approval of lighting plans.

3109.1.3 Elevation certification. As part of the permit process, upon placement of the *lowest horizontal structural member* of the *lowest floor* and prior to further vertical construction, certification of the elevation of the bottom of the *lowest horizontal structural member* of the *lowest floor* shall be submitted to the building official. Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building officials review shall be at the applicant's risk.

3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.

ALLOWED USE. For the purpose of Section 3109.3.4, use of enclosures above, or with *dry floodproofing* to, the elevation specified in ASCE 24 and below the *100-year storm elevation* includes, but is not limited to use for parking of vehicles, storage, building access, small mechanical and electrical rooms, retail shops, commercial pool bars and other bars, snack bars, commercial grills with portable cooking equipment, commercial dining areas where the permanent kitchen is located landward of the *coastal construction control line* or above the *100-year storm elevation*, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, commercial service/storage/back-of-house facilities; and uses of a similar nature that are not spaces for living, sleeping or cooking.

COASTAL A ZONE. See Section 202.

COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.

COASTAL HIGH HAZARD AREA. See Section 202.

COMBINED TOTAL STORM TIDE ELEVATION (VALUE). The elevation of combined total tides including storm surges, astronomical tide and dynamic wave set-up which occurs primarily inside the wave breaking zone. The *combined total storm tide elevations (values)* for various return periods are determined by the Florida Department of Environmental Protection for each coastal county with an established *coastal construction control line* and published in reports for each county titled "Revised Combined Total Storm Tide Frequency Analysis."

DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified Florida-registered professional engineer or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999).

DRY FLOODPROOFING. See Section 202.

FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.

FLOOD HAZARD AREA. See Section 202.

HABITABLE STRUCTURE. Structures and buildings designed primarily for human occupancy. Typically included within this category are residences, hotels and restaurants.

LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft.

LOWEST FLOOR. For the purpose of Section 3109, the *lowest floor* of the lowest enclosed area, excluding any enclosure that complies with the requirements and limitations of Section 3109.3.4 applicable to enclosures below the flood elevation.

LOWEST HORIZONTAL STRUCTURAL MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation.

100-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave set-up of a 100-year (one-percent-annual chance) storm. The *100-year storm elevation* is determined by the Florida Department of Environmental Protection based on studies published as part of the *coastal construction control line* establishment process and analyses of topographic and other site specific data and found in the report "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request the Department of Environmental Protection to determine a site-specific *100-year storm elevation* for the location of the applicant's proposed structure as part of the environmental permit application process.

SPECIAL FLOOD HAZARD AREA. See Section 202.

SUBSTANTIAL DAMAGE. See Section 202.

SUBSTANTIAL IMPROVEMENT. See Section 202.

3109.3 Design and construction. The design and construction of *habitable structures*, including *substantial improvement* and repair of *substantial damage* to such structures, shall be in accordance with this section and with Section 1612 and ASCE 24, as applicable. *Habitable structures* subject to this section shall be designed to minimize the potential for wind and water-borne debris during storms.

Exception. Additions, repairs, and alterations that, when combined with all other work on a structure, do not constitute *substantial improvement* or repair of *substantial damage*, and provided all of the following apply:

- a. The work does not violate the terms of previously issued permits.
- b. Any addition does not advance the seaward limits of the existing structure.

3109.3.1 Flood loads. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the *design grade* at the location and the higher of:

1. The stillwater elevation specified in the applicable Flood Insurance Study referenced to the datum on the Flood Insurance Rate Map, if the structure is also in a *coastal high hazard area* (Zone V); or
2. The *combined total storm tide elevation (value)* for the 100-year return period identified by the Florida Department of Environmental Protection in reports titled "Revised Combined Total Storm Tide Frequency Analysis" prepared for each county with an established *coastal construction control line*.

3109.3.2 Foundations. *Habitable structures* shall be elevated and supported on piles or columns that are designed to comply with this section. The space below elevated *habitable structures* shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4. Foundations shall be designed to comply with ASCE 24 Section 4.5, except shallow foundations and stemwalls are not permitted.

3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Section 4.5 for pile and columns foundations:

1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the *design grade*, unless justified by a geotechnical analysis and the foundation design.
2. The tops of grade beams and pile caps shall be at or below the natural grade and below the *design grade* unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the *design grade*.
3. Pile penetration shall take into consideration the anticipated loss of soil above the *design grade*.

3109.3.2.2 Shear walls. Shear walls shall comply with one of the following:

1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline.
2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore and wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts.

Exception. *Habitable structures* other than *low-rise buildings* are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent, wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts, and the following design documentation is submitted:

- a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.
- b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of

the predicted 100-year storm erosion limit.

3109.3.3 Elevation standards. The bottom of the *lowest horizontal structural member* of the *lowest floor* shall be at or above the higher of one of the following:

1. The elevation specified in ASCE 24 Chapter 4 if the structure is in a *coastal high hazard area* or *Coastal A Zone*;
2. The elevation specified by the jurisdiction; or
3. The *100-year storm elevation* determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific *100-year storm elevation* (see definition).

3109.3.4 Walls and enclosures below the flood elevation. Walls and enclosures below the elevation required by Section 3109.3.3 and above the *design grade* elevation shall comply with all of the following, as applicable:

1. Walls seaward of the CCCL shall comply with the breakaway wall requirements of ASCE 24 Section 4.6 using the lesser of the flood loads specified by Section 3109.3.1.
2. Elevator shafts and stairways shall comply with ASCE 24.
3. For nonresidential buildings located outside of a *coastal high hazard area* (Zone V):
 - a. Small mechanical and electrical rooms with *dry floodproofing* to the elevation specified in ASCE 24 or by the jurisdiction are not required to be breakaway.
 - b. Stairwells are not required to be breakaway provided the walls have flood openings in accordance with this section.
4. In *special flood hazard areas* (Zone V and Zone A), all breakaway walls below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall have flood openings in accordance with ASCE 24 Section 4.6.2. Flood openings are not required in:
 - a. Shear walls designed in accordance with Section 3109.3.2.2.
 - b. Walls of enclosures below buildings not located in *special flood hazard areas* (Zone X).
 - c. Walls that are designed and constructed in conformance with the *dry floodproofing* requirements of ASCE 24 in areas other than *coastal high hazard areas*.
5. In *special flood hazard areas* (Zone V and Zone A):
 - a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage unless enclosures are designed and constructed in accordance with the *dry floodproofing* requirements of ASCE 24.
 - b. Enclosures above the elevation specified in ASCE 24 or by the jurisdiction and below the *100-year storm elevation*, or enclosures with *dry floodproofing* to the elevation specified in ASCE 24 or by the jurisdiction, shall be limited to *allowed use* as defined in this section.
6. In *habitable structures* not located in *special flood hazard areas* (Zone X), uses of enclosures below the *100-year storm elevation* shall be limited to *allowed use* as defined in this section.

3109.3.5 Structural slabs below the 100-year storm elevation. Structural slabs below the *100-year storm elevation* and below the *lowest floor* are not required to be breakaway provided the slabs are designed by a qualified Florida-registered professional engineer to withstand the flood loads specified by Section 3109.3.1.

3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared, signed, and sealed by a qualified Florida-registered professional engineer and submitted to the building official:

1. For site-specific determination of *design grade*, a report of the assumptions and methods used.
2. For shear walls, the certifications required in Section 3109.3.2.

S6883 Public Comment

Proponent: Steve Martin, Florida Division of Emergency Management (steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM, requinn@earthlink.net).

SECTION 3109 CURRENT	PROPOSED REPLACEMENT, as of 06/20/16, lined up with Current (i.e., not in sequential order)	Comments on NEW 3109
3109.1 General.		
<p>3109.1.1 Scope. The provisions of Section 3109 shall ensure that structures located seaward of the coastal construction control line are designed to resist the predicted forces associated with a 100-year storm event and shall apply to the following:</p> <ol style="list-style-type: none"> 1. All habitable structures which extend wholly or partially seaward of a coastal construction control line (CCCL) or 50-foot (15.3 m) setback line. 2. Substantial improvement of or additions to existing habitable structures. 3. Swimming pools that are located in close proximity to a habitable structure or armoring. <p>An environmental permit from the Florida Department of Environmental Protection, requiring special siting considerations to protect the beach-dune system or proposed or existing structures and public beach access, is required prior to the start of construction. The environmental permit may condition the nature, timing and sequence of construction of permitted activities to provide protection to nesting sea turtles and hatchlings and their habitat, including review, submittal and approval of lighting plans.</p> <p>Exception: The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance</p>	<p>NEW 3109.1 General. The provisions of this section shall apply to the design and construction of <i>habitable structures</i>, and <i>substantial improvement</i> or repair of <i>substantial damage</i> of such structures, that are entirely seaward of, and portions of such structures that extend seaward of, the <i>coastal construction control line</i> or seaward of the <i>50-foot setback line</i>, whichever is applicable. This section does not apply to structures that are not <i>habitable structures</i>, as defined in this section. Section 1612 shall apply to <i>habitable structures</i> and structures that are not <i>habitable structures</i> if located in whole or in part in <i>special flood hazard areas</i> established in Section 1612.3.</p> <p>NEW 3109.1.1 Modification, maintenance or repair of existing <i>habitable structures</i>. The requirements of Section 3109 do not apply to the modification, maintenance or repair of existing <i>habitable structures</i>, provided all of the following apply to the modification, maintenance, or repair:</p> <ol style="list-style-type: none"> 1. Is within the limits of the existing foundation. 2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation. 	<p>Scope doesn't include swimming pools because pools are already regulated by the FBC and environmental impacts will be addressed through the DEP environmental permit.</p> <p>"Do not constitute rebuilding" not retained; see note on definition "rebuilding"</p> <p>#3 comes from 161.053(11)(a), F.S.</p>

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<p>or repair to any existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.</p>	<p>3. Does not include any additions or enclosures added, constructed, or installed below the lowest floor or deck.</p> <p>Advisory Note. If the modification or repair is determined to be <i>substantial improvement</i> or <i>substantial damage</i>, and if the building is located in a <i>special flood hazard area</i> (Zone A and Zone V) established in Section 1612.3, the requirements of <i>Florida Building Code, Existing Building</i> applicable to <i>flood hazard areas</i> shall apply.</p> <p>NEW 3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose special siting considerations to protect the beach-dune system, proposed or existing structures, and public beach access, and may condition the nature, timing and sequence of construction of permitted activities to provide protection to nesting sea turtles and hatchlings and their habitat, including submittal and approval of lighting plans.</p> <p>NEW 3109.3 Design and construction. The design and construction of <i>habitable structures</i>, including <i>substantial improvement</i> and repair of <i>substantial damage</i> to such structures, shall be in accordance with this section and with Section 1612 and ASCE 24, as applicable. <i>Habitable structures</i> subject to this section shall be designed to</p>	<p>To satisfy the NFIP requirements, the note (exception) advises work exempt from CCCL must comply with the FBC, Existing Building if located special flood hazard areas identified by FEMA on Flood Insurance Rate Maps.</p> <p>See the comparison of ASCE 24 requirements for coastal high hazard areas (Zone V) and existing 3109.</p>
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	<p>minimize the potential for wind and water-borne debris during storms.</p> <p>Exception. Additions, repairs, and alterations that, when combined with all other work on a structure, do not constitute <i>substantial improvement</i> or repair of <i>substantial damage</i>, and provided all of the following apply:</p> <ul style="list-style-type: none"> a. The work does not violate the terms of previously issued permits. b. Any addition does not advance the seaward limits of the existing structure. 	
<p>3109.1.2 Certification. As part of the permit process and upon placement of the lowest horizontal structural member, the applicant shall submit to the building official certification of the elevation of the lowest horizontal structural member of the lowest floor as built in relation to National Geodetic Vertical Datum (N.G.V.D.). Said certification shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer or architect and certified by same and be submitted prior to commencing any addition work. Any work undertaken prior to submission of the certification shall be at the applicant's risk. The building official shall review the submitted elevation data, and any deficiencies found shall be corrected by the permit holder immediately and prior to any further work being permitted to proceed.</p>	<p>NEW 3109.1.3 Elevation certification. As part of the permit process, upon placement of the <i>lowest horizontal structural member of the lowest floor</i> and prior to further vertical construction, certification of the elevation of the bottom of the <i>lowest horizontal structural member of the lowest floor</i> shall be submitted to the building official. Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building officials review shall be at the applicant's risk.</p>	<p>See FBC Sec. 110.3 (items 1.1 and 5.1 apply only in flood hazard areas)</p> <p>F.S. Chapters 471 (engineering) and 481 (architecture) practices don't include surveying (see Chapter 472)</p>
<p>3109.2 Definitions.</p>	<p>NEW 3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.</p>	
	<p>ALLOWED USE. For the purpose of Section 3109.3.4, use of enclosures above, or with <i>dry floodproofing</i> to, the</p>	<p>New definition, used to describe what is allowed above the ASCE</p>

	elevation specified in ASCE 24 and below the 100-year storm elevation includes, but is not limited to use for parking of vehicles, storage, building access, small mechanical and electrical rooms, retail shops, commercial pool bars and other bars, snack bars, commercial grills with portable cooking equipment, commercial dining areas where the permanent kitchen is located landward of the coastal construction control line or above the 100-year storm elevation, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, commercial service/storage/back-of-house facilities; and uses of a similar nature that are not spaces for living, sleeping or cooking.	24-required elevation and below the 100-year storm elevation (or below the 100-year storm elevation in FEMA Zone X). The uses listed derive from declaration statements.
ARMORING. A manmade structure designed to either prevent erosion of the upland property or protect upland structures from the effects of coastal wave and current action. Armoring includes certain rigid coastal structures such as geotextile bags or tubes, seawalls, revetments, bulkheads, retaining walls or similar structures, but does not include jetties, groins or other construction whose purpose is to add sand to the beach and dune system, alter the natural coastal currents or stabilize the mouths of inlets.		DEP advises no project ever authorized based on this. Armoring is still in the statute, which means qualifying circumstance could be addressed.
BREAKAWAY WALL. A partition independent of supporting structural members that is intended to withstand design wind forces but to collapse from a water load less than that which would occur during a 100-year storm event without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.		See ASCE 24
	COASTAL A ZONE. See Section 202.	

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COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the county which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.	COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.	No change
	COASTAL HIGH HAZARD AREA. See Section 202.	
	COMBINED TOTAL STORM TIDE ELEVATION (VALUE). The elevation of combined total tides including storm surges, astronomical tide and dynamic wave set-up which occurs primarily inside the wave breaking zone. The <i>combined total storm tide elevations (values)</i> for various return periods are determined by the Florida Department of Environmental Protection for each coastal county with an established <i>coastal construction control line</i> and published in reports for each county titled "Revised Combined Total Storm Tide Frequency Analysis."	
DESIGN GRADE. The predicted eroded grade caused by the 100-year storm.	DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified Florida-registered professional engineer or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999).	See new 3109.4 Documentation

	DRY FLOODPROOFING. See Section 202.	
FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.	FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.	No change
	FLOOD HAZARD AREA. See Section 202.	
HABITABLE STRUCTURE. Structures designed primarily for human occupancy and are potential locations for shelter from storms. Typically included within this category are residences, hotels and restaurants.	HABITABLE STRUCTURE. Structures and buildings designed primarily for human occupancy. Typically included within this category are residences, hotels and restaurants.	
	LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft.	
	LOWEST FLOOR. For the purpose of Section 3109, the <i>lowest floor</i> of the lowest enclosed area, excluding any enclosure that complies with the requirements and limitations of Section 3109.3.4 applicable to enclosures below the flood elevation.	
LOWEST HORIZONTAL STRUCTURE MEMBER. Any shore-parallel structural member which supports floor, wall or column loads and transmits them to the pile foundation.	LOWEST HORIZONTAL STRUCTURAL MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation.	Not defined in ASCE 24-14; this term is always used in this form: "lowest horizontal structural member of the lowest floor". Too limiting to refer only to shore-parallel, which would permit shore-perpendicular to be lower than the minimum elevation

ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave setup of a 100-year storm. This 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and an analysis of topographic and other site specific data.	100-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave setup of a 100-year (one-percent-annual chance) storm. The 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and analyses of topographic and other site specific data and found in the report "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the location of the applicant's proposed structure as part of the environmental permit application process.	Same, with the addition of advisory note regarding requesting site-specific determination from DEP
REBUILDING. See definition of "Substantial improvement."		Rebuilding is new construction, not Substantial Improvement See exception to new 3109.3
	SPECIAL FLOOD HAZARD AREA. See Section 202.	
	SUBSTANTIAL DAMAGE. See Section 202.	
SUBSTANTIAL IMPROVEMENT. See definition in Section 161.54(12), Florida Statutes.	SUBSTANTIAL IMPROVEMENT. See Section 202.	2015 IBC has all definitions in Section 202
3109.3 Elevation standards. All habitable structures shall be elevated at or above an elevation which places the lowest horizontal structural member above the 100-year storm elevation as determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line."	NEW 3109.3.3 Elevation standards. The bottom of the lowest horizontal structural member of the lowest floor shall be at or above the higher of one of the following: 1. The elevation specified in ASCE 24 Chapter 4 if the structure is in a coastal high hazard area or Coastal A Zone; 2. The elevation specified by the jurisdiction; or	From existing exception #3, acknowledges some jurisdictions adopt elevation requirements higher than the minimum (local technical amendments or adopted prior to July 1, 2010).

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<p>An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the applicant's proposed habitable structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, Florida Statutes.</p>	<p>3. The <i>100-year storm elevation</i> determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific <i>100-year storm elevation</i> (see definition).</p>	
<p>Exceptions:</p>		
<p>1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.</p>		<p>See new 3109.3 exception</p>
<p>2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:</p> <p>2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runoff overtopping.</p>		<p>#2 see note for definition of Armoring explaining why this removed.</p>

<p>2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure, or loss of material from beneath or behind the armoring.</p> <p>2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.</p> <p>2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.</p>		
<p>3. A higher elevation standard is required by either the National Flood Insurance Program (NFIP), as found on a community's Flood Insurance Rate Map (FIRM), or the local flood damage prevention ordinance. In such instances, the higher elevation standard shall apply.</p>		See new 3109.3.3
3109.4 Construction standards.		
<p>3109.4.1 Pile foundations. All habitable structures shall be elevated on, and securely anchored to, an adequate pile foundation. Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated erosion, scour and loads resulting from a 100-year storm including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads. All habitable structures should be anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement. The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural</p>	<p>NEW 3109.3.2 Foundations. <i>Habitable structures</i> shall be elevated and supported on piles or columns that are designed to comply with this section. The space below elevated <i>habitable structures</i> shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4. Foundations shall be designed to comply with ASCE 24 Section 4.5, except shallow foundations and stemwalls are not permitted.</p> <p>NEW 3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Section 4.5 for pile and columns foundations:</p> <p>1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the <i>design grade</i>, unless justified</p>	<p>See ASCE 24 and C. Jones comparison</p> <p>See in new 3109.3.1 for loads</p> <p>Per DEP, retains specific requirements not in ASCE 24.</p>

<p>components. Design ratio or pile spacing to pile diameter should not be less than 8:1 for individual piles located above the design grade. Pile caps shall be set below the design grade unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.</p>	<p>by a geotechnical analysis and the foundation design.</p> <p>2. The tops of grade beams and pile caps shall be at or below the natural grade and below the <i>design grade</i> unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the <i>design grade</i>.</p> <p>3. Pile penetration shall take into consideration the anticipated loss of soil above the <i>design grade</i>.</p>	
<p>Exceptions:</p> <p>1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.</p> <p>2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the armoring was designed and constructed and is in adequate condition to meet the following criteria:</p> <p>2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge</p>		<p>#1 says do not have to use pile or column foundation for additions if the additions do not advance the building seaward (captured in 3109.3) and not rebuilding</p> <p>#2 removed because armoring removed</p>

<p>level combination, and must be high enough to preclude runup overtopping.</p> <p>2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure or loss of material from beneath or behind the armoring.</p> <p>2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.</p> <p>2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.</p>		
<p>3109.4.2 Walls below the 100-year storm elevation. No substantial walls or partitions shall be constructed below the level of the first finished floor of habitable structures. All other walls shall be designed to break away.</p>	<p>NEW 3109.3.4 Walls and enclosures below the flood elevation. Walls and enclosures below the elevation required by Section 3109.3.3 and above the <i>design grade</i> elevation shall comply with all of the following, as applicable:</p> <ol style="list-style-type: none"> 1. Walls seaward of the CCCL shall comply with the breakaway wall requirements of ASCE 24 Section 4.6 using the lesser of the flood loads specified by Section 3109.3.1. 2. Elevator shafts and stairways shall comply with ASCE 24. 3. For nonresidential buildings located outside of a <i>coastal high hazard area</i> (Zone V): <ol style="list-style-type: none"> a. Small mechanical and electrical rooms with <i>dry floodproofing</i> to the elevation specified in ASCE 24 or by the jurisdiction are not required to be breakaway. b. Stairwells are not required to be breakaway provided the walls have flood openings in accordance with this section. 	

	<p>4. In <i>special flood hazard areas</i> (Zone V and Zone A), all breakaway walls below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall have flood openings in accordance with ASCE 24 Section 4.6.2. Flood openings are not required in:</p> <ul style="list-style-type: none"> a. Shear walls designed in accordance with Section 3109.3.2.2. b. Walls of enclosures below buildings not located in <i>special flood hazard areas</i> (Zone X). c. Walls that are designed and constructed in conformance with the <i>dry floodproofing</i> requirements of ASCE 24 in areas other than <i>coastal high hazard areas</i>. <p>5. In <i>special flood hazard areas</i> (Zone V and Zone A):</p> <ul style="list-style-type: none"> a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage unless enclosures are designed and constructed in accordance with the <i>dry floodproofing</i> requirements of ASCE 24. b. Enclosures above the elevation specified in ASCE 24 or by the jurisdiction and below the <i>100-year storm elevation</i>, or enclosures with <i>dry floodproofing</i> to the elevation specified in ASCE 24 or by the jurisdiction, shall be limited to <i>allowed use</i> as defined in this section. <p>6. In <i>habitable structures</i> not located in <i>special flood hazard areas</i> (Zone X), uses of enclosures below the <i>100-year storm elevation</i> shall be limited to <i>allowed use</i> as defined in this section.</p>	
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<p>Exceptions:</p> <ol style="list-style-type: none"> 1. Stairways and stairwells; 2. Shear walls perpendicular to the shoreline; 3. Shear walls parallel to the shoreline, which are limited to a maximum of 20 percent of the building length in the direction running parallel to the shore; 		<ul style="list-style-type: none"> • #1 stairways (stairways are not walls; stairways covered by 24 Sec. 8.1) • #1 stairwells have walls (24 requires breakaway walls, Sec. 4.6 and Sec. 8.1)
<p>4. Shear walls parallel to the shoreline, which exceed 20 percent of the total building length (including any attached major structure) when they meet the following criteria:</p> <p>4.1. A certification is provided by a Florida-registered professional engineer that certifies that the increased length of shear walls, over 20 percent, are located landward of the 100-year erosion limit;</p> <p>4.2. A hydraulic analysis is provided and certified by a Florida-registered professional engineer that evaluates the potential impact of flow increase on the subject parcel and adjacent properties;</p> <p>4.3. The hydraulic analysis demonstrates that although the overall shearwall coverage is more than 20 percent, the increased shear-wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures; and</p> <p>4.4. The provisions under Section 3109.4.2 (Exception 4) do not include any low-rise building as defined in Section 1609.2.</p>	<p>NEW 3109.3.2.2 Shear walls. Shear walls shall comply with one of the following:</p> <ol style="list-style-type: none"> 1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline. 2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore and wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts. <p>Exception. <i>Habitable structures</i> other than <i>low-rise buildings</i> are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent, wall segments, spacing between wall segments, and elevator shafts shall be located and positioned to allow floodwater to flow easily around the walls and elevator shafts, and the following design documentation is submitted:</p> <ol style="list-style-type: none"> a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will 	<p>The shear wall limitation on wall lengths when walls are not perpendicular to the shore is retained and clarified that wall segments, spacing between segments and elevators shafts must be arranged to minimize blockage of flow.</p> <p>See new 3109.4 documentation if exception applies</p>

	<p>not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.</p> <p>b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the predicted 100-year storm erosion limit.</p>	
<p>5. Wind or sand screens constructed of fiber or wire mesh;</p> <p>6. Light, open lattice partitions with individual, wooden lattice strips not greater than 3/4 inch (19 mm) thick and 3 inches (76 mm) wide;</p> <p>7. Elevator shafts;</p> <p>8. Small mechanical and electrical rooms; and</p> <p>9. Break-away or frangible walls.</p>		<ul style="list-style-type: none"> • #5 screens (see 24 Sec. 4.6.1) • #6 lattice (see 24 Sec. 4.6.1 "open wood lattice work" without dimensions) • #7 elevator shafts (see 24 Sec 7.5, especially 7.5.1) • #8 small mech/elect rooms – not permitted NFIP/24 (see Sec. 4.6 use limitations and Chapter 7) • #9 breakaway/frangible walls, specified in 24, Sec. 4.6
<p>3109.5 Flood loads during a 100-year storm.</p> <p>3109.5.1 Load basis. The structural design shall be based on the 100-year storm as determined by the Florida Department of Environmental Protection in studies published as part of the coastal construction control line establishment process. Breaking, broken and nonbreaking waves shall be considered as applicable. Design wave loading analysis shall consider vertical uplift pressures and all lateral pressures to include impact, as well as dynamic loading and the harmonic intensification resulting from repetitive waves.</p>	<p>NEW 3109.3.1 Flood loads. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the <i>design grade</i> at the location and the higher of:</p> <ol style="list-style-type: none"> 1. The stillwater elevation specified in the applicable Flood Insurance Study referenced to the datum on the Flood Insurance Rate Map, if the structure is also in a <i>coastal high hazard area</i> (Zone V); or 2. The <i>combined total storm tide elevation (value)</i> for the 100-year return period identified by the Florida Department of Environmental Protection in reports titled "Revised Combined Total Storm Tide 	<p>See flood loads ASCE 7-10 and ASCE 24</p>

	Frequency Analysis" prepared for each county with an established <i>coastal construction control line</i> .	
<p>3109.5.2 Hydrostatic load. Habitable structures shall be designed in consideration of the hydrostatic loads which would be expected under the conditions of maximum inundation associated with a 100-year storm event. Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed on the design storm surge with dynamic wave set-up. Both free and confined hydrostatic loads shall be considered. Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined. Vertical hydrostatic loads shall be considered as forces acting both vertically downward and upward on horizontal or inclined surfaces of major structures (e.g., floors, slabs, roofs, walls). Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces of major structures and coastal or shore protection structures. Hydrostatic loads on irregular or curving geometric surfaces may be determined in consideration of separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.</p> <p>3109.5.3 Hydrodynamic loads. Habitable structures shall be designed in consideration of the hydrodynamic loads which would be expected under the conditions of a 100-year storm event. Calculations for hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with a 100-year storm event. Full-intensity loading shall</p>		

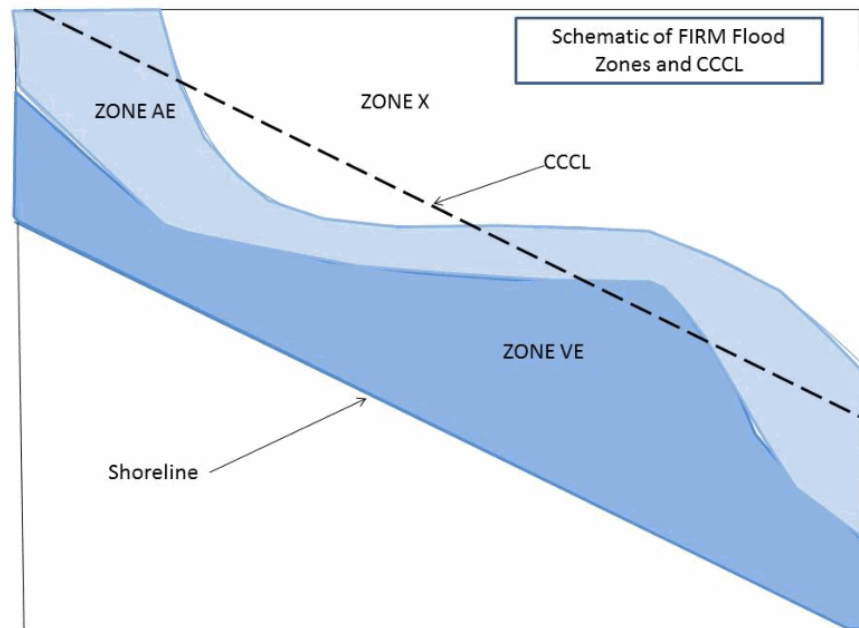
be applied on all structural surfaces above the design grade which would affect the flow velocities.		
3109.6 Wind loads. All habitable structures shall be designed in accordance with Chapter 16.		FBC requirement, no need to repeat
3109.7 Swimming pools. Swimming pools located in close proximity to an existing habitable structure or armoring shall be designed with an adequate pile foundation for the erosion and scour conditions of a 100-year storm event.		FBC Section 454 refers swimming pools in flood hazard areas to ASCE 24.
3109.8 Storm debris. All structures will be designed to minimize the potential for wind- and water-borne debris during a storm.		See new 3109.1, moved because it is generally applicable
	NEW 3109.3.5 Structural slabs below the 100-year storm elevation. Structural slabs below the 100-year storm elevation and below the lowest floor are not required to be breakaway provided the slabs are designed by a qualified Florida-registered professional engineer to withstand the flood loads specified by Section 3109.3.1.	
	NEW 3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared, signed, and sealed by a qualified Florida-registered professional engineer and submitted to the building official: 1. For site-specific determination of <i>design grade</i> , a report of the assumptions and methods used. 2. For shear walls, the certifications required in Section 3109.3.2.	If applicants elect to have analyses prepared for design grade, or have shear walls exceed the 20% limitation, the documentation must be submitted

Flood Zone Area Seaward of the Coastal Construction Control Line

GIS analyses prepared by Florida Division of Emergency Management. FEMA flood zone data from FEMA; Coastal Construction Control Line data from Florida DEP. The analyses determined the area of each flood zone that lies between the shoreline (from FEMA data) and the CCCL. The data reported below are at the county level, including area in the unincorporated counties and incorporated municipalities in each county.

Based on this analysis:

- 25,160 total acres of land seaward of the CCCL
- 17,785 acres (71%) is FEMA Flood Zone VE
- 4,009 acres (16%) is FEMA Flood Zone AE
- 2,530 acres (10%) is FEMA Flood Zone X (outside of SFHA)
- 581 acres (2%) is FEMA Flood Zone AO
- 123 acres (1%) is Zone A (without BFE), shaded Zone X (500-year), Zone D, or open water



Comparing CCCL and FEMA Flood Zones

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Flood Zone Area Seaward of CCCL – by County							
Bay	Flood Zone	Area (acres)	Percent of Area	Miami-Dade	Flood Zone	Area (acres)	Percent of Area
	AE	91.53	10.12%		AE	244.09	62.66%
	VE	552.56	61.11%		Open water	1.06	0.27%
	X	260.17	28.77%		VE	68.37	17.55%
	TOTAL:	904.27	100%		X	76.05	19.52%
Brevard	Flood Zone	Area (acres)	Percent of Area		TOTAL:	389.57	100%
	AE	134.75	9.29%	Nassau	Flood Zone	Area (acres)	Percent of Area
	AO	156.82	10.81%		AE	92.45	22.92%
	VE	846.04	58.34%		VE	103.36	25.62%
	X	312.6	21.56%		X	207.63	51.46%
	TOTAL:	1,450.21	100%		TOTAL:	403.44	100%
Broward	Flood Zone	Area (acres)	Percent of Area	Okaloosa	Flood Zone	Area (acres)	Percent of Area
	AE	125.99	21.92%		AE	0.69	0.15%
	AO	72.62	12.63%		VE	421.23	92.24%
	VE	355.61	61.87%		X	34.74	7.61%
	X	20.59	3.58%		TOTAL:	456.67	100%
	TOTAL:	574.81	100%	Palm Beach	Flood Zone	Area (acres)	Percent of Area
Charlotte	Flood Zone	Area (acres)	Percent of Area		AE	1.71	0.34%
	AE	67.72	10.26%		VE	427.25	85.16%
	VE	592.3	89.74%		X(500)	1.72	0.34%
	TOTAL:	660.02	100%		X	71.03	14.16%
Collier	Flood Zone	Area (acres)	Percent of Area		TOTAL:	501.72	100%
	AE	481.99	26.83%	Pinellas	Flood Zone	Area (acres)	Percent of Area
	VE	1,297.67	72.23%		AE	68.87	4.31%
	X	16.87	0.94%		Open water	0.2	0.01%
	TOTAL:	1,796.52	100%		VE	1,530.36	95.68%
Duval	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,599.42	100%
	AE	51.41	5.54%	Sarasota	Flood Zone	Area (acres)	Percent of Area
	AO	201.95	21.76%		A	0.12	0.01%
	Open water	119.23	12.85%		AE	962.08	62.49%
	VE	433.86	46.75%		D	0.69	0.04%
	X	121.68	13.10%		VE	524.03	34.04%
	TOTAL:	928.13	100%		X	52.66	3.42%
Escambia	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,539.58	100%
	AE	35.49	4.96%				
	VE	680.23	95.04%				
	TOTAL:	715.72	100%				

Comparing CCCL and FEMA Flood Zones

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Flagler	Flood Zone	Area (acres)	Percent of Area	St. Johns	Flood Zone	Area (acres)	Percent of Area
	AE	48.86	9.83%		AE	225.99	13.24%
	VE	390.56	78.58%		AO	3.52	0.20%
	X	57.61	11.59%		VE	1,403.45	82.21%
	TOTAL:	497.04	100%		X	74.22	4.35%
Franklin	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,707.19	100%
	AE	273.98	9.71%	St. Lucie	Flood Zone	Area (acres)	Percent of Area
	VE	2,543.07	90.11%		AE	253.5	32.00%
	X	5.1	0.18%		AO	78.66	9.93%
	TOTAL:	2,822.14	100%		VE	395.68	49.96%
Gulf	Flood Zone	Area (acres)	Percent of Area		X	64.23	8.11%
	A	0.17	0.01%		TOTAL:	792.06	100%
	AE	375.74	19.28%	Volusia	Flood Zone	Area (acres)	Percent of Area
	VE	1,457.43	74.78%		AE	0.03	0%
	X	115.57	5.93%		VE	504.82	36.45%
	TOTAL:	1,948.91	100%		X	880.25	63.55%
Indian River	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,385.09	100%
	AE	42.04	5.97%	Walton	Flood Zone	Area (acres)	Percent of Area
	AO	67.68	9.60%		AE	4.92	0.67%
	VE	435.58	61.81%		VE	612.73	83.41%
	X	159.4	22.62%		X	116.95	15.92%
	TOTAL:	704.7	100%		TOTAL:	734.6	100%
Lee	Flood Zone	Area (acres)	Percent of Area				
	AE	204.94	9.86%				
	VE	1,872.51	90.14%				
	TOTAL:	2,077.45	100%				
Manatee	Flood Zone	Area (acres)	Percent of Area				
	AE	158.12	47.33%				
	VE	175.93	52.67%				
	TOTAL:	334.05	100%				
Martin	Flood Zone	Area (acres)	Percent of Area				
	AE	62.13	26.24%				
	VE	170.1	71.85%				
	X (500)	0.18	0.08%				
	X	4.33	1.83%				
	TOTAL:	236.74	100%				

Comparing CCCL and FEMA Flood Zones

3

S6883 Public Comment

Proponent: Steve Martin, Florida Division of Emergency Management (steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM, rcquinn@earthlink.net).

Rationale

Submitted on behalf of Steve Martin, State Floodplain Manager, Florida Division of Emergency Management.

This public comment revises/replaces proposal SP6883. It modifies the proposal to revise Sec 3109 to align more closely with the coastal high hazard areas requirements (Zone V) of ASCE 24, Section 1612 while retaining more restrictive or specific requirements that flow from Chapter 161 FS, were requested by DEP, or are on declaratory statements. GIS analysis indicates 90% of land seaward of the Coastal Construction Control Line is also FEMA-designated special flood hazard area. Structures located both seaward of the CCCL and in a flood hazard area must comply with the more restrictive of the two sets of requirements. The benefits of resolving inconsistencies to the extent feasible include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs, local plan review will be easier, and property owners will realize savings.

In 2009 a Commission workgroup that recommended this action to resolve differences between CCCL and Zone V to minimize case-by-case resolutions. FDEM, designated by the Governor to coordinate the National Flood Insurance Program, worked with FDEP to develop the proposal.

A complete reason statement is attached along with a "clean" copy of the proposal and a side-by-side comparison of the existing 3109 text and the proposed revision. Attached to the original proposal is a comparison of the foundation requirements of Sec 3109 and ASCE 24.

The complete reason statement includes notes on the changes, including why some provisions are not retained and why some definitions are added. The proposal requires use of the higher of the DEP 100-year storm elevation or the elevation required by ASCE 24 or the jurisdiction. It incorporates some recent declaratory statements for consistency across all jurisdictions with CCCL.

SUMMARY OF PROPOSAL: The proposed amendment to the FBC revises Section 3109 to align with the coastal high hazard areas requirements (Zone V) of the standard referenced in Section 1612 for flood hazard areas, ASCE 24-14 *Flood Resistant Design and Construction*, while retaining specific requirements for CCCL that flow from Chapter 161, Fla. Stat., were requested by DEP, or are in Declaration Statements. To identify the more restrictive requirements of Section 3109 and pertinent sections of Chapter 161, Fla. Stat., DEM compared the foundation requirements of ASCE 24 and Section 3109 (see **Attachment C** of the original proposal). See below for a brief statement of Benefits.

DEM developed the original proposal with the DEP's Division of Water Resource Management staff from the Coastal Construction Control Line and the Beach Field Services Programs. Immediately prior to the initial meetings of the Special Occupancy and Structural TACs, several comments were received from a group associated with the BASF high rise committee. DEM and DEP staff determined many comments had merit and DEM committed to working with the commenting entities to address those concerns. This public comment proposal reflects the ensuing discussions. See below for Background and History that supports this proposal.

S6883 Public Comment: Reason (06/21/16)

1

See **Attachment A** for a “clean” copy of the proposed revised Section 3109 (without legislative format) and see **Attachment B** for a side-by-side comparison, with notes:

- Although some work on existing buildings seaward of the CCCL may be exempt from the CCCL requirements, if those buildings are also in a FEMA-designated flood zone, then the Substantial Improvement and Substantial Damage requirements apply. Exemption from the CCCL does not have any effect on the flood zone requirements.
- Rebuilding is new construction, it is not a repair or alteration as defined by FBC, Existing Building.
- Flood loads (hydrostatic and hydrodynamic loads) are addressed by the requirement to determine loads in accordance with ASCE 7.
- Existing Section 3109 has a provision related to the presence of armoring that meets certain requirements. This provision is removed because DEP advises no project has been approved based on such armoring.
- For the purpose of determining use of shear walls, a definition for “low-rise building” is added because the current reference to Section 1609.2 no longer contains a definition. The proposed definition is equivalent to the definition that used to appear in Section 1609.2.
- A new definition for “allowed use” is proposed to address circumstances where there is an enclosed area above the FBC-required building elevation for buildings in flood hazard areas and below the DEP 100-year storm elevation. The term is also used to limit use of enclosures below buildings that are located seaward of CCCL and in a FEMA-designated Zone X. The uses included in the definition are identified in Declaratory Statements issued by the Florida Building Commission.
- At any given location, the required building elevation is the higher of the elevation required by ASCE 24 (for flood hazard areas), the elevation specified by the jurisdiction (to account for communities that elect to adopt higher elevations, called ‘freeboard’), and the DEP 100-year storm elevation.
- In general, ASCE 24 Chapter 4 requirements for coastal high hazard areas (Zone V) apply seaward of the CCCL, with the three specific requirements for piles and columns retained: (1) design ratio of 8:1 for individual piles or columns; (2) tops of grade beams and pile caps positioned below the design grade; and (3) pile penetration must account for loss of soil above the design grade.
- Requirements for shear walls are clarified so that walls, wall segments, and elevator shafts are located and positioned to allow floodwater to flow easily around the walls and elevator shafts.
- Elements previously located under “walls below the 100-year storm elevation” are not retained because they are covered by ASCE 24 (stairwells, screen and lattice, elevator shafts, break-away or frangible walls), are not walls (stairways), or are not permitted below BFE in special flood hazard areas (small mechanical and electrical rooms).
- Uses of enclosures below elevated buildings are specified as a function of whether the building is in a special flood hazard area (Zone A and Zone V) and the enclosure is below the ASCE 24-required elevation or above that elevation but below the 100-year storm elevation, in which case a new term for “allowed uses” is defined.

- Swimming pools are not explicitly addressed because they are already regulated by the FBC (and environmental impacts will be addressed through DEP's environmental permit).

BENEFITS: Although there will be a 'learning curve,' the benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

BACKGROUND and HISTORY: In 2009, the Florida Building Commission at the request of the Florida Division of Emergency Management (DEM) convened a Flood Resistant Standards Workgroup to evaluate and recommend whether the Commission should retain the flood resistant requirements of the International Codes in the 2010 edition of the Florida Building Code (FBC). The DEM is designated by the Governor to coordinate the National Flood Insurance Program (NFIP).

In addition to recommending inclusion of the flood provisions in the 2010 FBC, the Workgroup acknowledged that inconsistencies between the FBC Section 3109 CCCL requirements and FEMA coastal high hazard area (Zone V) requirements should continue to be resolved at the local level on a case-by-case basis, continuing the burden of resolving inconsistencies on property owners, design professionals, developers, builders and local building officials. A recent county-by-county GIS comparison of the land area seaward of the CCCL and designated FEMA flood zones is summarized below.

The Workgroup recommended an interagency group develop a strategy to determine whether inconsistencies between the CCCL and Zone V requirements can be resolved by code changes while retaining any CCCL-specific requirements that exceed those in ASCE 24, a standard referenced by the FBC for application in flood hazard areas.

Following a series meetings with the Florida Department of Environmental Protection (DEP) over the past several years, DEM took the lead to develop a code proposal. During this same time frame, DEP repealed the building code requirements contained in Rule 62B-33.007, F.A.C. The repeal, effective February 2012, is consistent with s. 161.053(21), Fla. Stat., and in accordance with ss. 553.73 and 553.79, Fla. Stat.

Immediately prior to the initial meetings of the Special Occupancy and Structural TACs to consider the original proposal, several comments were received from a group associated with the BASF high rise committee. Although a member of that group had been invited to comment as DEM/DEP staff developed the original proposal, DEM and DEP staff determined many comments had merit and committed to working with the commenting entities to address those concerns. The result is this public comment

COUNTY-BY-COUNTY GIS ANALYSIS OF FLOOD ZONE AREA SEAWARD OF THE CCCL:

The Florida Division of Emergency Management used FEMA flood zone data from FEMA and Coastal Construction Control Line data from Florida DEP to determine the area of each flood zone that lies seaward of the CCCL to the shoreline. See **Attachment D** for the summary at the

county level, including area in the unincorporated counties and incorporated municipalities in each county. Based on this analysis:

- 25,160 total acres of land seaward of the CCCL
- 17,785 acres (71%) is FEMA Flood Zone VE
- 4,009 acres (16%) is FEMA Flood Zone AE
- 2,530 acres (10%) is FEMA Flood Zone X (outside of SFHA)
- 581 acres (2%) is FEMA Flood Zone AO
- 123 acres (1%) is Zone A (without BFE), shaded Zone X (500-year), Zone D, or open water

Proponent: Steve Martin, Florida Division of Emergency Management (steve.martin@em.myflorida.com) and Rebecca Quinn, RCQuinn Consulting, Inc. (on behalf of FDEM, rcquinn@earthlink.net).

Rationale

SUMMARY OF PROPOSAL: The proposed amendment to the FBC revises Section 3109 to align with the coastal high hazard areas requirements (Zone V) of the standard referenced in Section 1612 for flood hazard areas, ASCE 24-14 *Flood Resistant Design and Construction*, while retaining specific requirements for CCCL that flow from Chapter 161, Fla. Stat. or were requested by DEP. To identify the more restrictive requirements of Section 3109 and pertinent sections of Chapter 161, Fla. Stat., DEM compared the foundation requirements of ASCE 24 and Section 3109 (see **Attachment C**). See below for a brief statement of Benefits.

See below for Background and History that supports this proposal. DEM developed the proposal with the DEP's Division of Water Resource Management staff from the Coastal Construction Control Line and the Beach Field Services Programs. The proposal retains the explicit provision that environmental permits from DEP are required prior to the start of construction.

See **Attachment A** for a "clean" copy of the proposed revised Section 3109 (without legislative format) and see **Attachment B** for a side-by-side comparison, with notes:

- Although some work on existing buildings seaward of the CCCL may be exempt from the CCCL requirements, if those buildings are also in a FEMA-designated flood zone, then the Substantial Improvement and Substantial Damage requirements apply. Exemption from the CCCL does not have any effect on the flood zone requirements.
- Rebuilding is new construction, it is not a repair or alteration as defined by FBC, Existing Building.
- Flood loads (hydrostatic and hydrodynamic loads) are addressed by the requirement to determine loads in accordance with ASCE 7.
- Existing Section 3109 has a provision related to the presence of armoring that meets certain requirements. This provision is removed because DEP advises no project has been approved based on such armoring.
- For the purpose of determining use of shear walls, a definition for "low-rise building" is added because the current reference to Section 1609.2 no longer contains a definition. The proposed definition is equivalent to the definition that used to appear in Section 1609.2.
- A new definition for "non-habitable use" is proposed to address circumstances where there is an enclosed area above the FBC-required building elevation for buildings in flood hazard areas and below the DEP 100-year storm elevation. The term is also used to limit use of enclosures below buildings that are located seaward of CCCL and in a FEMA-designated Zone X. The uses included in the definition are identified in Declaratory Statements issued by the Florida Building Commission.
- At any given location, the required building elevation is the higher of the elevation required by ASCE 24 (for flood hazard areas), the elevation specified by the jurisdiction

(to account for communities that elect to adopt higher elevations, called 'freeboard'), and the DEP 100-year storm elevation.

- ASCE 24 Chapter 4 requirements for coastal high hazard areas (Zone V) apply throughout the area seaward of the CCCL (see new Section 3109.3.2.1), with the three specific requirements retained: (1) design ratio of 8:1 for individual piles or columns; (2) tops of grade beams and pile caps positioned below the design grade; and (3) pile penetration must account for loss of soil above the design grade.
- ASCE 24 Chapter 4 requirements for shear walls apply, with CCCL-specific limitations retained.
- Elements previously located under "walls below the 100-year storm elevation" are not retained because they are covered by ASCE 24 (stairwells, screen and lattice, elevator shafts, break-away or frangible walls), are not walls (stairways), or are not permitted (small mechanical and electrical rooms).
- Swimming pools are not explicitly addressed because they are already regulated by the FBC (and environmental impacts will be addressed through DEP's environmental permit).

BENEFITS: The benefits of resolving inconsistencies include elimination of confusing and conflicting requirements, which means design professionals will find it easier to prepare designs. Because code officials in every jurisdiction where the CCCL is delineated will not have to independently determine the more restrictive of the flood provisions and the CCCL requirements, there will also be improved efficiencies in the plan review and permitting process, which will yield savings for property owners proposing new habitable structures or changes to existing habitable structures seaward of the CCCL.

BACKGROUND and HISTORY: In 2009, the Florida Building Commission at the request of the Florida Division of Emergency Management (DEM) convened a Flood Resistant Standards Workgroup to evaluate and recommend whether the Commission should retain the flood resistant requirements of the International Codes in the 2010 edition of the Florida Building Code (FBC). The DEM is designated by the Governor to coordinate the National Flood Insurance Program (NFIP).

In addition to recommending inclusion of the flood provisions in the 2010 FBC, the Workgroup acknowledged that inconsistencies between the FBC Section 3109 CCCL requirements and FEMA coastal high hazard area (Zone V) requirements should continue to be resolved at the local level on a case-by-case basis, continuing the burden of resolving inconsistencies on property owners, design professionals, developers, builders and local building officials. A recent county-by-county GIS comparison of the land area seaward of the CCCL and designated FEMA flood zones is summarized below.

The Workgroup recommended an interagency group develop a strategy to determine whether inconsistencies between the CCCL and Zone V requirements can be resolved by code changes while retaining any CCCL-specific requirements that exceed those in ASCE 24, a standard referenced by the FBC for application in flood hazard areas.

Following a series meetings with the Florida Department of Environmental Protection (DEP) over the past several years, DEM took the lead to develop a code proposal. During this same time frame, DEP repealed the building code requirements contained in Rule 62B-33.007, F.A.C.

The repeal, effective February 2012, is consistent with s. 161.053(21), Fla. Stat., and in accordance with ss. 553.73 and 553.79, Fla. Stat. DEM's code proposal retains an explicit provision that environmental permits from DEP are required prior to the start of construction.

COUNTY-BY-COUNTY GIS ANALYSIS OF FLOOD ZONE AREA SEAWARD OF THE CCCL:

The Florida Division of Emergency Management used FEMA flood zone data from FEMA and Coastal Construction Control Line data from Florida DEP to determine the area of each flood zone that lies seaward of the CCCL to the shoreline. See **Attachment D** for the summary at the county level, including area in the unincorporated counties and incorporated municipalities in each county. Based on this analysis:

- 25,160 total acres of land seaward of the CCCL
- 17,785 acres (71%) is FEMA Flood Zone VE
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- 2,530 acres (10%) is FEMA Flood Zone X (outside of SFHA)
- 581 acres (2%) is FEMA Flood Zone AO
- 123 acres (1%) is Zone A (without BFE), shaded Zone X (500-year), Zone D, or open water

Proposal to amend Section 3109 – shown “clean” without legislative format

SECTION 3109 STRUCTURES SEAWARD OF A COASTAL CONSTRUCTION CONTROL LINE

3109.1 General. The provisions of this section shall apply to the design and construction of new construction of *habitable structures*, buildings, and portions of buildings and structures, and substantial improvement or repair of substantial damage of such buildings and structures that extend wholly or partially seaward of the *coastal construction control line*, or seaward of the *50-foot setback line*, whichever is applicable. This section does not apply to structures that are not *habitable structures*, as defined in this section, and that extend seaward of the *coastal construction control line* or seaward of the *50-foot setback line*. Section 1612 shall apply to structures that are not *habitable structures* if located in flood hazard areas established in Section 1612.3.

3109.1.1 Modification, maintenance or repair of existing buildings and structures.

The requirements of Section 3109.1 do not apply to the modification, maintenance or repair of existing buildings and structures, provided all of the following apply to the modification, maintenance, or repair:

1. Is within the limits of the existing foundation.
2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation.
3. Does not include lateral additions or the construction of enclosures below the lowest floor or deck.

Exception. If the modification or repair is determined to be substantial improvement or substantial damage, and if the building is located in a flood hazard area (Zone A and Zone V) established in Section 1612.3, the requirements of Section 1612 and ASCE 24 applicable to coastal high hazard areas shall apply.

3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose special siting considerations to protect the beach-dune system, proposed or existing structures, and public beach access and may condition the nature, timing and sequence of construction of permitted activities. The Department may require submittal and approval of lighting plans to provide protection to nesting sea turtles and hatchlings and their habitat.

3109.1.3 Elevation certification. As part of the permit process, upon placement of the *lowest horizontal structural member* of the *lowest floor* and prior to further vertical construction, certification of the elevation of the bottom of the *lowest horizontal structural member* of the *lowest floor* shall be submitted to the building official. Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building officials review shall be at the applicant's risk.

3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.

DEM CCCL Clean (not leg format) (12/28/15)

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COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.

DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified registered design professional or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line."

FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.

HABITABLE STRUCTURE. Structures and buildings designed primarily for human occupancy. Structures that are not habitable include, but are not limited to, detached garages, detached accessory structures, dune walkovers, parking structures and garages, and structures without walls and roofs.

LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft.

LOWEST HORIZONTAL STRUCTURAL MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation and is the lowest such member.

NONHABITABLE USE. For the purpose of Section 3109, use of enclosures above the elevation specified in ASCE 24 and below the *100-year storm elevation*, including only parking of vehicles, storage, building access, retail shops, pool bars and other bars, snack bars, grills with portable cooking equipment, dining areas where the permanent kitchen is located landward of the *coastal construction control line* or above the lowest horizontal structural member, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, and service/storage/back-of-house facilities.

ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave set-up of a 100-year (one-percent-annual chance) storm. The 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the *coastal construction control line* establishment process and analyses of topographic and other site specific data. An applicant may request the Department of Environmental Protection to determine a site-specific *100-year storm elevation* for the location of the applicant's proposed structure as part of the environmental permit application process. The

DEM CCCL Clean (not leg format) (12/28/15)

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elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, the Administrative Procedures Act, Florida Statutes.

SUBSTANTIAL DAMAGE. See Section 202.

SUBSTANTIAL IMPROVEMENT. See Section 202.

3109.3 Design and construction. The design and construction of *habitable* buildings, structures and portions of buildings and structures, including substantial improvement and repair of substantial damage to buildings and structures, shall be in accordance with this section, Section 1612 and ASCE 24 for coastal high hazard areas, regardless of how such areas are designated on a Flood Insurance Rate Map. Buildings, structures and portions of buildings and structures shall be designed to minimize the potential for wind and water-borne debris during storms.

Exception. Additions, repairs, and alterations that, when combined with all other work on a building or structure, do not constitute substantial improvement or repair of substantial damage, and provided all of the following apply:

- a. The work is consistent with previously issued permits.
- b. Any addition does not advance the seaward limits of the existing building or structure.

3109.3.1 Flood loads. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the *design grade* at the location and the higher of:

1. The stillwater elevation specified in the applicable Flood Insurance Study; or
2. The *100-year storm elevation* published by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition).

3109.3.2 Foundations. Buildings and structures shall be elevated and supported on piles or columns shall comply with this section. The space below elevated buildings and structures shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4.

3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Chapter 4 for pile and columns foundations:

1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the *design grade*, unless justified by a geotechnical analysis and the foundation design.
2. The tops of grade beams and pile caps shall be at or below the natural grade and below the *design grade* unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the *design grade*.
3. Pile penetration shall take into consideration the anticipated loss of soil above the

design grade.

3109.3.2.2 Shear walls. In addition to the requirements of ASCE 24 Chapter 4 for shear walls:

1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline.
2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore.

Exception. Buildings and structures other than *low-rise buildings* are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent and the following design documentation is submitted:

- a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures.
- b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the 100-year erosion limit, which shall be determined in consultation with the Florida Department of Environmental Protection.

3109.3.3 Elevation standards. The bottom of the *lowest horizontal structural member* of the *lowest floor* shall be at or above the higher of one of the following:

1. The elevation specified in ASCE 24 Chapter 4;
2. The elevation specified by the jurisdiction; or
3. The *100-year storm elevation* determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition).

3109.3.4 Enclosures below the flood elevation. Enclosures below the applicable flood elevation shall comply with all of the following:

1. Walls of enclosures shall comply with the breakaway wall requirements of ASCE 24 Section 4.6.
2. Walls of enclosures shall have flood openings in accordance with ASCE 24 Section 4.6.2, except shear walls designed in accordance with Section 3109.3.2.2.
3. If located in flood hazard areas established in Section 1612.3:
 - a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage.
 - b. Enclosures above the elevation specified in ASCE 24 or above the elevation specified by the jurisdiction and below the *100-year storm elevation* shall be limited to *nonhabitable use* as defined in this section.
4. If not located in flood hazard areas established in Section 1612.3 (Zone X), enclosures below the *100-year storm elevation* shall be limited to *nonhabitable use* as

defined in this section.

3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared and sealed by a Florida-registered professional engineer and submitted to the building official:

1. For site-specific determination of *design grade*, a report of the assumptions and methods used.
2. For shear walls, the certifications required in Section 3109.3.2.

SECTION 3109 CURRENT	PROPOSED REPLACEMENT, as of 12/28/15, lined up with Current (i.e., not in sequential order)	Comments on NEW 3109
<p>3109.1 General.</p> <p>3109.1.1 Scope. The provisions of Section 3109 shall ensure that structures located seaward of the coastal construction control line are designed to resist the predicted forces associated with a 100-year storm event and shall apply to the following:</p> <ol style="list-style-type: none"> 1. All habitable structures which extend wholly or partially seaward of a coastal construction control line (CCCL) or 50-foot (15.3 m) setback line. 2. Substantial improvement or additions to existing habitable structures. 3. Swimming pools that are located in close proximity to a habitable structure or armoring. <p>An environmental permit from the Florida Department of Environmental Protection, requiring special siting considerations to protect the beach-dune system or proposed or existing structures and public beach access, is required prior to the start of construction. The environmental permit may condition the nature, timing and sequence of construction of permitted activities to provide protection to nesting sea turtles and hatchlings and their habitat, including review, submittal and approval of lighting plans.</p> <p>Exception: The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance or repair to any existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.</p>	<p>New 3109.1 General. The provisions of this section shall apply to the design and construction of new construction of <i>habitable structures</i>, buildings, and portions of buildings and structures, and substantial improvement or repair of substantial damage of such buildings and structures that extend wholly or partially seaward of the <i>coastal construction control line</i>, or seaward of the <i>50-foot setback line</i>, whichever is applicable. This section does not apply to structures that are not <i>habitable structures</i>, as defined in this section, and that extend seaward of the <i>coastal construction control line</i> or seaward of the <i>50-foot setback line</i>. Section 1612 shall apply to structures that are not <i>habitable structures</i> if located in flood hazard areas established in Section 1612.3.</p> <p>New 3109.1.1 Modification, maintenance or repair of existing buildings and structures. The requirements of Section 3109.1 do not apply to the modification, maintenance or repair of existing buildings and structures, provided all of the following apply to the modification, maintenance, or repair:</p> <ol style="list-style-type: none"> 1. Is within the limits of the existing foundation. 2. Does not require, involve or include any additions to, or repair or modification of, the existing foundation. 3. Does not include lateral additions or the construction of enclosures below the lowest floor or deck. <p>Exception. If the modification or repair is determined to be substantial improvement or substantial damage, and if the building is located in a flood hazard area (Zone A and</p>	<p>Scope doesn't include swimming pools because pools are already regulated by the FBC and environmental impacts will be addressed through the DEP environmental permit.</p> <p>"Do not constitute rebuilding" not retained; see note on definition "rebuilding"</p> <p>#3 comes from 161.053(11)(a), F.S.</p> <p>To satisfy the NFIP requirements, the exception "recaptures" those elements exempt from CCCL if located in a flood hazard area</p>

FBC CCCL: Side-by-Side (12/28/15)

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	<p>Zone V) established in Section 1612.3, the requirements of Section 1612 and ASCE 24 applicable to coastal high hazard areas shall apply.</p> <p>New 3109.1.2 Approval prior to construction. An environmental permit from the Florida Department of Environmental Protection is required prior to the start of construction. When issued, a copy of the environmental permit shall be submitted to the building official. The environmental permit may impose special siting considerations to protect the beach-dune system, proposed or existing structures, and public beach access and may condition the nature, timing and sequence of construction of permitted activities. The Department may require submittal and approval of lighting plans to provide protection to nesting sea turtles and hatchlings and their habitat.</p> <p>New 3109.3 Design and construction. The design and construction of <i>habitable</i> buildings, structures and portions of buildings and structures, including substantial improvement and repair of substantial damage to buildings and structures, shall be in accordance with this section, Section 1612 and ASCE 24 for coastal high hazard areas, regardless of how such areas are designated on a Flood Insurance Rate Map. Buildings, structures and portions of buildings and structures shall be designed to minimize the potential for wind and water-borne debris during storms.</p> <p>Exception. Additions, repairs, and alterations that, when combined with all other work on a building or structure, do not constitute substantial improvement or</p>	<p>identified by FEMA on Flood Insurance Rate Maps.</p> <p>See the comparison of ASCE 24 requirements for coastal high hazard areas (Zone V) and existing 3109.</p>
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	<p>repair of substantial damage, and provided all of the following apply:</p> <ul style="list-style-type: none"> a. The work is consistent with previously issued permits. b. Any addition does not advance the seaward limits of the existing building or structure. 	
<p>3109.1.2 Certification. As part of the permit process and upon placement of the lowest horizontal structural member, the applicant shall submit to the building official certification of the elevation of the lowest horizontal structural member of the lowest floor as built in relation to National Geodetic Vertical Datum (N.G.V.D.). Said certification shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer or architect and certified by same and be submitted prior to commencing any addition work. Any work undertaken prior to submission of the certification shall be at the applicant's risk. The building official shall review the submitted elevation data, and any deficiencies found shall be corrected by the permit holder immediately and prior to any further work being permitted to proceed.</p>	<p>New 3109.1.3 Elevation certification. As part of the permit process, upon placement of the <i>lowest horizontal structural member</i> of the <i>lowest floor</i> and prior to further vertical construction, certification of the elevation of the bottom of the <i>lowest horizontal structural member</i> of the <i>lowest floor</i> shall be submitted to the building official. Any work undertaken prior to submission of the certification or subsequent to submission and prior to the building officials review shall be at the applicant's risk.</p>	<p>See FBC Sec. 110.3 (items 1.1 and 5.1 apply only in flood hazard areas)</p> <p>F.S. Chapters 471 (engineering) and 481 (architecture) practices don't include surveying (see Chapter 472)</p>
<p>3109.2 Definitions.</p>	<p>New 3109.2 Definitions. The following words and terms shall, for the purposes of this section, have the indicated meanings shown herein.</p>	
<p>ARMORING. A manmade structure designed to either prevent erosion of the upland property or protect upland structures from the effects of coastal wave and current action. Armoring includes certain rigid coastal structures such as geotextile bags or tubes, seawalls, revetments, bulkheads, retaining walls or similar structures, but does not include jetties, groins or other construction whose purpose is to add sand to the beach and dune system,</p>		<p>DEP advises no project ever authorized based on this. Armoring is still in the statute, which means qualifying circumstance could be addressed.</p>

alter the natural coastal currents or stabilize the mouths of inlets.		
BREAKAWAY WALL. A partition independent of supporting structural members that is intended to withstand design wind forces but to collapse from a water load less than that which would occur during a 100-year storm event without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.		See ASCE 24
COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the county which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.	COASTAL CONSTRUCTION CONTROL LINE. The line established by the State of Florida pursuant to Section 161.053, Florida Statutes, and recorded in the official records of the respective county and which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.	No change
DESIGN GRADE. The predicted eroded grade caused by the 100-year storm.	DESIGN GRADE. The predicted eroded grade, accounting for erosion and localized scour resulting from the presence of structural components, used in the calculation of flood loads, pile reactions and bearing capacities. The design grade shall be determined by a site-specific analysis prepared by a qualified registered design professional or the design grade may be determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line."	See new 3109.4 Documentation
FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any	FIFTY-FOOT SETBACK LINE. A line of jurisdiction, established pursuant to the provisions of Section 161.052, Florida Statutes, in which construction is prohibited within 50 feet (15.13 m) of the line of mean high water at any	No change

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riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.	riparian coastal location fronting the Gulf of Mexico or the Atlantic coast shoreline.	
HABITABLE STRUCTURE. Structures designed primarily for human occupancy and are potential locations for shelter from storms. Typically included within this category are residences, hotels and restaurants.	HABITABLE STRUCTURE. Structures and buildings designed primarily for human occupancy. Structures that are not habitable include, but are not limited to, detached garages, detached accessory structures, dune walkovers, parking structures and garages, and structures without walls and roofs.	Modified based on practice
	LOW-RISE BUILDING. A structure with mean roof height less than or equal to 60 ft.	Used in shear wall "Building, Low-rise" no longer defined in 1609.2. Last appeared in 2003 IBC: "Enclosed or partially enclosed buildings that comply with the following conditions (1) mean roof height, h, less than or equal to 60 feet. (2) Mean roof height, h, does not exceed least horizontal dimension
LOWEST HORIZONTAL STRUCTURE MEMBER. Any shore-parallel structural member which supports floor, wall or column loads and transmits them to the pile foundation.	LOWEST HORIZONTAL STRUCTURAL MEMBER. A horizontal structural member that supports floor, wall or column loads and transmits the loads to the foundation and is the lowest such member.	Not defined in ASCE 24-14. Too limiting to refer only to shore-parallel, which would permit shore-perpendicular to be lower than the minimum elevation
	NONHABITABLE USE. For the purpose of Section 3109, use of enclosures above the elevation specified in ASCE 24 and below the 100-year storm elevation, including only parking of vehicles, storage, building access, retail shops, pool bars and other bars, snack bars, grills with portable cooking equipment, dining areas where the permanent kitchen is located landward of the <i>coastal construction</i>	New definition, applicable to enclosed areas above the FBC-required building elevation for buildings in flood hazard areas and below the 100-year storm elevation, used in 3109.3.4. The uses included

	control line or above the lowest horizontal structural member, toilet rooms and bathrooms, cabanas, recreational spaces such as gyms and card rooms, and service/storage/back-of-house facilities.	in the definition are identified in recent Declaratory Statements issued by the Florida Building Commission
ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave setup of a 100-year storm. This 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the coastal construction control line establishment process and an analysis of topographic and other site specific data.	ONE-HUNDRED-YEAR STORM ELEVATION. The height of the breaking wave crest or wave approach as superimposed on the storm surge with dynamic wave setup of a 100-year (one-percent-annual chance) storm. The 100-year storm elevation is determined by the Florida Department of Environmental Protection based on studies published as part of the <i>coastal construction control line</i> establishment process and analyses of topographic and other site specific data. An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the location of the applicant's proposed structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, the Administrative Procedures Act, Florida Statutes.	Same, with the addition of advisory note regarding requesting site-specific determination from DEP
REBUILDING. See definition of "Substantial improvement."		Rebuilding is new construction, not Substantial Improvement See exception to new 3109.3
	SUBSTANTIAL DAMAGE. See Section 202.	
SUBSTANTIAL IMPROVEMENT. See definition in Section 161.54(12), Florida Statutes.	SUBSTANTIAL IMPROVEMENT. See Section 202.	2015 IBC has all definitions in Section 202

<p>3109.3 Elevation standards. All habitable structures shall be elevated at or above an elevation which places the lowest horizontal structural member above the 100-year storm elevation as determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line."</p> <p>An applicant may request the Department of Environmental Protection to determine a site-specific 100-year storm elevation for the applicant's proposed habitable structure as part of the environmental permit application process. The elevation will be provided as part of the applicant's environmental permit and shall be subject to review under the provisions of Chapter 120, Florida Statutes.</p>	<p>New 3109.3.3 Elevation standards. The bottom of the <i>lowest horizontal structural member</i> of the <i>lowest floor</i> shall be at or above the higher of one of the following:</p> <ol style="list-style-type: none"> 1. The elevation specified in ASCE 24 Chapter 4; 2. The elevation specified by the jurisdiction; or 3. The <i>100-year storm elevation</i> determined by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition). 	
<p>Exceptions:</p>		
<p>1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure.</p>		<p>See new 3109.3 exception</p>
<p>2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the</p>		<p>#2 see note for definition of Armoring explaining why this removed.</p>

<p>armoring was designed and constructed and is in adequate condition to meet the following criteria:</p> <p>2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.</p> <p>2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure, or loss of material from beneath or behind the armoring.</p> <p>2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.</p> <p>2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.</p>		
<p>3. A higher elevation standard is required by either the National Flood Insurance Program (NFIP), as found on a community's Flood Insurance Rate Map (FIRM), or the local flood damage prevention ordinance. In such instances, the higher elevation standard shall apply.</p>		See new 3109.3.3
3109.4 Construction standards.		
<p>3109.4.1 Pile foundations. All habitable structures shall be elevated on, and securely anchored to, an adequate pile foundation. Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated erosion, scour and loads resulting from a 100-year storm including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads. All habitable structures should be</p>	<p>New 3109.3.2 Foundations. Buildings and structures shall be elevated and supported on piles or columns shall comply with this section. The space below elevated buildings and structures shall be free of obstructions and walls, if any, shall comply with Section 3109.3.4.</p>	<p>See ASCE 24 and C. Jones comparison</p> <p>See in new 3109.3.1 for loads</p>

<p>anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement. The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural components. Design ratio or pile spacing to pile diameter should not be less than 8:1 for individual piles located above the design grade. Pile caps shall be set below the design grade unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade. Pile penetration shall take into consideration the anticipated loss of soil above the design grade.</p>	<p>New 3109.3.2.1 Piles and columns. In addition to the requirements of ASCE 24 Chapter 4 for pile and columns foundations:</p> <ol style="list-style-type: none"> 1. The design ratio or pile spacing to pile diameter, or column spacing to column diameter, shall be not less than 8:1 for individual piles or columns extending above the <i>design grade</i>, unless justified by a geotechnical analysis and the foundation design. 2. The tops of grade beams and pile caps shall be at or below the natural grade and below the <i>design grade</i> unless designed to resist increased flood loads associated with setting the grade beam or pile cap above the <i>design grade</i>. 3. Pile penetration shall take into consideration the anticipated loss of soil above the <i>design grade</i>. 	
<p>Exceptions:</p> <ol style="list-style-type: none"> 1. Additions, repairs or modifications to existing nonconforming habitable structures that do not advance the seaward limits of the existing habitable structure and do not constitute rebuilding of the existing structure. 2. Habitable structures located landward of existing armoring which is capable of protecting buildings from the effects of erosion from a 100-year storm surge. The applicant shall provide scientific and engineering evidence that the armoring has been designed, constructed and maintained to survive the effects of the design storm and provide protection to existing and proposed structures from the erosion associated with that event. Evidence shall include a report with data and supporting analysis, and shall be certified by a professional engineer registered in this state, that the 		<p>#1 says do not have to use pile or column foundation for additions if the additions do not advance the building seaward (captured in 3109.3) and not rebuilding</p> <p>#2 removed because armoring removed</p>

<p>armoring was designed and constructed and is in adequate condition to meet the following criteria:</p> <p>2.1. The top must be at or above the still water level, including setup, for the design storm plus the breaking wave calculated at its highest achievable level based on the maximum eroded beach profile and highest surge level combination, and must be high enough to preclude runup overtopping.</p> <p>2.2. The armoring must be stable under the design storm including maximum localized scour, with adequate penetration and toe protection to avoid settlement, toe failure or loss of material from beneath or behind the armoring.</p> <p>2.3. The armoring must have sufficient continuity or return walls to prevent flanking under the design storm from impacting the proposed construction.</p> <p>2.4. The armoring must withstand the static and hydrodynamic forces of the design storm.</p>		
<p>3109.4.2 Walls below the 100-year storm elevation. No substantial walls or partitions shall be constructed below the level of the first finished floor of habitable structures. All other walls shall be designed to break away.</p>	<p>New 3109.3.4 Enclosures below the flood elevation. Enclosures below the applicable flood elevation shall comply with all of the following:</p> <ol style="list-style-type: none"> 1. Walls of enclosures shall comply with the breakaway wall requirements of ASCE 24 Section 4.6. 2. Walls of enclosures shall have flood openings in accordance with ASCE 24 Section 4.6.2, except shear walls designed in accordance with Section 3109.3.2.2. 3. If located in flood hazard areas established in Section 1612.3: <ol style="list-style-type: none"> a. Enclosures below the elevation specified in ASCE 24 or the elevation specified by the jurisdiction shall be used solely for parking of vehicles, building access or storage. 	

	<p>b. Enclosures above the elevation specified in ASCE 24 or above the elevation specified by the jurisdiction and below the <i>100-year storm elevation</i> shall be limited to <i>nonhabitable use</i> as defined in this section.</p> <p>4. If not located in flood hazard areas established in Section 1612.3 (Zone X), enclosures below the <i>100-year storm elevation</i> shall be limited to <i>nonhabitable use</i> as defined in this section.</p>	
<p>Exceptions:</p> <ol style="list-style-type: none"> 1. Stairways and stairwells; 2. Shear walls perpendicular to the shoreline; 3. Shear walls parallel to the shoreline, which are limited to a maximum of 20 percent of the building length in the direction running parallel to the shore; 		<ul style="list-style-type: none"> • #1 stairways (stairways are not walls; stairways covered by 24 Sec. 8.1) • #1 stairwells have walls (24 requires breakaway walls, Sec. 4.6 and Sec. 8.1)
<p>4. Shear walls parallel to the shoreline, which exceed 20 percent of the total building length (including any attached major structure) when they meet the following criteria:</p> <p>4.1. A certification is provided by a Florida-registered professional engineer that certifies that the increased length of shear walls, over 20 percent, are located landward of the 100-year erosion limit;</p> <p>4.2. A hydraulic analysis is provided and certified by a Florida-registered professional engineer that evaluates the potential impact of flow increase on the subject parcel and adjacent properties;</p> <p>4.3. The hydraulic analysis demonstrates that although the overall shearwall coverage is more than 20 percent, the increased shear-wall length will not result in</p>	<p>New 3109.3.2.2 Shear walls. In addition to the requirements of ASCE 24 Chapter 4 for shear walls:</p> <ol style="list-style-type: none"> 1. Shear walls are permitted perpendicular to the shoreline where perpendicular shall mean less than or equal to ± 20 degrees from a line drawn normal to the shoreline. 2. Shear walls not perpendicular to the shoreline shall be limited to a maximum of 20 percent of the building length in the direction running parallel to the shore. <p>Exception. Buildings and structures other than <i>low-rise buildings</i> are permitted to have shear walls that are not perpendicular to the shoreline and that exceed 20 percent of the total building length provided the design requires a length greater than 20 percent and the following design documentation is submitted:</p>	<p>See new 3109.4 documentation if exception applies</p>

substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures; and 4.4. The provisions under Section 3109.4.2 (Exception 4) do not include any low-rise building as defined in Section 1609.2.	a. A hydraulic analysis conducted and certified by a Florida-registered professional engineer qualified to evaluate the potential impact of flow increase on the subject parcel and adjacent properties and demonstrates the increased shear wall length will not result in substantial increase of flow velocities and drag forces on the structural components of the proposed structure and neighboring structures. b. The certified design documentation shall include a statement that the increased length of shear walls over 20 percent of total building length are located landward of the 100-year erosion limit, which shall be determined in consultation with the Florida Department of Environmental Protection.	
5. Wind or sand screens constructed of fiber or wire mesh; 6. Light, open lattice partitions with individual, wooden lattice strips not greater than 3/4 inch (19 mm) thick and 3 inches (76 mm) wide; 7. Elevator shafts; 8. Small mechanical and electrical rooms; and 9. Break-away or frangible walls.		<ul style="list-style-type: none"> • #5 screens (see 24 Sec. 4.6.1) • #6 lattice (see 24 Sec. 4.6.1 "open wood lattice work" without dimensions) • #7 elevator shafts (see 24 Sec 7.5, especially 7.5.1) • #8 small mech/elect rooms – not permitted NFIP/24 (see Sec. 4.6 use limitations and Chapter 7) • #9 breakaway/frangible walls, specified in 24, Sec. 4.6
3109.5 Flood loads during a 100-year storm. 3109.5.1 Load basis. The structural design shall be based on the 100-year storm as determined by the Florida Department of Environmental Protection in studies published as part of the coastal construction control line establishment process. Breaking, broken and	New 3109.3.1 Flood loads. Flood loads shall be determined according to Chapter 5 of ASCE 7, where the stillwater depth shall be the difference between the <i>design grade</i> at the location and the higher of: 1. The stillwater elevation specified in the applicable Flood Insurance Study; or	See flood loads ASCE 7-10 and ASCE 24

<p>nonbreaking waves shall be considered as applicable. Design wave loading analysis shall consider vertical uplift pressures and all lateral pressures to include impact, as well as dynamic loading and the harmonic intensification resulting from repetitive waves.</p>	<p>2. The <i>100-year storm elevation</i> published by the Florida Department of Environmental Protection in the report titled "One-Hundred-Year Storm Elevation Requirements for Habitable Structures Located Seaward of a Coastal Construction Control Line" (1999). An applicant may request determination of a site-specific 100-year storm elevation (see definition).</p>	
<p>3109.5.2 Hydrostatic load. Habitable structures shall be designed in consideration of the hydrostatic loads which would be expected under the conditions of maximum inundation associated with a 100-year storm event. Calculations for hydrostatic loads shall consider the maximum water pressure resulting from a fully peaked, breaking wave superimposed on the design storm surge with dynamic wave set-up. Both free and confined hydrostatic loads shall be considered. Hydrostatic loads which are confined shall be determined using the maximum elevation to which the confined water would freely rise if unconfined. Vertical hydrostatic loads shall be considered as forces acting both vertically downward and upward on horizontal or inclined surfaces of major structures (e.g., floors, slabs, roofs, walls). Lateral hydrostatic loads shall be considered as forces acting horizontally above and below grade on vertical or inclined surfaces of major structures and coastal or shore protection structures. Hydrostatic loads on irregular or curving geometric surfaces may be determined in consideration of separate vertical and horizontal components acting simultaneously under the distribution of the hydrostatic pressures.</p>		

3109.5.3 Hydrodynamic loads. Habitable structures shall be designed in consideration of the hydrodynamic loads which would be expected under the conditions of a 100-year storm event. Calculations for hydrodynamic loads shall consider the maximum water pressures resulting from the motion of the water mass associated with a 100-year storm event. Full-intensity loading shall be applied on all structural surfaces above the design grade which would affect the flow velocities.		
3109.6 Wind loads. All habitable structures shall be designed in accordance with Chapter 16.		FBC requirement, no need to repeat
3109.7 Swimming pools. Swimming pools located in close proximity to an existing habitable structure or armoring shall be designed with an adequate pile foundation for the erosion and scour conditions of a 100-year storm event.		FBC Section 454 refers swimming pools in flood hazard areas to ASCE 24.
3109.8 Storm debris. All structures will be designed to minimize the potential for wind- and water-borne debris during a storm.		See new 3109.1, moved because it is generally applicable
	<p>New 3109.4 Documentation. In addition to documentation specified in Section 1612.5, where applicable the following documentation shall be prepared and sealed by a Florida-registered professional engineer and submitted to the building official:</p> <ol style="list-style-type: none"> 1. For site-specific determination of <i>design grade</i>, a report of the assumptions and methods used. 2. For shear walls, the certifications required in Section 3109.3.2. 	If an applicant elects to do these analyses, the documentation must be submitted

Comparison of 3024 FBC 3109.4 vs ASCE 24-14

Prepared by Christopher P. Jones, P.E., a Florida-registered engineer with long experience in coastal processes, design of buildings in coastal zones, and Florida's CCCL. Mr. Jones is chair of the ASCE 24 committee.

2014 FBC Provision	Corresponding ASCE 24-14 Provision	Comments
3109.4 Construction Standards		
3109.4.1 Pile Foundations		
All habitable structures shall be elevated on, and securely anchored to, an adequate <u>pile foundation</u> .	1.5.3.4 4.5.1, 4.5.1.1, 4.5.1.2, 4.5.5, 4.5.6, 4.5.7, 4.5.7.1, 4.5.8, 4.5.12, 4.5.13	<p>ASCE 24-14 is <u>less restrictive</u> regarding allowable foundation types, but <u>+/- equivalent</u> regarding foundation performance.</p> <p>Sec 4.5.1 and 4.5.5 of ASCE 24-14 permit use of <u>deep foundations</u> other than piles (i.e., drilled shafts, caissons, other deep foundations), but this allowance is <u>+/- equivalent</u> to FBC 3109.4.1.</p> <p>In CHHA where surface or subsurface conditions consist of non-erodible soil or rock, Sec 4.5.1.1 and 4.5.8 of ASCE 24-14 permit use of certain shallow foundations (<u>footings, mats, rafts, slabs</u>), columns and/or walls to extend up from there. Foundation type is <u>less restrictive</u>, foundation performance is <u>+/- equivalent</u>.</p> <p>In CAZ (no requirement for non-erodible soil or rock), Sec 4.5.1.2 and 4.5.8 of ASCE 24-14 permit use of certain shallow foundations (<u>footings, mats, rafts, slabs</u>). Top of foundation must be below eroded grade, columns and/or walls to extend up from there. Foundation type is <u>less restrictive</u>, foundation performance is <u>+/- equivalent</u>.</p> <p>Sec 4.5.7 of ASCE 24-14 permits the use of <u>posts, piers, and columns</u> in lieu of piles, but those posts-piers and columns must resist the same design loads, have the same spacing, and meet the same embedment requirements as piles in ASCE 24-14. 24-14 is <u>+/- equivalent</u>.</p> <p>Sec 4.5.12 of ASCE 24-14 permits the use of shear walls – see shear wall entry in this table.</p> <p>Sec 4.5.13 permits stem walls in CAZ (not in CHHA). Walls must resist all loads and have deep footings where soils are erodible. Foundation type is <u>less restrictive</u>, foundation performance is <u>+/- equivalent</u>.</p>

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Comparison of 3024 FBC 3109.4 vs ASCE 24-14

Pile foundations for habitable structures shall be designed to withstand all reasonable anticipated <u>erosion, scour and loads resulting from a 100-year storm</u> including wind, wave, hydrostatic and hydrodynamic forces acting simultaneously with typical structural (live and dead) loads.	1.5.1, 1.5.3, 1.5.3.1, 1.5.3.2, 1.6.1, 1.6.2 (1.6.1 and 1.6.2 reference ASCE 7-05, of which section 5.3.1 and 5.3.2 require consideration of design flood loads, other design loads, and erosion and scour) 4.2, 4.5.1, 4.5.2, 4.5.3, 4.5.5, 4.5.5.1, 4.5.6.1, 4.5.6.3, 4.5.7, 4.5.8, 4.5.9, 4.5.13	ASCE 24-14 is <u>equivalent</u> (aside from the specification of the design flood and 100-year storm elevation, ASCE 24 vs FBC)
All habitable structures should be <u>anchored to their pile foundation in such a manner as to prevent flotation, collapse or lateral displacement.</u>	1.5.1, 1.5.3, 1.5.5, 4.5.1.1, 4.5.1.2, 4.5.7 1.6 (reference to ASCE 7-05, of which section 5.3.1 has a similar requirement)	ASCE 24-14 is <u>+/-equivalent</u>
<u>The elevation of the soil surface to be used in the calculation of pile reactions and bearing capacities</u> for habitable structures shall not be greater than that which would result from erosion caused by a 100-year storm event. Calculation of the design grade shall account for localized scour resulting from the presence of structural components.	1.5.3.2 4.5.2, 4.5.3	Technically, ASCE 24-14 is <u>more restrictive</u> since sec 4.5.2 and 4.5.3 require shoreline movement to be included in erosion analyses. Practically speaking, ASCE 24-14 is <u>+/- equivalent</u> .

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Comparison of 3024 FBC 3109.4 vs ASCE 24-14

Design ratio or <u>pile spacing</u> to pile diameter should not be less than 8:1 for individual piles located above the design grade.	4.5.6.4	<p>ASCE 24 is <u>less restrictive</u> (could result in closer pile spacing than 3109.4.1).</p> <p>ASCE 24 specifies pile spacing only, not ratio.</p> <p>For pile diameters greater than 1 ft, ASCE 24 pile spacing (8 ft; or less, based on geotechnical analysis and foundation design) would be less than spacing required by 3109.4.1.</p> <p>For pile diameters less than or equal to 1 ft, ASCE 24 could result in pile spacing less than 3109.4.1.</p>
<u>Pile caps shall be set below the design grade</u> unless designed to resist increased flood loads associated with setting the cap above the design grade, but at or below the natural grade.	4.5.9	<p>ASCE 24 is <u>+/- equivalent</u>.</p> <p>ASCE 24 does not specify "natural grade", only that the tops of pile caps shall be at or below "grade".</p> <p>ASCE 24 requires pile caps exposed by erosion and scour to be designed for flood loads.</p>
<u>Pile penetration</u> shall take into consideration the anticipated loss of soil above the design grade.	4.5.3, 4.5.5, 4.5.6.3, 4.5.7	<p>ASCE 24 is <u>+/- equivalent</u>.</p> <p>ASCE 24 does not define "design grade" like 3109 (or have a report tabulating design grade like CCCL does), but does require foundation design to account for erosion and scour during design event.</p> <p>ASCE 24 specifies a minimum pile tip elevation (-10 ft MWL, unless design demonstrates less penetration provides required support).</p> <p>Technically, ASCE 24-14 is <u>more restrictive</u> since sec 4.5.3 requires shoreline movement to be included in erosion analyses. Practically speaking, ASCE 24-14 is <u>+/- equivalent</u>.</p>

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Comparison of 3024 FBC 3109.4 vs ASCE 24-14

3109.4.2 Walls Below the 100-Year Storm elevation	4.5.12, 4.5.13, 4.6, 4.6.1, 8.1	<p>Sec 4.5.12 of ASCE 24-14 is <u>less restrictive</u> than 3109.4.2 regarding allowable length of shore-parallel shear wall. As typically handled by DEP Beaches in the past, CCCL obstruction provisions (mimicked in 3109.4.2) permit shore-parallel shear walls equal 20% of the building length without hydraulic analysis, and up to +/-40% of building length with hydraulic analysis. ASCE 24-14 allows non-shore-perpendicular shear walls equal to 2/3 of building length (unobstructed area must equal ½ blocked area).</p> <p>ASCE 24-14 is <u>more restrictive</u> regarding mechanical and electrical rooms acting as obstructions than 3109.4.2 exception 8; plus, ASCE 24-14 would require utility equipment to meet the requirements of section 7.</p> <p>Sec 8.1 of ASCE 24-14 stairway and stairwell provisions are <u>+/- equivalent</u>.</p> <p>Sec 4.6.1 of ASCE 24-14 breakaway wall provisions are <u>+/- equivalent</u>. Exception is ASCE 24 Sec 4.6.2 requirement for flood openings in breakaway walls, which makes ASCE 24 <u>more restrictive</u>.</p> <p>Sec 4.6.1 of ASCE 24-14 lattice provisions are <u>less restrictive</u> (ASCE 24 permits lattice without specifying maximum width and thickness, 3109.4.2 exception 6 specifies maximum width and thickness).</p> <p>Sec 4.5.13 of ASCE 24-14 permits stem walls in CAZ (not in CHHA). Walls must resist all loads and have deep footings where soils are erodible. Foundation type is <u>less restrictive</u>, foundation performance is <u>+/- equivalent</u>.</p>
3109.4.5 Flood Loads During the 100-Year Storm	1.6.1 and 1.6.2 (reference ASCE 7-05, of which section 5.3.1 and 5.3.2 require consideration of design flood loads, other design loads, and erosion and scour) 4.2	ASCE 24-14 is <u>+/- equivalent</u> (aside from the specification of the design flood, ASCE 24 vs FBC)

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Comparison of 3024 FBC 3109.4 vs ASCE 24-14

Jones' Conclusions re FBC 3109.4 (CCCL) vs ASCE 24-14 V and CAZ requirements – *note that there may be some A zones seaward of CCCL, in which case ASCE 24 would apply Chapter 2 instead of Chapter 4. ASCE 24 Chapter 4 would have to be applied to A zones to make CCCL and ASCE 24 requirements more similar.*

- **Flood Loads** required by 3109 and ASCE 24-14 are +/- equivalent. FBC 3109 requires use of State's 100-year storm, ASCE 24-14 requires use of Design Flood.
- **Pile Foundations:** ASCE 24-14 foundation types are less restrictive than 3109, but performance requirements are +/- equivalent to 3109 performance requirements; ASCE 24-14 specific requirements are generally equivalent to 3109, with some less restrictive and some more restrictive than 3109:
 - ASCE 24-14 allows deep foundations other than piles (**conclusion – +/- equivalent to 3109**)
 - ASCE 24-14 permits use of posts, piers, columns – but these must meet the same performance, load, embedment and spacing requirements as piles (**conclusion – +/- equivalent to 3109**)
 - ASCE 24-14 permits use of footing, mat, raft and slab foundations (with open vertical foundation above), for erodible and non-erodible soils (**conclusion – ASCE 24-14 less restrictive than 3109**)
 - ASCE 24-14 permits use of stem wall foundations in Coastal A Zone (**conclusion – ASCE 24-14 less restrictive than 3109**)
 - ASCE 24-14 could result in a lower design grade (more restrictive) since ASCE 24 considers shoreline movement in the erosion (design grade) analysis, 3109 does not. However, this is probably of little importance in most cases (**conclusion – ASCE 24 design grade requirement is +/- equivalent**)
 - ASCE 24-14 pile spacing could potentially be less than 3109.4.1 pile spacing (**conclusion – less restrictive than 3109**)
 - ASCE 24-14 pile cap elevation requirement is similar to 3109 (**conclusion – +/- equivalent to 3109**)
 - ASCE 24-14 pile penetration requirement is similar to 3109 (**conclusion – +/- equivalent to 3109**)
 - ASCE 24-14 anchorage to foundation requirements are similar to 3109 (**conclusion – +/- equivalent to 3109**)
- **Shear Walls:** requirements of ASCE 24 are both less and more restrictive.
 - ASCE 24 could allow a greater length of shore-parallel shear wall (**conclusion – ASCE 24 less restrictive than 3109**)
 - ASCE 24 stairway and stairwell provisions are similar (**conclusion – +/- equivalent to 3109**)
 - ASCE 24 breakaway wall requirements are similar, but ASCE 24 requires flood openings in breakaway walls (**conclusion – ASCE 24 more restrictive than 3109**)
 - ASCE 24 does not specify maximum lattice width and thickness, but no-obstruction/breakaway requirement applies (**conclusion – no significant reduction of 3109**)
 - ASCE 24 prohibits solid walls for electrical and mechanical rooms in V and CAZ, and would require elevation of equipment (**conclusion – ASCE 24 more restrictive than 3109**)

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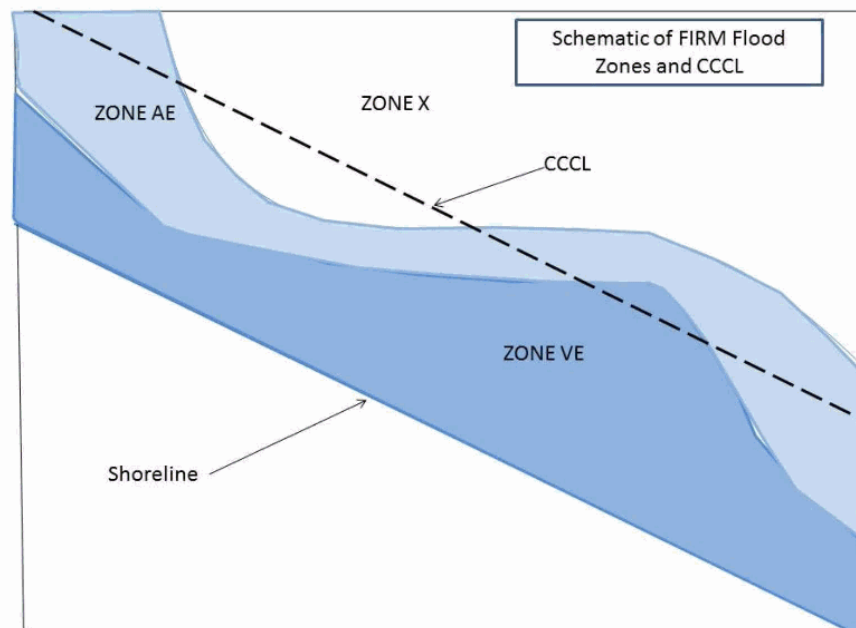
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Flood Zone Area Seaward of the Coastal Construction Control Line

GIS analyses prepared by Florida Division of Emergency Management. FEMA flood zone data from FEMA; Coastal Construction Control Line data from Florida DEP. The analyses determined the area of each flood zone that lies between the shoreline (from FEMA data) and the CCCL. The data reported below are at the county level, including area in the unincorporated counties and incorporated municipalities in each county.

Based on this analysis:

- 25,160 total acres of land seaward of the CCCL
- 17,785 acres (71%) is FEMA Flood Zone VE
- 4,009 acres (16%) is FEMA Flood Zone AE
- 2,530 acres (10%) is FEMA Flood Zone X (outside of SFHA)
- 581 acres (2%) is FEMA Flood Zone AO
- 123 acres (1%) is Zone A (without BFE), shaded Zone X (500-year), Zone D, or open water



Comparing CCCL and FEMA Flood Zones

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Flood Zone Area Seaward of CCCL – by County							
Bay	Flood Zone	Area (acres)	Percent of Area	Miami-Dade	Flood Zone	Area (acres)	Percent of Area
	AE	91.53	10.12%		AE	244.09	62.66%
	VE	552.56	61.11%		Open water	1.06	0.27%
	X	260.17	28.77%		VE	68.37	17.55%
	TOTAL:	904.27	100%		X	76.05	19.52%
Brevard	Flood Zone	Area (acres)	Percent of Area		TOTAL:	389.57	100%
	AE	134.75	9.29%	Nassau	Flood Zone	Area (acres)	Percent of Area
	AO	156.82	10.81%		AE	92.45	22.92%
	VE	846.04	58.34%		VE	103.36	25.62%
	X	312.6	21.56%		X	207.63	51.46%
	TOTAL:	1,450.21	100%		TOTAL:	403.44	100%
Broward	Flood Zone	Area (acres)	Percent of Area	Okaloosa	Flood Zone	Area (acres)	Percent of Area
	AE	125.99	21.92%		AE	0.69	0.15%
	AO	72.62	12.63%		VE	421.23	92.24%
	VE	355.61	61.87%		X	34.74	7.61%
	X	20.59	3.58%		TOTAL:	456.67	100%
	TOTAL:	574.81	100%	Palm Beach	Flood Zone	Area (acres)	Percent of Area
Charlotte	Flood Zone	Area (acres)	Percent of Area		AE	1.71	0.34%
	AE	67.72	10.26%		VE	427.25	85.16%
	VE	592.3	89.74%		X(500)	1.72	0.34%
	TOTAL:	660.02	100%		X	71.03	14.16%
Collier	Flood Zone	Area (acres)	Percent of Area		TOTAL:	501.72	100%
	AE	481.99	26.83%	Pinellas	Flood Zone	Area (acres)	Percent of Area
	VE	1,297.67	72.23%		AE	68.87	4.31%
	X	16.87	0.94%		Open water	0.2	0.01%
	TOTAL:	1,796.52	100%		VE	1,530.36	95.68%
Duval	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,599.42	100%
	AE	51.41	5.54%	Sarasota	Flood Zone	Area (acres)	Percent of Area
	AO	201.95	21.76%		A	0.12	0.01%
	Open water	119.23	12.85%		AE	962.08	62.49%
	VE	433.86	46.75%		D	0.69	0.04%
	X	121.68	13.10%		VE	524.03	34.04%
	TOTAL:	928.13	100%		X	52.66	3.42%
Escambia	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,539.58	100%
	AE	35.49	4.96%				
	VE	680.23	95.04%				
	TOTAL:	715.72	100%				

Comparing CCCL and FEMA Flood Zones

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Flagler	Flood Zone	Area (acres)	Percent of Area	St. Johns	Flood Zone	Area (acres)	Percent of Area
	AE	48.86	9.83%		AE	225.99	13.24%
	VE	390.56	78.58%		AO	3.52	0.20%
	X	57.61	11.59%		VE	1,403.45	82.21%
	TOTAL:	497.04	100%		X	74.22	4.35%
Franklin	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,707.19	100%
	AE	273.98	9.71%	St. Lucie	Flood Zone	Area (acres)	Percent of Area
	VE	2,543.07	90.11%		AE	253.5	32.00%
	X	5.1	0.18%		AO	78.66	9.93%
	TOTAL:	2,822.14	100%		VE	395.68	49.96%
Gulf	Flood Zone	Area (acres)	Percent of Area		X	64.23	8.11%
	A	0.17	0.01%		TOTAL:	792.06	100%
	AE	375.74	19.28%	Volusia	Flood Zone	Area (acres)	Percent of Area
	VE	1,457.43	74.78%		AE	0.03	0%
	X	115.57	5.93%		VE	504.82	36.45%
	TOTAL:	1,948.91	100%		X	880.25	63.55%
Indian River	Flood Zone	Area (acres)	Percent of Area		TOTAL:	1,385.09	100%
	AE	42.04	5.97%	Walton	Flood Zone	Area (acres)	Percent of Area
	AO	67.68	9.60%		AE	4.92	0.67%
	VE	435.58	61.81%		VE	612.73	83.41%
	X	159.4	22.62%		X	116.95	15.92%
	TOTAL:	704.7	100%		TOTAL:	734.6	100%
Lee	Flood Zone	Area (acres)	Percent of Area				
	AE	204.94	9.86%				
	VE	1,872.51	90.14%				
	TOTAL:	2,077.45	100%				
Manatee	Flood Zone	Area (acres)	Percent of Area				
	AE	158.12	47.33%				
	VE	175.93	52.67%				
	TOTAL:	334.05	100%				
Martin	Flood Zone	Area (acres)	Percent of Area				
	AE	62.13	26.24%				
	VE	170.1	71.85%				
	X (500)	0.18	0.08%				
	X	4.33	1.83%				
	TOTAL:	236.74	100%				

Comparing CCCL and FEMA Flood Zones

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