CTC-Balanced Fire Protection Features Study Group
2007/2008 Cycle
Code Changes Related to Features Study Group

The following are code changes related to the CTC BFP Features Study Group that will be considered at the 2007/2008 Code Development Hearings in Palm Springs, California.

G110–07/08
Chapter 5

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise as follows:

CHAPTER 5
GENERAL BUILDING ~~HEIGHTS AND AREAS~~ COMPARTMENTATION AND HEIGHT

501.1 Scope. The provisions of this chapter control the height and ~~area of~~ the type and number of fire compartments within all structures hereafter erected and additions to existing structures

[F] 501.2 (Supp) Address identification. New and existing buildings shall be provided with approved address numbers or letters. Each character shall be a minimum 4 inches (102 mm) high and a minimum of 0.5 inch (12.7 mm) wide. They shall be installed on a contrasting background and be plainly visible from the street or road fronting the property. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure.

SECTION 502
DEFINITIONS

502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

AREA, ~~BUILDING~~ FIRE COMPARTMENT. The area included within surrounding exterior walls, compartment walls, (or exterior walls and firewalls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the ~~building~~ fire compartment area if such areas are included within the horizontal projection of the roof or floor above.

(Supp) BASEMENT. A story that is not a story above grade plane (See "Story above grade plane" in Section 202).

EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairs and ladders necessary to access the platform (see Section 505.5).

FIRE COMPARTMENT. An area enclosed and bounded by fire walls, fire barrier walls, exterior walls, or fire-resistance-rated horizontal assemblies of a building.

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

MEZZANINE. An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505.

SECTION 503
GENERAL HEIGHT AND FIRE COMPARTMENT AREA LIMITATIONS

503.1 (Supp) General. The height and maximum area of any fire compartment and the number of fire compartments in a buildings shall not exceed the limits specified in Tables 503.1(1), 503.1(2), 503.1(3) and 503.1(4) based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more fire walls complying with Section 705 shall be considered to be a separate building.

(Delete existing Table 503 entire in its entirety and replace with Tables 503.1(1) through 503.1(4))

~~**TABLE 503**~~
~~**ALLOWABLE HEIGHT AND BUILDING AREASa**~~
~~**Height limitations shown as stories and feet above grade plane.**~~
~~**Area limitations as determined by the definition of "Area, building," per story**~~

Table 503.1(1)
MAXIMUM BUILDING HEIGHT (Feet and Stories)

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
Feet	UL	160	65	55	65	50	65	55	40
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
S-2	UL	11	5	4	4	5	5	4	2
F-2	UL	11	5	3	4	3	5	3	2
B	UL	11	5	4	5	3	5	4	2
R-1, R-2, R-4	UL	11	4	4	4	3	4	4	2
R-3	UL	11	4	4	4	3	4	4	3
M	UL	11	4	4	4	3	4	4	1
F-1	UL	11	4	2	3	2	4	2	1
S-1	UL	11	4	3	3	3	4	3	1
A-3, A-4	UL	11	3	2	3	2	3	2	1
M	UL	11	4	4	4	2	4	4	1
A-2	UL	11	3	2	3	2	3	2	1
I-1	UL	9	4	3	4	3	4	3	2

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
H-4	UL	7	5	3	5	3	5	3	2
H-3	UL	6	4	2	4	2	4	2	1
U	UL	5	4	2	3	2	4	2	1
A-1	UL	5	3	2	3	2	3	2	1
I-4	UL	5	3	2	3	1	2	3	1
E	UL	5	3	2	3	1	3	2	1
H-5	4	4	3	3	3	3	3	3	2
I-2	UL	4	2	1	1	1	1	NP	NP
I-3	UL	4	2	1	2	2	2	1	1
H-2	UL	3	2	1	2	1	2	1	1
H–1	1	1	1	1	1	1	1	1	NP

UL = unlimited in height
NP = not permitted

TABLE 503.1(2)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS [a, b]

OCCUPANCY	TYPE IA/IB	TYPE IIA	TYPE IIIA	TYPE IV AND VA	TYPE IIB AND IIIB	TYPE VB
S-2, F-2	30,267	16,933	16,933	10,933	7,867	4,800
A-3, A-4, B, H-4, I, R, E	26,706	14,941	14,941	9,647	6,941	4,235
A-1, A-2, M	22,700	12,700	12,700	8,200	5,900	3,600
F-1, S-1, H-5	19,739	11,043	11,043	7,130	5,130	3,130
H–1, H-2, H-3	NP	NP	NP	NP	NP	NP

a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.

NP = Not Permitted

TABLE 503.1(3)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a, b]

OCCUPANCY	TYPE IA/IB	TYPE IIA	TYPE IIIA	TYPE IV AND VA	TYPE IIB AND IIIB	TYPE VB
S-2, F-2	722,400	290,667	290,667	172,000	130,667	82,667
A-3, A-4, B, H-4, I, R, E	637,412	256,471	256,471	151,765	115,294	72,941
A-1, A-2, M	387,000	109,000	109,000	64,500	49,000	31,000
F-1, S-1, H-5	168,261	70,139	70,139	41,504	31,530	19,948

H–1, H-2, H-3	30,960	17,440	17,440	10,320	7,840	4,960

a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.

TABLE 503.1(4)
GROSS AREA FACTOR

ACTUAL BUILDING HEIGHT, STORIES	**NUMBER OF STORIES PERMITTED**								
	1	2	3	4	5	6	7	8	9
1	4	8	12	16	20	24	28	32	36
2	-	6	9	12	15	18	21	24	27
3	-	-	6	8	10	12	14	16	18

503.2 Building area. The maximum allowable building area shall not exceed the maximum area of fire compartments in accordance with Tables 503.1(2) or 503.1(3) multiplied by the number in Table 503.1(4). A building shall be considered one fire compartment except where subdivided by compartment fire barriers conforming with this section.

503.2.1 Enclosure. Each fire compartment shall be enclosed by exterior walls, roof, fire rated horizontal assemblies or fire compartment barrier walls. If a building has more than one fire compartment, each fire compartment shall be separated by horizontal or vertical compartment barrier having a fire resistance rating determined in accordance with Table 503.2.2.

503.2.2 Fire compartment barriers. Fire compartment barriers separating a building into fire compartments shall comply with Sections 503.2.2.1 and 503.2.2.2 and Table 503.2.2.

TABLE 503.2.2
FIRE COMPARTMENT FIRE RESISTANCE (hrs)

	SPRINKLERED	**NON-SPRINKLERED**
Assembly		
A-1	1	2
A-2	1	2
A-3	1	2
A-4	1	2
A-5	NA	NA
Business		
B	1	2
Educational		

	SPRINKLERED	NON-SPRINKLERED
E	1	2
Factory and Industry		
F-1	2	3
F-2	1	2
Hazardous		
H-1	3	4
H-2	3	4
H-3	2	3
H-4	1	2
H-5	1	2
Institutional		
I-1	1	2
I-2	1	2
I-3	1	2
I-4	1	2
Mercantile		
M	1	2
Residential		
R-1	1	2
R-2	1	2
R-3	1	2
R-4	1	2
Storage		
S-1	2	3
S-2	1	2
Utility		
U	½	1

NA = Not Applicable

503.2.2.1 Horizontal fire compartment barriers. Horizontal fire compartment barriers shall be constructed in accordance with Section 711.

503.2.2.2 Vertical fire barriers. Vertical fire compartment barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, including but not limited to spaces such as above a

suspended ceiling.

503.2.2.2.1 Vertical continuity. Fire compartment barriers shall extend from the foundation to the underside of the roof deck.

Exceptions:

1. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab provided:
   1.1. The lower roof assembly within 4 feet (1220 mm) of the wall has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
   1.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
   1.3. Each building shall be provided with not less than a Class B roof covering.
2. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck, or slabs where both buildings are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire compartment barrier.
3. In buildings of Type III, IV and V construction, walls shall be permitted to terminate at the underside of combustible roof sheathing or decks provided:
   3.1. There are no openings in the roof within 4 feet (1220 mm) of a fire wall,
   3.2. The roof is covered with a minimum Class B roof covering, and
   3.3. The roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with 5/8 inch (15.9 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm) on both sides of the fire wall.
4. Buildings located above a parking garage designed in accordance with Section 509.2 shall be permitted to have the fire compartment barriers for the buildings located above the parking garage extend from the horizontal separation between the parking garage and the buildings.

503.2.2.2.2 Supporting construction. The supporting construction for fire compartment barrier walls shall be protected to afford the required fire-resistance rating of the fire compartment barrier supported.

Exceptions:

1. The supporting construction for a 1 hr. fire compartment barrier wall in buildings of Type IIB, IIIB and VB construction, not protected throughout by sprinklers in accordance with Section 903.3.1.1 or 903.3.1.2, shall be supported by a structure having a layer of 20 minute fire-resistance rated finish protection.
2. The supporting construction for a 1 hr. fire compartment barriers in buildings of Type IIB, IIIB and VB construction that are protected by sprinklers throughout in accordance with Section 903.3.1.1 or 903.3.1.2 shall not be required to be protected.

503.2.2.3 Glazed openings. Glazed openings in fire compartment barriers shall be limited to those in fire doors complying with 715.4.

503.2.2.4 Fire compartment doors. Doors in fire compartment barriers shall have a fire protection rating of at least 1 hour in accordance with Table 503.2.2.4. Doors in fire compartment barriers shall limit temperature rise to 450°F (250°C) when tested in accordance with NFPA 252.

TABLE 503.2.2.4
FIRE PROTECTION RATING OF DOORS IN FIRE COMPARTMENT BARRIERS (HRS)

FIRE COMPARTMENT BARRIER	DOOR IN FIRE COMPARTMENT BARRIER
1 hr.	1 hr.
2 hr.	1½ hr.
3 hr.	2 hr.

503.2.2.5 Other openings fire compartment barriers. Openings in 1-hour fire compartment barriers for air-handling shall be protected with fire dampers having a fire protection rating of 1 hour.

503.3 Smoke management for adjacent fire compartments. Where adjacent fire compartments share a common fire compartment wall or horizontal assembly, or both, for the purpose of creating separate fire compartments, a method of smoke management shall be provided in accordance with Section 503.3.1 for such fire compartments that meet any of the following conditions:

1. The fire compartment is not protected with an automatic sprinkler system in accordance with Section 903.3.1 and contains one or more stories located more than one story above grade plane or
2. The fire compartment contains one or more stories located more than two stories above grade plane having any of the following occupancies:
   - 2.1. Group A occupancy with an occupant load of 300 or more persons;
   - 2.2. Group I-1 occupancy; or
   - 2.3. Group I-2 occupancy.

503.4 Smoke management methods. Smoke management as required by Section 503.3 shall comply with any one or a combination of any of the following methods, as applicable:

1. Door openings, joints and penetrations in fire compartment separation walls and horizontal assemblies shall be protected as required for smoke barriers in accordance with the following:
   - 1.1. Door openings shall comply with Section 715.4.3.1.
   - 1.2. Penetrations shall comply with Section 712.5.
   - 1.3. Joints shall comply with Section 713.6.
   - 1.4. Ducts and air transfer openings shall comply with Section 716.5.5.
2. Openings in fire compartment separation horizontal assemblies shall be protected by shaft enclosures in accordance with Section 707. For the purpose of smoke management at fire compartment separations, Section 707.2 shall not apply.
3. Exit stair enclosures penetrating a fire compartment separation horizontal assembly shall be protected as for smokeproof enclosures in accordance with Section 909.20.
4. One or more of the following mechanical methods shall be permitted to be used for smoke management in lieu of Items 1 and 2 above:
   - 4.1. The pressurization method in accordance with Section 909.6
   - 4.2. The air flow design method in accordance with Section 909.7 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1
   - 4.3. The exhaust method in accordance with Section 909.8 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1

~~**503.1.1**~~ **503.5 Special industrial occupancies.** Buildings and structures designed to house special industrial processes that require large areas and unusual heights to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the height and area limitations of Table ~~503~~ 503.1(1) through 503.1(3).

~~**503.1.2**~~ **503.6 Buildings on same lot.** Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the height of each building and the aggregate maximum area of fire compartments ~~area of buildings~~ are within the limitations of Table ~~503~~ 503.1(1) through 503.1(3) as modified by Sections 504 ~~and 506~~. The provisions of this code applicable to the aggregate building shall be applicable to each building.

~~**503.1.3**~~ **503.7 Type I construction.** Buildings of Type I construction permitted to be of unlimited tabular heights ~~and areas~~ or number of fire compartments are not subject to the special requirements that allow unlimited fire compartments ~~area buildings~~ in Section 507 or unlimited height in Sections 503.5~~1.1~~ and 504.3 or increased height and areas for other types of construction.

SECTION 504
HEIGHT

504.1 General. The height permitted by Table 503.1(1) shall be increased in accordance with this section.

Exception: The height of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited if the building is provided with an automatic fire-extinguishing system

in accordance with Chapter 9 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503.1(1) for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. ~~These increases are permitted in addition to the area increase in accordance with Sections 506.2 and 506.3.~~ For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503.1(1) for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

504.3 Roof structures. Towers, spires, steeples and other roof structures shall be constructed of materials consistent with the required type of construction of the building except where other construction is permitted by Section 1509.2.1. Such structures shall not be used for habitation or storage. The structures shall be unlimited in height if of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable height if of combustible materials (see Chapter 15 for additional requirements).

SECTION 505
MEZZANINES

505.1 General. A mezzanine or mezzanines in compliance with Section 505 shall be considered a portion of the story below. Such mezzanines shall not contribute to either the ~~building~~ fire compartment area or number of stories as regulated by Section 503.1. The area of the mezzanine shall be included in determining the fire area defined in Section 702. The clear height above and below the mezzanine floor construction shall not be less than 7 feet (2134 mm).

505.2 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the floor area of that room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the floor area of the room.

Exceptions:

1. The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.5~~1.1~~ shall not exceed two-thirds of the floor area of the room.
2. The aggregate area of mezzanines in buildings and structures of Type I or II construction shall not exceed
   one-half of the floor area of the room in buildings and structures equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 and an approved emergency voice/alarm communication system in accordance with Section 907.2.12.2.

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1014.3. Where a stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing. Accessible means of egress shall be provided in accordance with Section 1007.

Exception: A single means of egress shall be permitted in accordance with Section 1015.1.

505.4 (Supp) Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more means of egress is not required to be open to the room in which the mezzanine is located if at least one of the means of egress provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In other than Groups H and I occupancies no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.

505.5 (Supp) Equipment platforms. Equipment platforms in buildings shall not be considered as a portion of the floor below. Such equipment platforms shall not contribute to either the building area or the number of stories as regulated by Section 503.1. The area of the equipment platform shall not be included in determining the fire area in accordance with Section 903. Equipment platforms shall not be a part of any mezzanine and such platforms and the walkways, stairs and ladders providing access to an equipment platform shall not serve as a part of the means of egress from the building.

505.5.1 Area limitations. The aggregate area of all equipment platforms within a room shall not exceed two-thirds of the area of the room in which they are located. Where an equipment platform is located in the same room as a mezzanine, the area of the mezzanine shall be determined by Section 505.2 and the combined aggregate area of the equipment platforms and mezzanines shall not exceed two-thirds of the room in which they are located.

[F] 505.5.2 Fire suppression. Where located in a building that is required to be protected by an automatic sprinkler system, equipment platforms shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in Section 903.3.

505.5.3 Guards. Equipment platforms shall have guards where required by Section 1013.1.

~~**SECTION 506**~~
~~**AREA MODIFICATIONS**~~

~~**506.1 General.** The areas limited by Table 503 shall be permitted to be increased due to frontage *(I_f)* and automatic sprinkler system protection *(I_s)* in accordance with the following:~~

~~$$A_a = \{A_t + [A_t \times I_f] + [A_t \times I_s]\}$$~~ ~~**(Equation 5-1)**~~

~~where:~~

~~A_a = Allowable area per story (square feet).~~
~~A_t = Tabular area per story in accordance with Table 503 (square feet).~~
~~I_f = Area increase factor due to frontage as calculated in accordance with Section 506.2.~~
~~I_s = Area increase factor due to sprinkler protection as calculated in accordance with Section 506.3.~~

~~**506.2 Frontage increase.** Every building shall adjoin or have access to a public way to receive an area increase for frontage. Where a building has more than 25 percent of its perimeter on a public way or open space having a minimum width of 20 feet (6096 mm), the frontage increase shall be determined in accordance with the following:~~

~~$$I_f = [F / P - 0.25]W / 30$$~~ ~~**(Equation 5-2)**~~

~~where:~~

~~I_f = Area increase due to frontage.~~
~~F = Building perimeter that fronts on a public way or open space having 20 feet (6096 mm) open minimum width (feet).~~
~~P = Perimeter of entire building (feet).~~
~~W = Width of public way or open space (feet) in accordance with Section 506.2.1.~~

~~**506.2.1 (Supp) Width limits.** The value of W shall be at least 20 feet (6096 mm). Where the value of W varies along the perimeter of the building, the calculation performed in accordance with Equation 5-2 shall be based on the weighted average of each portion of exterior wall and open space where the value of W is greater than or equal to 20 feet (6096 mm). Where the value of W exceeds 30 feet (9144 mm), a value of 30 feet (9144 mm) shall be used in calculating the weighted average, regardless of the actual width of the open space.~~

~~**Exception:** The value of W divided by 30 shall be permitted to be a maximum of 2 when the building meets all requirements of Section 507 except for compliance with the 60-foot (18 288 mm) public way or yard requirement, as applicable.~~

~~**506.2.2 Open space limits.** Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved fire lane.~~

~~**506.3 (Supp) Automatic sprinkler system increase.** Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (I_s = 2) for buildings with more than one story above grade plane and an additional 300 percent (I_s = 3) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2.~~
~~**Exception:** The area limitation increases shall not be permitted for the following conditions:~~

1. ~~The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.~~
2. ~~The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.~~
3. ~~Fire-resistance rating substitution in accordance with Table 601, Note e.~~

~~**506.4 (Supp) Buildings with more than one story.** The total allowable building area of a building with more than one story shall be determined in accordance with this section. The actual aggregate building area at all stories in the building shall not exceed the total allowable building area.~~

~~**Exception:** A single basement need not be included in the total allowable building area, provided such basement does not exceed the area permitted for a building with no more than one story above grade plane.~~

~~**506.4.1 (Supp) Area determination.** The maximum area of a building with more than one story above grade plane shall be determined by multiplying the allowable area of the first story (A_a), as determined in Section 506.1, by the number of stories above grade plane as listed below:~~

1. ~~For buildings with two stories above grade plane, multiply by 2;~~
2. ~~For buildings with three or more stories above grade plane, multiply by 3; and~~
3. ~~No story shall exceed the allowable area per story (A_a), as determined in Section 506.1, for the occupancies on that story.~~

~~**Exceptions:**~~

1. ~~Unlimited area buildings in accordance with Section 507.~~
2. ~~The maximum area of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story (A_a), as determined in Section 506.1, by the number of stories above grade plane.~~

~~**506.4.1.1 (Supp) Mixed occupancies.** In buildings with mixed occupancies, the allowable area per story (A_a) shall be based on the most restrictive provisions for each occupancy when the mixed occupancies are treated according to Section 508.3.2. When the occupancies are treated according to Section 508.3.3 as separated occupancies, the maximum total building area shall be such that the sum of the ratios for each such area on all floors as calculated~~

~~according to Section 508.3.3.2 shall not exceed 2 for two-story buildings and 3 for buildings three stories or higher.~~

SECTION ~~507~~ 506
FIRE COMPARTMENTS PERMITTED TO BE UNLIMITED IN AREA ~~BUILDINGS~~

~~507.1~~ 506.1 General. The area of a fire compartment shall not be limited and only one fire compartment is required in buildings meeting the requirements of Sections 506~~7~~.2 through 506~~7~~.11. ~~The area of buildings of the occupancies and configurations specified herein shall not be limited.~~

~~507.2~~ 506.2 (Supp) Nonsprinklered, one story. The area of the fire compartment in a Group F-2 or S-2 occupancy ~~building~~ no more than one-story in height, shall not be limited when the building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.3~~ 506.3 (Supp) Sprinklered, one story. The area of the fire compartment in a Group B, F, M or S occupancy ~~building~~ no more than one-story above grade plane, or the fire compartment in a Group A-4 occupancy ~~building~~ no more than one-story above grade plane, of other than Type V construction, shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) n width.

Exceptions:

1. ~~Buildings and~~ The fire compartment in structures of Type I and II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such ~~buildings~~ fire compartment conform to the requirements of Sections 506~~7~~.2 and 903.3.1.1 and NFPA 230.
2. The automatic sprinkler system shall not be required in ~~areas~~ parts of fire compartments that are occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-4, provided that:
   2.1. Exit doors directly to the outside are provided for occupants of the participant sports areas; and
   2.2. The ~~building~~ fire compartment is equipped with a fire alarm system with manual fire alarm boxes installed in accordance with Section 907.
3. Group A-1 and A-2 occupancies of other than Type V construction shall be permitted, provided:
   3.1. All assembly occupancies are separated from other spaces as required for separated occupancies in Section 508.4.4 with no reduction allowed in the fire-resistance rating of the separation based upon the installation of an automatic sprinkler system;
   3.2. Each Group A occupancy shall not exceed the maximum allowable area permitted in Section 503.1; and
   3.3. All required exits shall discharge directly to the exterior.

~~507.4~~ 506.4 (Supp) Two story. The area of the fire compartment in a Group B, F, M or S occupancy ~~building~~ no more than two stories above grade plane shall not be limited when the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.5~~ 506.5 Reduced open space. The permanent open space of 60 feet (18 288 mm) required in Sections 507.2, 507.3, 507.4, 507.6 and 507.10 shall be permitted to be reduced to not less than 40 feet (12 192 mm), provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the building.
2. The exterior wall facing the reduced open space shall have a minimum fire-resistance rating of 3 hours.
3. Openings in the exterior wall facing the reduced open space shall have opening protectives with a minimum fire protection rating of 3 hours.

~~507.6~~ 506.6 (Supp) Group A-3 buildings. The area of the fire compartment in a Group A-3 occupancy ~~building~~ no more than one-story above grade plane, used as a place of religious worship, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor swimming pool or tennis court of Type II construction shall not be limited when all of the following criteria are met:

1. The fire compartment ~~building~~ shall not have a stage other than a platform.
2. The fire compartment ~~building~~ shall be equipped throughout with an automatic sprinkler system in accordance

with Section 903.3.1.1.

3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all exits are provided with ramps complying with Section 1010.1 to the street or grade level.
4. The building shall be surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.7~~ **506.7 (Supp) Group H occupancies.** Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area fire compartments ~~buildings~~ containing Group F and S occupancies, in accordance with Sections 507.3 and 507.4 and the limitations of this section. The aggregate floor area of the Group H occupancies located at the perimeter of the unlimited area fire compartment ~~building~~ shall not exceed 10 percent of the area of the building nor the area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3) ~~as modified by Section 506.2~~, based upon the percentage of the perimeter of each Group H floor area that fronts on a street or other unoccupied space. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the fire compartment area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3). Group H occupancies shall be separated from the rest of the unlimited area building and from each other in accordance with Table 508.4. For two-story unlimited area fire compartments ~~buildings~~, the Group H occupancies shall not be located more than one story above grade plane unless permitted by the allowable height in stories and feet as set forth in Table 503.1(1) based on the type of construction of the unlimited area building.

~~507.8~~ **506.8 (Supp) Aircraft paint hangar.** The area of the fire compartment for a Group H-2 aircraft paint hangar no more than one-story above grade plane, shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.4 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

~~507.9~~ **506.9 (Supp) Group E buildings.** The area of the fire compartment for a Group E occupancy ~~building~~ no more than one-story above grade plane, of Type II, IIIA or IV construction shall not be limited when the following criteria are met:

1. Each classroom shall have not less than two means of egress, with one of the means of egress being a direct exit to the outside of the building complying with Section 1018.
2. The fire compartment ~~building~~ is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The fire compartment ~~building~~ is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.10~~ **506.10 (Supp) Motion picture theaters.** In fire compartment ~~buildings~~ of Type II construction, the area of the fire compartment for a motion picture theater located on the first story above grade plane shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.11~~ **506.11 Covered mall buildings and anchor stores.** The area of the fire compartment for a covered mall buildings and anchor stores not exceeding three stories in height that comply with Section 402.6 shall not be limited.

SECTION ~~508~~ 507
MIXED USE AND OCCUPANCY

~~508.1~~ **507.1 (Supp) General.** Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 509.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. Live/Work Units in accordance with Section 419 are not considered separate occupancies.

~~508.2~~ **507. 2 (Supp) Accessory occupancies** Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.5.3.

~~508.2.1~~ **507.2.1 (Supp) Area limitations.** Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story in which they are located and shall not exceed the tabular values in Tables 503.1(2) and 503.1(3), ~~without area increases in accordance with Section 506 for such accessory occupancies~~

~~508.2.2~~ **507.2.2 (Supp) Occupancy classification.** Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

~~508.2.3~~ **507.2.3 (Supp) Allowable area and height.** The allowable area of the fire compartment and height of the building shall be based on the allowable area and height for the main occupancy in accordance with Section 503.1. The height of each accessory occupancy shall not exceed the tabular values in Table 503.1(1), without increases in accordance with Section 504 for such accessory occupancies. The area of the accessory occupancies shall be in accordance with Section 508.2.1

~~508.2.4~~ **507.2.4 (Supp) Separation of occupancies.** No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Incidental accessory occupancies required to be separated or protected by Section 508.2.5.
3. Group R occupancies shall be separated from other accessory occupancies in accordance with Section 508.4.4

~~508.2.5~~ **507.2.5 (Supp) Separation of incidental accessory occupancies.** The incidental accessory occupancies listed in Table 508.2.5 shall be separated from the remainder of the building or equipped with an automatic fire-extinguishing system, or both, in accordance with Table 508.2.5.

Exception: Incidental accessory occupancies within and serving a dwelling unit are not required to comply with this section.

TABLE ~~508.2.5~~ 507.2.5 (Supp)
INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cut-off rooms, not classified as Group H	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary storage battery systems having a liquid capacity of more than 100 gallons used for facility standby power, emergency power or uninterrupted power supplies	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.9 kPa,

1 British thermal unit per hour = 0.293 watts, 1 horsepower = 746 watts,
1 gallon = 3.785 L.

~~508.2.5.1~~ 507.2.5.1 **(Supp) Fire resistance rated separation.** Where Table 508.2.5 specifies a fire-resistance rated separation, the incidental accessory occupancies shall be separated from the remainder of the building by a fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

~~508.2.5.2~~ 507.2.5.2 **(Supp) Nonfire-resistance rated separation and protection.** Where Table 508.2.5 permits an automatic fire extinguishing system without a fire barrier, the incidental accessory occupancies shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the fire-resistance-rated floor/ceiling assembly above or fire-resistance-rated roof/ceiling assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic closing upon detection of smoke in accordance with Section 715.4.7.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.

~~508.2.5.3~~ 507.2.5.3 **(Supp) Protection.** Where an automatic fire-extinguishing system or an automatic sprinkler system is provided in accordance with Table 508.2.5, only the space occupied by the incidental accessory occupancy need be equipped with such a system.

~~508.3~~ 507.3 **(Supp) Nonseparated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

~~508.3.1~~ 507.3.1 **(Supp) Occupancy classification.** Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space except that the most restrictive applicable provisions of Section 403 and Chapter 9 shall apply to the building or portion thereof in which the nonseparated occupancies are located.

~~508.3.2~~ 507.3.2 **(Supp) Allowable fire compartment area and height.** The allowable fire compartment area and height of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

~~508.3.3~~ 507.3.3 **(Supp) Separation.** No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.3.3.
2. All Group R occupancies shall be separated from other occupancies in accordance with Section 508.4.4.

~~508.4~~ 507.4 **(Supp) Separated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

TABLE ~~508.4~~ 507.4 (Supp)
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		I		R[c]		F-2, S-2[b,c], U[c]		B, F-1, M, S-1		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[d], E[d]	N	N	1	2	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I	--	--	N	N	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
R[c]	--	--	--	--	N	N	1	2	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b,c], U[d]	--	--	--	--	--	--	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	--	--	--	--	--	--	--	--	N	N	NP	NP	2	3	1	2[a]
H-1	--	--	--	--	--	--	--	--	--	--	N	NP	NP	NP	NP	NP
H-2	--	--	--	--	--	--	--	--	--	--	--	--	N	NP	1	NP
H-3, H-4, H-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	NP

For SI: 1 square foot = 0.0929 m^2.

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.4.2.
b. Areas used only for private or pleasure vehicles shall be allowed to reduce separation by 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

~~508.4.1~~ **507.4.1 (Supp) Occupancy classification.** Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building.

~~508.4.2~~ **507.4.2 (Supp) Allowable fire compartment area.** In each story, the ~~building~~ fire compartment area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable area of each separated occupancy fire compartment shall not exceed one.

~~508.4.3~~ **507.4.3 (Supp) Allowable height.** Each separated occupancy shall comply with the height limitations based on the type of construction of the building in accordance with Section 503.1.

Exception: Special provisions permitted by Section 509.

~~508.4.4~~ **507.4.4 (Supp) Separation.** Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.

~~508.4.4.1~~ **507.4.4.1 (Supp) Construction.** Required separations shall be fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

SECTION ~~509~~ 508
SPECIAL PROVISIONS

~~509.1~~ **508.1 (Supp) General.** The provisions in this section shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights and areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in this section for such condition and other applicable requirements of this code. The provisions of Sections 509.2 through 509.8 are to be considered independent and separate from each other.

~~509.2~~ **508.2 (Supp) Horizontal building separation allowance**. A building shall be considered as separate and distinct buildings for the purpose of determining fire compartment area limitations, continuity of fire walls, limitation of number of stories and type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 3-hour fire-resistance rating.
2. The building below the horizontal assembly is no more than one story above grade plane
3. The building below the horizontal assembly is of Type IA construction.
4. Shaft, stairway, ramp and escalator enclosures through the horizontal assembly shall have not less than a 2-hour fire-resistance rating with opening protectives in accordance with Table 715.4.

   Exception: Where the enclosure walls below the horizontal assembly have not less than a 3-hour fire resistance rating with opening protectives in accordance with Table 715.4, the enclosure walls extending above the horizontal assembly shall be permitted to have a 1-hour fire-resistance rating, provided:

   1. The building above the horizontal assembly is not required to be of Type I construction;
   2. The enclosure connects less than four stories; and
   3. The enclosure opening protectives above the horizontal assembly have a minimum 1-hour fire protection rating.

5. The building or buildings above the horizontal assembly shall be permitted to have multiple Group A uses, each with an occupant load of less than 300, or Group B, M, R or S uses.
6. The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any of the following occupancies:

    1. Group S-2 parking garage used for the parking and storage of private motor vehicles;
    2. Multiple Group A, each with an occupant load of less than 300;
    3. Group B;
    4. Group M;
    5. Group R; and
    6. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).

7. The maximum building height in feet shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the grade plane.

~~509.3~~ 508.3 **(Supp) Group S-2 enclosed parking garage with Group S-2 open parking garage above.** A Group S-2 enclosed parking garage with no more than one story above grade plane and located below a Group S-2 open parking garage shall be classified as a separate and distinct building for the purpose of determining the type of construction where the following conditions are met:

1. The allowable area of the building shall be such that the sum of the ratios of the actual area divided by the allowable area for each separate occupancy shall not exceed 1.0.
2. The Group S-2 enclosed parking garage is of Type I or II construction and is at least equal to the fire resistance requirements of the Group S-2 open parking garage.
3. The height and the number of tiers of the Group S-2 open parking garage shall be limited as specified in Table 406.3.5.
4. The floor assembly separating the Group S-2 enclosed parking garage and Group S-2 open parking garage shall be protected as required for the floor assembly of the Group S-2 enclosed parking garage. Openings between the Group S-2 enclosed parking garage and Group S-2 open parking garage, except exit openings, shall not be required to be protected.
5. The Group S-2 enclosed parking garage is used exclusively for the parking or storage of private motor vehicles, but shall be permitted to contain an office, waiting room and toilet room having a total area of not more than 1,000 square feet (93 m_2), and mechanical equipment rooms incidental to the operation of the building.

~~509.4~~ 508.4 **Parking beneath Group R.** Where a maximum one-story above grade plane Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of stories to be used in determining the minimum type of construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a fire-resistance rating not less than the mixed occupancy separation required in Section 508.3.3.

~~509.5~~ 508.5 **(Supp) Group R-1 and R-2 buildings of Type IIIA construction.** The height limitation for buildings of Type IIIA construction in Groups R-1 and R-2 shall be increased to six stories and 75 feet (22 860 mm) where the first-floor construction above the basement has a fire-resistance rating of not less than 3 hours and the floor area is subdivided by 2-hour fire-resistance-rated fire walls into areas of not more than 3,000 square feet (279 m_2).

~~509.6~~ 508.6 **(Supp) Group R-1 and R-2 buildings of Type IIA construction.** The height limitation for buildings of Type IIA construction in Groups R-1 and R-2 shall be increased to nine stories and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the lot and from lot lines, the exits are segregated in an area enclosed by a 2-hour fire-resistance-rated fire wall and the first-floor construction has a fire-resistance rating of not less than $1^1/_2$ hours.

~~509.7~~ 508.7 **Open parking garage beneath Groups A, I, B, M and R.** Open parking garages constructed under Groups A, I, B, M and R shall not exceed the height and area limitations permitted under Section 406.3. The height and fire compartment area of the portion of the building above the open parking garage shall not exceed the limitations in Section 503 for the upper occupancy. The height, in both feet and stories, of the portion of the building above the open parking garage shall be measured from grade plane and shall include both the open parking garage and the

portion of the building above the parking garage.

~~509.7.1~~ **508.7.1 Fire separation.** Fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711 between the parking occupancy and the upper occupancy shall correspond to the required fire-resistance rating prescribed in Table 508.3.3 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. Means of egress for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by fire barriers having at least a 2-hour fire-resistance rating as required by Section 706 with self-closing doors complying with Section 715 or horizontal assemblies having at least a 2-hour fire-resistance rating as required by Section 711, with self-closing doors complying with Section 715. Means of egress from the open parking garage shall comply with Section 406.3.

~~509.8~~ **508.8 (Supp) Group B or M with Group S-2 open parking garage below**. Group B or M occupancies located no higher than the first story above grade plane shall be considered as a separate and distinct building for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 2-hour fire-resistance rating.
2. The occupancies in the building below the horizontal assembly are limited to Groups B and M.
3. The occupancy above the horizontal assembly is limited to a Group S-2 open parking garage.
4. The building below the horizontal assembly is of Type I or II construction but not less than the type of construction required for the Group S-2 open parking garage above.
5. The height and area of the building below the horizontal assembly does not exceed the limits set forth in Section 503.
6. The height and area of the Group S-2 open parking garage does not exceed the limits set forth in Section 406.3. The height, in both feet and stories, of the Group S-2 open parking garage shall be measured from grade plane and shall include the building below the horizontal assembly.
7. Exits serving the Group S-2 open parking garage discharge directly to a street or public way and are separated from the building below the horizontal assembly by 2-hour fire barriers constructed in accordance with Section 706 or 2-hour horizontal assemblies constructed in accordance with Section 711, or both.

~~509.9~~ **508.9 (Supp) Multiple buildings above an enclosed or open Group S-2 parking garage.** Where two or more buildings are provided above the horizontal assembly separating a Group S-2 open or closed parking garage from the buildings above in accordance with the special provisions in Sections 509.2 and 509.3, the buildings above the horizontal assembly shall be regarded as separate and distinct buildings and shall comply with all other provisions of this code as applicable to each separate and distinct building.

Reason: At the Orlando 2006 Code Development Hearing, the Height and Area Study Group (now renamed the CTC Balanced Fire Protection Features Study Group) was formed for the purpose of examining the contentious Height and Area code proposals in a more comprehensive way than the code hearing itself could provide.

We started with a review of the legacy code consolidation and IBC development. The foundation of that process was the concept that as the IBC began to be adopted across the previous regional boundaries the new code would not generally create non-conforming buildings in entire legacy code regions. The starting point was that for each occupancy and construction type, the largest maximum allowable area in any one of the codes should be the prevailing value. Once that area was determined, then the Table 503 tabular values could be reverse-calculated to meet the non-conforming objective.

The Study Group debated this approach and reconstructed Table 503 independently. At the conclusion of that effort, we discovered that 48 of the 225 cells in Table 503 did not meet the "largest maximum area" statement in that the building areas were larger than any legacy code, while 10 cells were smaller than any of the legacy codes.

We then asked ourselves: "Is the best way to address this issue and the others on our list to work at revising the table and modifiers, or to look at the bigger question of building safety in a more comprehensive way?"

We concluded that the better approach for us to develop and present to the membership was the latter, and we changed gears from a historically-focused approach focused strictly on height and area to a forward-looking one that asked "What can we do to improve building safety using the concepts of balanced fire protection?"

To address building safety holistically and to efficiently incorporate changing technology, we are better served to make a significant shift in Chapter 5 (Height and Area) and incorporate a conceptual approach that meets the following goals:

- Create buildings that meet an acceptable level of safety for communities, occupants and emergency responders.
- Describe methods, materials, and systems that are flexible enough to adapt to a differing community conditions, changing materials and methodologies, and individual building needs.
- Design a building code that is simple, straightforward, and understandable.

Supporting Concepts

"Building Safety" is defined as the aggregate features in a building that are provided to protect structures, occupants and emergency responders, and property from losses associated with anticipated hazards, primarily from fire and collapse.

The goal of building safety is best achieved through the interaction of all the hazard mitigation processes (Active and Passive and Emergency

Response) to produce an/the acceptable level of risk (level of safety). Building safety success can be defined as meeting the goals of life and property loss that are acceptable and economically supportable. This is the core concept of acceptable risk.

Acceptable building safety risk is that level of loss that each entity impacted can accept if a hazardous event occurs. It is created by aggregating the hazards and adjusting mitigations to create the agreed upon risk level. It can be measured as a quantitative value, qualitative value, or both. On a national scale and state scale, this loss is currently represented by national death and property loss figures. On a community scale, this is usually represented by the community loss goals and economic "scale" measured against the cost of providing an emergency prevention and response system. On an individual level, acceptable risk is a often a contractual condition between a building owner/occupant and an insurance provider.

Compartmentation Approach

The ICC CTC BFP Study Group debated the origins and basis of the height and area tables in the legacy codes, as well as the current IBC, attempting to identify some rational basis and evolution related to the stated goals of the codes. The lengthy exercise proved informative yet futile in meeting this objective, although the disparity in positions related to the current table's interpretation and application became more obvious and focused. This also resulted in some short term fixes being proposed to address concerns expressed about the table and identified the need to develop a long term resolution of the issue.

As a result, the Study Group looked for an alternate approach that is both rational and can stand the test of time in terms of flexibility to accommodate the code development process, as well as meet defined goals of life safety, firefighter safety, property protection, and social and environmental demands (community disruption, loss of jobs, homelessness, tax base erosion, business interruption, environmental needs, etc.).

The discussion shifted from overall building size to what is necessary to meet the above goals and specific building elements/systems having a significant impact on the stated goals were identified and agreed upon:

- compartmentation
- exiting
- smoke management
- automatic sprinklers
- fire-resistive construction
- structural integrity
- improved inspection and maintenance programs

Compartmentation became the basis of this effort with the other elements/ systems influencing the compartment's characteristics. This approach was chosen as it is based on a rational analysis of fire containment which takes into consideration the ability of the responding fire department to control and extinguish a fire within the compartment while performing search and rescue and evacuation assistance operations. We believe it is supportable when considered from a rational assessment perspective that includes such factors as technical soundness, appropriate and valid fire data, scientific basis, field experience, cost effectiveness, and the needs of stakeholders. Specifically, the compartment is intended to keep a fire to a manageable size for the responding fire department, with or without fire sprinkler protection, limit the spread of smoke, and provide a level of redundancy to help limit loss potential.

FIRE FLOW

The CTC Features Study Group developed the shortened table of allowable compartment areas based on assumptions about available fire flow, fire ignition and development hazards of specific occupancies, and the allowable range of area increases for fire sprinkler protection area related to the impact of reductions in required fire flow.

The base table values for occupancy compartment size without fire sprinkler protection are based on the minimum fire flow for total building area tabulated in Appendix B of the International Fire Code for commercial structures (1,500 gpm). It should also be noted that 1,500 gpm is the basic fire flow used in the Insurance Services Office (ISO) rating system. The use of 1,500 is predicated on an assumption that a first alarm complement of fire apparatus and firefighters from most mid-size and larger cities and towns are capable of deploying this flow via a combination of hand-lines and master streams (ground monitors or aerial streams). The fire flow table is independent of occupancy. Therefore the base areas from Table B105.1 were then adjusted up or down based on the occupancy hazard factors from the ISO process.

For the areas of compartments within buildings protected by fire sprinklers, the Study Group believed it prudent to encourage sprinkler protection by starting with a base area allowed for a larger fire flow. Sprinkler protection should allow for the extended time necessary to assemble the resources to develop a larger fire flow. As with buildings without sprinkler protection, the base area was adjusted using the occupancy hazard factors from the ISO process. The last adjustment for the proposed table was for sprinkler protection. The IFC allows the required fire flow to be reduced by up to 75%. An evaluation of Table B105.1 values will demonstrate that a 50% reduction in required fire flow will permit a ~3.7 times area increase. A 60% reduction in required fire flow would result in a ~5 times area increase. A 70% decrease in required fire flow would result in a ~10 times area increase. Finally a 75% reduction in required fire flow would result in a ~14 times area increase. The entire range of increases was used based on construction type (contribution to fuel load) and occupancy hazard. No sprinkler related increases were proposed for H1, H2, and H3 occupancies.

SMOKE COMPARTMENTATION

An important component of providing safety for occupants in a building is to limit the spread of smoke from a fire to other portions of the building. While the BFP Features Study Group felt fire barrier construction would be sufficient to limit the spread of smoke in most cases, we recognized there are some cases where the occupants are more vulnerable and need extra protection, either because they are expected to be defended in place, or because more time is needed to evacuate.

Addressing the specific provisions:

1. These requirements only apply where fire compartments abut each other, not to walls or floors within the fire compartment. (See charging paragraph in Section 503.3.) Smoke migration within the compartment is addressed by other current code requirements.
2. Buildings with non-sprinklered two-story compartments will require smoke management, since there is nothing to slow the fire from producing more smoke. However, single story compartments that are located at the first story are exempt, since the occupants are able to readily escape. (See Section 503.3, Item 1 and Item 2.)
3. Where a Group A occupancy with 300 or more occupants, a Group I-1, or a Group I-2 occupancy is located on the 3rd story above grade plane or higher, smoke management will be required. This recognizes that occupancies with more vulnerable populations should be better protected from smoke and the increased risk of being above grade. Three stories was chosen as the threshold in recognition that the code generally allows two stories to be open to each other, allowing smoke migration between the stories. (See Section 503.3, Item 2)

4. Section 503.4.1 lays out what constitutes "smoke management." It is recognized that rated floor and wall construction generally provides adequate protection for the passage of smoke. The goal of this proposal is to limit smoke migration through openings in the fire-resistance rated assemblies that define the fire compartment. However, the section allows several essentially equivalent methods to accomplish the goal.
5. Section 503.4, Item 1 requires door openings, penetrations, joints, and duct and air transfer openings to be protected as for smoke barriers. Doors will be required to be smoke- and draft-control assemblies. Penetration and joint systems will need to carry a leakage rating (with an "L" label). Smoke dampers will be required for duct and air transfer openings.
6. Section 503.4, Item 2 requires shaft construction for openings in floors between compartments (for openings other than for exit stair enclosures). In this case, because an unprotected opening would allow smoke migration between compartments, none of the exceptions to shaft construction in Section 707.2 are allowed to be used.
7. Section 503.4, Item 3 allows a smokeproof enclosure to serve as one of the options to limit smoke migration through exit stairs that connect adjacent fire compartments. This could be used in lieu of providing the smoke gaskets for the doors as referred to in Section 503.4, Item 1.1. A smokeproof stair not only prevents smoke from migrating between the compartments, but also provides added protection for occupants who may be using the stairs to evacuate.
8. 1.Section 503.4, Item 4 specifies the mechanical methods that are allowed to be used as an alternative to providing the physical barriers in Items 1 and 2. A system that utilizes pressure differentials between the compartment where the fire is burning and adjacent compartments could be designed to adequately limit smoke migration. While the air flow or exhaust methods could also be designed to limit smoke migration, they are predicated on removing smoke being produced by a sprinklered fire, and are not adequate to deal with smoke migration from a non-sprinklered fire. That being the case, they are limited in this proposal to those buildings that are sprinklered.

The Features Study Group will continue work on this subject and many of the other elements of the I-Codes that affect the height and area of buildings. Further study is planned on the thresholds for fire suppression as currently determined in Chapter 9, the integration of the compartment approach to the provisions for high rise buildings will be further investigated along with other specific subjects not yet identified.

It is often difficult to isolate a groups thought on a single approach to a subject. Compartmentation as a solution has been the focus for a significant change to this subject by this group. Much of the basis for what is shown in this code change is attributable to the appendix of the IFC and the ISO fire flow calculation method. Integrating those approaches with the occupancy base in the IBC a system for determining the maximum area of a building was derived.

Cost Impact: This new approach to regulation of building height and area will not increase the cost of overall construction.

Public Hearing: Committee:	AS	AM	D		
	Assembly:	ASF	AMF	DF	

G111–07/08

501.1, 3403.1(IEBC [B] 302.1), 3406.1(IEBC [B] 305.1), 3410.2.3 (IEBC [B] 1301.2.3)

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

1. Revise as follows:

501.1 Scope. The provisions of this chapter control the height and area of structures hereafter erected and additions to existing structures.

Exception: Additions to existing structures shall be permitted to comply with the exceptions to Sections 3403.1, 3406.1 and 3410.2.3.

3403.1 (IEBC [B] 302.1) Existing buildings or structures. Additions or alterations to any building or structure shall comply with the requirements of the code for new construction. Additions or alterations shall not be made to an existing building or structure that will cause the existing building or structure to be in violation of any provisions of this code. An existing building plus additions shall comply with the height and area provisions of Chapter 5.

Exception: An existing building plus any additions shall not be required to comply with the height and area provisions of Chapter 5 provided the existing building including additions comply with the height and area provisions of the code under which the existing building was issued a certificate of occupancy.

Portions of the structure not altered and not affected by the alteration are not required to comply with the code requirements for a new structure.

3406.1 Conformance. No change shall be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancy or in a different group of occupancies, unless such building is made to comply with the requirements of this code for such division or group of occupancy.

Exceptions:

1. Subject to the approval of the building official, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.
2. The existing building shall not be required to comply with the height and area provisions of Chapter 5 provided the new occupancy of the existing building complies with the height and area provisions of the code under which the existing building was issued a certificate of occupancy.

3410.2.3 (IEBC [B] 1301.2.3) Additions. Additions to existing buildings shall comply with the requirements of this code for new construction. ~~The combined height and area of the~~ An existing building plus any ~~and the new~~ additions shall ~~not exceed~~ comply with the height and area provisions of ~~allowed by~~ Chapter 5. ~~Where a fire wall that complies with Section 705 is provided between the addition and the existing building, the addition shall be considered a separate building~~.

Exception: An existing building plus additions shall not be required to comply with the height and area provisions of Chapter 5 provided the existing building including additions comply with the height and area provisions of the code under which the existing building was issued a certificate of occupancy.

Reason: Since the current height and area provisions of the International Building Code (IBC) theoretically are generally as large or larger than any of the legacy model codes, there should be no significant concern about grandfathering existing buildings with their heights and areas based upon the legacy codes. Those heights and areas, in general, should seldom exceed those currently allowed by the IBC. Therefore, grandfathering in such existing buildings is not a problem from a fire/life safety perspective in regard to enforcement of the newest edition of the IBC. In these suggested code changes, the exceptions for existing buildings heights and areas when the building area is increased or the use of the building is changed to a different occupancy allows the application of the legacy code height and area provisions that were used when the building was originally occupied and approved under that edition of the legacy code.

This "grandfathering" will also give our Study Group some flexibility in what we may decide to do to ratchet down any of the current provisions for heights and areas in Chapter 5 as an interim solution to the long term project of substituting a new concept of compartmentation using a balanced fire protection design concept, without being concerned about impacting the existing building stock throughout the country.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G113–07/08

Table 503

Proponent: Robert J. Wills, PE, American Iron and Steel Institute

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHTS AND BUILDING AREAS[a]
Height limits shown as stories and feet above grade plane.
Area limits as determined by the definition of "Area, building", per story.

		Type of Construction								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT (feet) HGT(s)	UL	160	65	55	65	55	65	50	40
A-1	S	UL	5	3	2	3	2	3	~~2~~1	1
	A	UL	UL	15,500	~~8,500~~ 7,500	14,000	~~8,500~~ 7,500	15,000	11,500	5,500
A-2	S	UL	11	~~3~~2	~~2~~1	~~3~~2	~~2~~1	~~3~~2	~~2~~1	1
	A	UL	UL	~~15,500~~ 10,000	~~9,500~~ 7,500	~~14,000~~ 10,000	~~9,500~~ 7500	~~15,000~~ 10,000	11,500	~~6,000~~ 5,000

A-3	S A	UL UL	11 UL	3 15,500	2 ~~9,500~~ 7,500	3 14,000	2 ~~9,500~~ 7,500	3 15,000	~~2~~1 ~~11,500~~ 11,000	1 ~~6,000~~ 5,500
A-4	S A	UL UL	11 UL	3 15,500	2 ~~9,500~~ 7,500	3 14,000	2 ~~9,500~~ 7,500	3 15,000	~~2~~1 11,500	1 ~~6,000~~ 5,500
A-5	S A	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL
B	S A	UL UL	11 UL	5 37,500	4 23,000	~~5~~4 28,500	4 19,000	5 36,000	3 18,000	2 ~~9,000~~ 6,500
E	S A	UL UL	5 UL	3 26,500	2 ~~14,500~~ 13,000	3 23,500	2 ~~14,500~~ 13,000	3 25,500	1 18,500	1 ~~9,500~~ 9,000
F-1	S A	UL UL	11 UL	4 ~~25,000~~ 34,000	~~2~~3 ~~15,500~~ 22,500	3 ~~19,000~~ 24,000	~~2~~3 ~~12,000~~ 16,000	4~~5~~ ~~33,500~~ 50,500	2 ~~14,000~~ 10,000	1 ~~8,500~~ 9,000
F-2	S A	UL UL	11 UL	5 37,500	3 23,000	4 28,500	3 ~~18,000~~ 17,000	5 50,500	3 ~~21,000~~ 18,000	2 ~~13,000~~ 6,500
H-1	S A	1 ~~21,000~~ 8,000	1 ~~16500~~ 6,000	1 ~~11,000~~ 4,000	1 ~~7,000~~ 3,000	1 ~~9,500~~ 3,500	1 ~~7,000~~ 3,000	1 ~~10,500~~ 4,000	1 ~~7,500~~ 3,000	NP NP
H-2[d]	S A	UL ~~21000~~ 10,000	3 ~~16,500~~ 7,500	2 ~~11,000~~ 5,000	1 ~~7,000~~ 3,000	2 ~~9,500~~ 4,500	1 ~~7,000~~ 3,000	2 ~~10,500~~ 5,000	1 ~~7,500~~ 3,000	1 ~~3,000~~ 1,500
H-3[d]	S A	UL UL	6 ~~60,000~~ 28,000	4 ~~26,500~~ 12,500	2 ~~14,000~~ 6,500	4 ~~17,500~~ 8,500	2 ~~13,000~~ 6,000	4 ~~25,500~~ 12,000	2 10,000	1 ~~5,000~~ 6,500
H-4	S A	UL UL	7 UL	5 37,500	3 17,500	~~5~~4 28,500	3 ~~17,500~~ 17,000	5 36,000	3 18,000	2 6,500
H-5	S A	4 UL	4 UL	3 ~~37,500~~ 25,500	3 ~~23,000~~ 17,000	3 28,500	3 ~~19,000~~ 17,000	3 36,000	3 18,000	2 ~~9,000~~ 6,500
I-1	S A	UL UL	9 55,000	4 19,000	3 10,000	4 16,500	3 10,000	4 18,000	3 10,500	2 ~~4,500~~ 4,000
I-2	S A	UL UL	4 UL	2 ~~15,000~~ 12,000	1 ~~11,000~~ 8,500	1 ~~12,000~~ 9,500	NP NP	1 ~~12,000~~ 10,000	1 ~~9,500~~ 7,500	NP NP
I-3	S A	UL UL	4 UL	2 ~~15,000~~ 12,000	1 ~~10,000~~ 8,000	2 ~~10,500~~ 8,500	1 7,500	2 ~~12,000~~ 8,000	2 ~~7,500~~ 6,000	1 ~~5,000~~ 4,000
I-4	S A	UL UL	5 60,500	3 26,500	2 13,000	3 23,500	2 13,000	3 25,500	1 18,500	1 9,000
M	S A	UL UL	11 UL	4 21,500	4 12,500	4 18,500	4 12,500	4 20,500	~~3~~2 ~~14,000~~ 10,000	1 9,000
R-1	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 ~~7,000~~ 4,500

R-2	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 ~~7,000~~ 4,500
R-3	S A	UL UL	11 UL	4~~3~~ UL	4~~3~~ UL	4~~3~~ UL	4~~3~~ UL	4~~3~~ UL	3 UL	3 UL
R-4	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 ~~7,000~~ 4,500
S-1	S A	UL UL	11 48,000	4 26,000	3 17,500	3 26,000	3 17,500	4~~5~~ ~~25,500~~ 38,500	~~3~~2 ~~14,000~~ 10,000	1 9,000
S-2[b,c]	S A	UL UL	11 ~~79,000~~ 78,000	5 ~~39,000~~ 37,500	4~~3~~ ~~26,000~~ 17,500	4 ~~39,000~~ 28,500	4~~3~~ ~~26,000~~ 17,500	5 38,500	4~~3~~ ~~21,000~~ 18,000	2 ~~13,500~~ 9,000
U[c]	S A	UL UL	5 35,500	4 19,000	2 ~~8,500~~ 7,500	3 14,000	2 ~~8,500~~ 7,500	4 18,000	2 ~~9,000~~ 8,000	1 5,500

(Portions of footnotes not shown remain unchanged)

Reason: This code change proposal was prompted by several comments made during the public testimony in Rochester. The gist of these comments was that the IBC Occupancy Subcommittee that drafted the height and area provisions had started with an appropriate philosophy, but that industry had introduced anomalies into the process that had diverted the effort from the original objective. As one of the industry observers during many of these subcommittee drafting meetings, I don't recall industry as having that level of impact.

I'm sure many of you are familiar with the height and area drafting process and philosophy, but I will review a few points. In an ICC Building Standards article entitled "IBC: Reconciling Allowable Area Differences", Occupancy Subcommittee Chairman Dan Chudy, Ph.D and ICC Subcommittee Secretariat Bill Wall made the following observation:

"From another point of view, one might ask; which of the model codes can show the best fire- and life-safety record based on allowable area of buildings? The answer: Who knows? There is little empirical data to substantiate that one code is superior to the others is this aspect. Nevertheless, <u>each code group can readily support their allowable area tables as providing acceptable and appropriate levels of fire and life safety</u>. Therefore, one might conclude that all 3 of the model codes contain valid allowable area provisions, even though the values are inconsistent when compared from one code to another."

Since each code group had a level of comfort with buildings construction according to their allowable height and area tables, the Subcommittee reached the following conclusion (once again as noted by Chudy and Wall):

"The IBC Occupancy Subcommittee determined that the best approach was to compare all three model codes and identify the maximum allowable area for any given type of construction using that area as the basis for the IBC allowable area tables."

As a basic philosophy, the Subcommittee decided to determine the largest allowable aggregate building floor area for each combination of occupancy (use group) and type of construction recognized by the legacy codes. With those upper limit (but legal) building areas identified, the Subcommittee could then "back-calculate" using a common system of area and height increases for sprinklers and open perimeter to determine the appropriate basic area values for the new IBC Table 503. In theory, this approach would preserve the "largest" buildings that could potentially be built using the legacy codes. It is important to note that this only preserved one data point- the maximum allowable aggregate building area. It didn't address size of each floor plate, allowable area for single story buildings or any number of other variables that are created when the 3 different systems were merged. To execute this philosophy, the Subcommittee took the following steps:

- A matrix was created converting each of the legacy code use groups to a common IBC designation.
- A second matrix was created converting each of the legacy code type of construction classifications to a common IBC designation.
- Staff from each of the legacy codes calculated the maximum allowable building areas for each combination of use group and type of construction.
- Bill Wall combined these numerical values into a spreadsheet that showed maximum building area and number of stories for each legacy code. The spreadsheet also included the BCMC height and area values.

The matrix was used to determine the largest legacy code height and area values, and these values were used to establish the IBC Table.

Assuming that the legacy code values were calculated correctly, and that the reverse calculation method was accurately applied, we are left with 2 basic questions:

1) Was the Subcommittee's philosophy, (driven by the maximum allowable aggregate building area), an appropriate approach for the IBC development?
2) Did the Subcommittee make the appropriate conversions of use group and type of construction?

For the first question, I agree with the philosophy, but I'll leave it to the reader to reach his own conclusion. For the second question, the conversions that were used are well documented in Chudy and Wall's paper, however, there was considerable judgment required to correlate the legacy codes. These are certainly open for reconsideration, and it is possible that some of the difficulties with the acceptance of the IBC height and area provisions might be traced back to these judgments.

However, if you believe that the answer to the previous two questions is yes (and I do), then the reverse calculation of these values into IBC Table 503 should be a simple calculation exercise.

The code change I have submitted is my attempt to resurrect that "simple calculation exercise". I took the "Bill Wall spreadsheet" and ran the numbers using 3 assumptions:

- Sprinkler increases as permitted by 506.3 and 504.2.
- Frontage increases as permitted by 506.2 with W/30 as 1.0.
- Maximum building area limits as mandated by 506.4.

The results (to the best of my ability) are shown in the revised Table 503 shown in this code change proposal. While this numerical exercise

reproduces large portions of the values in Table 503, there are many cells that need to be changed if the Subcommittee basic philosophy and numerical accuracy are to be believed. There are many "names" that have been used to describe these cells, including errors, inconsistencies, and anomalies. Unfortunately, these cells have become the battleground for many of our recent code hearings.

Chudy and Wall made reference to these aberrant cells:

"Even with our best attempt to identify and resolve all of the variables among the three model codes, several anomalies cropped-up in the comparison, which required individual adjustments to "fit" with the balance of the table data."

To put it simply, after the number-crunching was over, the Subcommittee applied a layer of judgment to adjust what the methodology suggested. Many, but not all, of these judgments can be observed by examining the raw numbers. I submit that we can capture and reconsider these decisions in a few basic categories.

- **Use Group A-** Clearly the legacy codes had different philosophies behind their A Use Group designations. Converting these differences into a common IBC approach was perhaps the most difficult Use Group decision the Subcommittee had to make. When the conversion was finished, it appears the Subcommittee reached two conclusions. First, the allowable areas didn't need to vary substantially for the different assembly use groups for any given type of construction. It appears that once they had a basic number for A-1 of a certain TOC, they "smoothed" that value into the cells for all A use groups of that TOC. The next decision isn't as easy to explain. For some reason, they used 9500 as the basic table value for IIB and IIIB construction rather than the calculated value of 7500. I don't recall why, but perhaps someone else can fill in the reason.
- **Use Group I-** Another Use Group with similar philosophical differences in the legacy codes was Use Group I. Looking at the table values for this occupancy, the I-1 values track the legacy codes, however, the I-2 and I-3 values are significantly different. I don't recall why.
- **Use Group H-** The H values clearly are different from the legacy code generated numbers. Once again, I don't recall why, but it appears the Subcommittee made a deliberate choice to be different. I would note that it seems the Subcommittee chose to reflect the B Use Groups values in the H-5 portion of the table. This is philosophically tracks with what several of the legacy codes did to address the H-5 risk.
- **Use Group F and S**- The IBC followed the BOCA and UBC philosophy of dividing the low and moderate risk groups within these occupancies. Conversely, the SBC had a single classification for each of these occupancies. In addition, the SBC area values were relatively large for both of these use groups. As a result, if you put the SBC areas into the matrix, the single SBC values control for many of the low and moderate cells. Effectively, this wipes out the low and moderate distinction as can be seen by looking at the table areas in the proposed Table 503. The Subcommittee decided to allow the SBC values to be used when generating the S-1 values. They then multiplied the S-1 values by 1.5 to produce the S-2 numbers. Similarly, the SBC numbers were used to create the F-2 numbers with the F-1 values a result of dividing F-2 by 1.5. I believe the concept of reflecting a 50% increase between the low and moderate hazard categories is valid. How the SBC numbers are introduced into the method are a judgment call. For this code change, I simply reproduced the basic table values without the 50% multiplier even though this eliminates the low and moderate height and area distinction.
- **Type VB-** There are a number of significant places in Table 503 where the areas for VB construction appear to exceed the raw legacy code values. The Subcommittee may have considered the BCMC areas which typically were larger for this construction type. I will leave it to others to explain the committee's thought.

When we get beyond the 5 big categories noted above, there are only a few isolated cases where the IBC Table 503 doesn't line up with the Subcommittee philosophy. For example, the (M- VA) and the (E- IIB) cells don't follow the calculation method and I have no idea why.

I'm not naïve enough to believe that this code change is acceptable. In several areas, I think is has more flaws than the existing Table. What was my purpose in submitting this?

If we have a level of agreement with the Subcommittee philosophy and their legacy code conversion decisions, it would appear to me that we could organize task groups of knowledgeable individuals focused on the 5 big categories that produced the anomalies that we are getting caught up in. If we can't accomplish this, then we need to fundamentally change our basic height and area approach. However, if we could reach a consensus on how to handle the 5 big categories above that are at the heart of the anomalies, then the current table is salvageable.

In closing, I have spent an inordinate amount of time over the last 10 years on the height and area issue. Many of you have as well. Unfortunately, I'm not convinced that our time has been well spent. If our intent was to further the life-safety objectives of the code, I believe there were more significant issues that could have been advanced rather than entrenching ourselves in this issue.

I'm convinced that the code process is made up of professionals with the best of intentions and a considerable wealth of talent. We have let the height and area issue become the battleground that is dividing those intentions and wasting our collective talents and energies. We can do better.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee:	AS	AM	D	
	Assembly:	ASF	AMF	DF

G114–07/08
Table 503

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B

GROUP	HGT(feet) HGT(S)	UL	160	65	55	65	55	65	50	40
A-2	S	UL	11	3[e]	2[e]	3[e]	2[e]	3[e]	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000

e. In Group A-2 occupancies the height limitation for stories above grade plane shall be reduced by 1 story for bars, taverns, night clubs, and other similar assembly occupancies where alcoholic beverages are consumed (other than restaurants).

(Portions of table and footnotes not shown remain unchanged)

Reason: There is an anomaly in the allowable story heights for Group A-2 occupancies in the International Building Code (IBC) for Types II, III, and IV construction. This is because the Group A-2 occupancy in the IBC includes restaurants which were allowed by the BOCA National Building Code (NBC) to be 1 story greater in height than night clubs and similar occupancies. This is because the BOCA NBC classified a restaurant as a Group A3 occupancy and a night club as a Group A-2 occupancy. The other two legacy codes treat the Group A occupancies based on occupant load and do not differentiate between the various types of assembly uses in the same manner that the BOCA code did and the IBC currently does. However, the other two legacy codes do differentiate assembly occupancies with fixed seating and/or a legitimate stage which are generally captured under the A-1 occupancy group of the IBC and are not applicable to this issue.

Since assembly occupancies where alcohol is consumed are considered to be a much greater fire and life safety risk, the allowable number of stories in height should be reduced as indicated to reflect what was previously allowed by the three legacy codes in order to maintain the level of fire and life safety previously achieved by those codes based on the type of construction.

Please refer to the attached tables which compare the allowable number of stories for A-2 and A-3 occupancies for the three legacy codes and the IBC. The A-2 Occupancy table shows that if one story is deducted from the IBC line for Type II, III, and IV construction, the new numbers match the maximum number of stories allowed by any of the legacy codes with the exception of Types IIB and IIIB construction for the SBCCI Standard Building Code (SBC) for occupant loads less than 1,000 occupants.

A-2/A-3 Occupancies

Comparison of Number of Stories Allowed

A-2 Occupancy

Code	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
IBC	UL	11	3	2	3	2	3	2	1
IBC Revised	UL	11	2	1	2	1	2	2	1
BOCA NBC	UL	3	2	1	2	1	2	1	1
ICBO[1] UBC	UL	12	2	1	2	1	2	2	1
ICBO[2] UBC	UL	4	2	NP	2	NP	2	2	NP
SBCCI[3] SBC	UL	UL	2	2	2	2	2	1	1
SBCCI[4] SBC	UL	UL	1	1	1	1	1	NP	NP

A-3 Occupancy

IBC	UL	11	3	2	3	2	3	2	1
BOCA NBC	UL	5	3	2	3	2	3	1	1
ICBO[1] UBC	UL	12	2	1	2	1	2	2	1
ICBO[2] UBC	UL	4	2	NP	2	NP	2	2	NP
SBCCI[3] SBC	UL	UL	2	2	2	2	2	1	1
SBCCI[4] SBC	UL	UL	1	1	1	1	1	NP	NP

Footnotes:

1- A-3 Occupant load < 300 (UBC)

2- A-2.1 Occupant load ≥ 300 with no stage (UBC)

3- A-2 Small Assembly with no stage (<1,000 occ.) (SBC)

4- A-1 Large Assembly with no stage (≥ 1,000 occ.) (SBC)

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D

Assembly: ASF AMF DF

G115–07/08
Table 503

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(feet) HGT(S)									
B	S	UL	11	5	~~4~~ 3	5	~~4~~ 3	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB, Type IIIB (Unprotected Construction)
Story Comparison (w/ NFPA 13 Sprinklers)

NA- Not Applicable NP- Not Permitted

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (13)	5	4	4	**5**
R*(13R)	4	4	3	**4**

* - Applies for R-1, R-2 and R-3 Use Groups

The study group noted that for Use Group B, M, S-1, and R buildings of Type IIB or Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBC. In all these instances, the SBC sprinklered height allowance for these Use Groups relied on a multiple story sprinkler increase. For example, for Use Group B, the SBC allowed 2 stories for unsprinklered construction and 5 stories for sprinklered construction. This exceeds the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the study group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups is not based on any of the legacy code allowances. Second, for Use Group B, M, S-1, and R (Type IIB and IIIB construction), the IBC story height allowance for unsprinklered construction exceeds what was allowed by any of the legacy codes. For example, the maximum height for an unsprinklered Type IIB office building in any of the legacy codes was the NBC allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the study group suggested the following recommended story height changes:

Unsprinklered IBC Table 503 Values

Use Group	IIB	IIIB
B	3	3
M	2	2
S-1	2	2
S-2	3	3
R* (13)	3	3

* - Applies for R-1, R-2 and R-3 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC value back to the next least restrictive legacy code (in these cases, the NBC).

The study group noted that the motivation for these recommendations was to address anomalies associated with unsprinklered 4 and 5 story buildings of nonrated construction. No evidence was submitted to suggest that the existing sprinklered height allowances for these buildings in either the IBC or the legacy codes had created an unsafe condition that requires correction.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G116–07/08
Table 503

Proponent: Jason Thompson, PE, National Concrete Masonry Association NCMA, representing the Masonry Alliance for Codes and Standards (MACS)

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(ft) HGT(S)	UL	160	65	55	65	55	65	50	40
I-1	S	UL	~~9~~ 4	~~4~~ 2	~~3~~ 1	~~4~~ 1	~~3~~ 0	~~4~~ 1	~~3~~ 1	~~2~~ 0
	A	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500

(Portions of table and footnotes not shown remain unchanged)

Reason: This code change proposal basically reduces the allowable number of stories in height for Group I-1 occupancies which house more than 16 persons on a 24 hour basis who because of age, mental disability, or other reasons live in a supervised residential environment that provides personal care services. Typical Group I-1 occupancies include residential board and care facilities, assisted living facilities, half-way houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug centers, and convalescent facilities. Furthermore, the occupants of Group I-1 occupancies are supposed to be capable of responding to an emergency situation without physical assistance from staff. However, that may not always be the case and, in fact, there could be as many as five occupants who are not capable of self-preservation legally occupying the building since that is the occupant threshold beyond which the occupancy would be classified as a Group I-2, I-3, or I-4 occupancy. Even so, during the life of these types of Group I-1 occupancies it is very likely that there will be more such occupants at any given time just because of the nature of such facilities.

In our opinion, when it comes to determining the allowable construction types for this occupancy, it would be more realistic to generally reduce the allowable number of stories to not more than those allowed for a Group I-4 occupancy but not to less than that allowed for a Group I-2 occupancy. In fact, the number of stories limitations we've proposed in this code change reflect those specified in the NFPA 101-2006 Life Safety Code except for Type IB construction. The comparable occupancy in the Life Safety Code is called a large board and care facility. We believe the Life Safety Code story height limits make sense and are reasonable. Furthermore, approximately 40 states adopt NFPA 101 at the state level. Therefore, it is very likely that in those states Group I-1 occupancy buildings have been constructed to the height limits specified in NFPA 101 for the number of allowable stories. That is because the more restrictive provision of the applicable codes would apply and the lower story limits for NFPA 101 would supersede those allowed by any of the previous legacy codes or the current IBC.

For Type IB construction we used the number of stories allowed for the I-2 occupancy (4) in the current IBC which is also one story less than that allowed for the I-4 occupancy (5). That is because the Life Safety Code allowed a greater number of stories in height (11) than even the IBC for the I-1 occupancy (9).

It is also interesting to compare the number of stories height limits proposed for the Group I-1 occupancy to those currently specified in the IBC for the I-2 and I-4 occupancies. Please refer to the following table:

Comparison of Allowable Stories in Height
Proposed for Group I-1 Occupancies
vs.
Groups I-2 and I-4 Occupancies

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(ft) HGT(S)	UL	160	65	55	65	55	65	50	40
I-1	S	UL	4	2	1	1	0	1	1	0
I-2	S	UL	4	2	1	1	NP	1	1	NP
I-4	S	UL	5	3	2	3	2	3	1	1

In terms of providing relative levels of safety for these different Group I occupancies, in the Group I-1 occupancy the occupants are spending the night, as is the case in a Group I-2 occupancy. However, in a Group I-4 occupancy, which is a day care type occupancy, the occupants do not stay over night. Thus, even though they may need assistance from staff to evacuate, they are at least awake and aware, allowing for more effective and efficient evacuation in a fire emergency than if a fire were to occur while the occupants were sleeping as in the I-1 occupancy, for example. Furthermore, in the I-1 occupancy staffing levels are very minimal, if any, so the occupants are basically left on their own to respond to a fire emergency.

For all the above reasons, we believe it is more appropriate to revise the allowable number of stories in height for the Group I-1 occupancy as proposed by this code change to reflect the relative fire and life safety risk compared to the other Group I occupancies in Table 503.

Cost Impact: This code change will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G117–07/08
Table 503

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(feet) HGT(S)									
		UL	160	65	55	65	55	65	50	40
M	S	UL	11	4	~~4~~ 2	4	~~4~~ 2	4	3	1
	A	UL	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB, Type IIIB (Unprotected Construction)
Story Comparison (w/ NFPA 13 Sprinklers)

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (13)	5	4	4	**5**
R*(13R)	4	4	3	**4**

NA- Not Applicable NP- Not Permitted
* - Applies for R-1, R-2 and R-3 Use Groups

The study group noted that for Use Group B, M, S-1, and R buildings of Type IIB or Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBC. In all these instances, the SBC sprinklered height allowance for these Use Groups relied on a multiple story sprinkler increase. For example, for Use Group B, the SBC allowed 2 stories for unsprinklered construction and 5 stories for sprinklered construction. This exceeds the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the study group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups is not based on any of the legacy code allowances. Second, for Use Group B, M, S-1, and R (Type IIB and IIIB construction), the IBC story height allowance for unsprinklered construction exceeds what was allowed by any of the legacy codes. For example, the maximum height for an unsprinklered Type IIB office building in any of the legacy codes was the NBC allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the study group suggested the following recommended story height changes:

Unsprinklered IBC Table 503 Values

Use Group	IIB	IIIB
B	3	3
M	2	2

S-1	2	2
S-2	3	3
R* (13)	3	3

* - Applies for R-1, R-2 and R-3 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC value back to the next least restrictive legacy code (in these cases, the NBC).

The study group noted that the motivation for these recommendations was to address anomalies associated with unsprinklered 4 and 5 story buildings of nonrated construction. No evidence was submitted to suggest that the existing sprinklered height allowances for these buildings in either the IBC or the legacy codes had created an unsafe condition that requires correction.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G118–07/08

Table 503

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(feet) HGT(S)									
R-1	S	UL	11	4	~~4~~ 3	4	~~4~~ 3	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
R-2	S	UL	11	4	~~4~~ 3	4	~~4~~ 3	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
R-4	S	UL	11	4	~~4~~ 3	4	~~4~~ 3	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB, Type IIIB (Unprotected Construction)
Story Comparison (w/ NFPA 13 Sprinklers)

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (13)	5	4	4	**5**
R*(13R)	4	4	3	**4**

NA- Not Applicable NP- Not Permitted
* - Applies for R-1, R-2 and R-3 Use Groups

The study group noted that for Use Group B, M, S-1, and R buildings of Type IIB or Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBC. In all these instances, the SBC sprinklered height allowance for these Use Groups relied on a multiple story sprinkler increase. For example, for Use Group B, the SBC allowed 2 stories for unsprinklered construction and 5 stories

for sprinklered construction. This exceeds the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the study group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups is not based on any of the legacy code allowances. Second, for Use Group B, M, S-1, and R (Type IIB and IIIB construction), the IBC story height allowance for unsprinklered construction exceeds what was allowed by any of the legacy codes. For example, the maximum height for an unsprinklered Type IIB office building in any of the legacy codes was the NBC allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the study group suggested the following recommended story height changes:

Unsprinklered IBC Table 503 Values

Use Group	IIB	IIIB
B	3	3
M	2	2
S-1	2	2
S-2	3	3
R* (13)	3	3

* - Applies for R-1, R-2 and R-3 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC value back to the next least restrictive legacy code (in these cases, the NBC).

The study group noted that the motivation for these recommendations was to address anomalies associated with unsprinklered 4 and 5 story buildings of nonrated construction. No evidence was submitted to suggest that the existing sprinklered height allowances for these buildings in either the IBC or the legacy codes had created an unsafe condition that requires correction.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G119–07/08
Table 503

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	**HGT(feet)**									
	HGT(S)	**UL**	**160**	**65**	**55**	**65**	**55**	**65**	**50**	**40**
S-1	S	UL	11	4	~~3~~ 2	3	~~3~~ 2	4	3	1
	A	UL	48,000	26,000	17,500	26,000	17,500	25,500	14,000	9,000

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB, Type IIIB (Unprotected Construction)
Story Comparison (w/ NFPA 13 Sprinklers)

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (13)	5	4	4	**5**
R*(13R)	4	4	3	**4**

NA- Not Applicable NP- Not Permitted
* - Applies for R-1, R-2 and R-3 Use Groups

The study group noted that for Use Group B, M, S-1, and R buildings of Type IIB or Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBC. In all these instances, the SBC sprinklered height allowance for these Use Groups relied on a multiple story sprinkler increase. For example, for Use Group B, the SBC allowed 2 stories for unsprinklered construction and 5 stories for sprinklered construction. This exceeds the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the study group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups is not based on any of the legacy code allowances. Second, for Use Group B, M, S-1, and R (Type IIB and IIIB construction), the IBC story height allowance for unsprinklered construction exceeds what was allowed by any of the legacy codes. For example, the maximum height for an unsprinklered Type IIB office building in any of the legacy codes was the NBC allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the study group suggested the following recommended story height changes:

Unsprinklered IBC Table 503 Values

Use Group	IIB	IIIB
B	3	3
M	2	2
S-1	2	2
S-2	3	3
R* (13)	3	3

* - Applies for R-1, R-2 and R-3 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC value back to the next least restrictive legacy code (in these cases, the NBC).

The study group noted that the motivation for these recommendations was to address anomalies associated with unsprinklered 4 and 5 story buildings of nonrated construction. No evidence was submitted to suggest that the existing sprinklered height allowances for these buildings in either the IBC or the legacy codes had created an unsafe condition that requires correction.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G120–07/08
Table 503

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	HGT(feet)									
GROUP	**HGT(S)**	**UL**	**160**	**65**	**55**	**65**	**55**	**65**	**50**	**40**
S-2[b, c]	S	UL	11	5	~~4~~ 3	4	~~4~~ 3	5	4	2
	A	UL	79,000	39,000	26,000	39,000	26,000	38,500	21,000	13,500

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB, Type IIIB (Unprotected Construction)
Story Comparison (w/ NFPA 13 Sprinklers)

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (13)	5	4	4	**5**
R*(13R)	4	4	3	**4**

NA- Not Applicable NP- Not Permitted
* - Applies for R-1, R-2 and R-3 Use Groups

The study group noted that for Use Group B, M, S-1, and R buildings of Type IIB or Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBC. In all these instances, the SBC sprinklered height allowance for these Use Groups relied on a multiple story sprinkler increase. For example, for Use Group B, the SBC allowed 2 stories for unsprinklered construction and 5 stories for sprinklered construction. This exceeds the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the study group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups is not based on any of the legacy code allowances. Second, for Use Group B, M, S-1, and R (Type IIB and IIIB construction), the IBC story height allowance for unsprinklered construction exceeds what was allowed by any of the legacy codes. For example, the maximum height for an unsprinklered Type IIB office building in any of the legacy codes was the NBC allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the study group suggested the following recommended story height changes:

Unsprinklered IBC Table 503 Values

Use Group	IIB	IIIB
B	3	3
M	2	2
S-1	2	2
S-2	3	3
R* (13)	3	3

* - Applies for R-1, R-2 and R-3 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC value back to the next least restrictive legacy code (in these cases, the NBC).
The study group noted that the motivation for these recommendations was to address anomalies associated with unsprinklered 4 and 5 story buildings of nonrated construction. No evidence was submitted to suggest that the existing sprinklered height allowances for these buildings in either the IBC or the legacy codes had created an unsafe condition that requires correction.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G123–07/08
504.2

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Alliance for Fire and Smoke Containment and Control (AFSCC)

1. Revise as follows:

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height ~~is~~ shall be increased by ~~20~~ 10 feet (~~6096~~ 1524 mm), except that for Group B and H-4 occupancies in buildings of Type IIA or IV construction, the increase shall be 20 feet, and the maximum number of stories ~~is~~ shall be increased by one. These increases ~~are~~ shall be permitted in addition to the area increase in accordance with Sections 506.2 and 506.3. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height ~~is~~ shall be increased by ~~20~~ 10 feet (~~6096~~ 1524 mm) and the maximum number of stories ~~is~~ shall be increased by one, but shall not exceed ~~60 feet (18 288 mm) or~~ four stories~~, respectively~~.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

Reason: The purpose of this proposed code change is to reduce from 20 feet to 10 feet the height increase allowed when an automatic sprinkler system is installed throughout the building. This would apply not only to NFPA 13 sprinkler systems, but also to NFPA 13R sprinkler systems for Group R occupancies. During a thorough review of the heights allowed by the International Building Code (IBC) in comparison to the three legacy codes, it was discovered that the 20 foot height increase for automatic sprinkler systems in the IBC allows taller buildings than any of the three legacy model building codes allowed with a few minor exceptions. Both the 1997 ICBO Uniform Building Code (UBC) and the 1999 SBCCI Standard Building Code (SBC) allowed the identical building heights for their comparable types of construction with the exception of IBC Type IB construction (UBC Type II – F.R. and SBC Type II) for which the UBC allowed the same height of 160 feet as the IBC as compared to 80 feet in the SBC. A maximum height of 120 feet was allowed in the 1999 BOCA National Building Code (NBC) for the comparable construction Type 2A.

For the lesser types of construction the BOCA NBC generally did not allow higher building heights, even with the 20 foot height increase for automatic sprinklers (the BOCA NBC was the only legacy model building code that allowed for the 20 foot height increase for automatic sprinklers), than the maximum building heights allowed by the IBC without the 20 foot height increase for automatic sprinklers.

For the Committee's information, we have provided a table which compares the IBC construction types with the comparable BOCA NBC construction types and shows the height limit allowed by the IBC without an automatic sprinkler increase of 20 feet and the BOCA NBC maximum height allowed with an automatic sprinkler increase of 20 feet. The column at the far right shows the maximum height that would be allowed by the IBC with the proposed automatic sprinkler system increase of 10 feet for an additional comparison. Where an occupancy group is not shown in the table, that means the maximum allowable height by the BOCA NBC with the 20 foot sprinkler height increase included did not exceed the maximum allowable height permitted in Table 503 of the IBC without the 20 foot height increase for automatic sprinklers.

Construction Type		**Height Limit (FT)**					
IBC	NBC	IBC*	NBC**		IBC**	IBC***	
IIA	2B	65’	B	85’		85’	75’
				F-1	70’		
			F-2	85’			
			H-3	70’			
			H-4	85’			
			I-1	70’			
			M	70’			
			R-1	70’			
			R-2	70’			
			R-3	70’			
			S-1	70’			
			S-2	85’			
IIB	2C	55’		B	60’	75’	65’
			F-2	60’			
			H-4	60’			
			I-1	60’			
			R-1	60’			
			R-2	60’			
			R-3	60’			
			S-2	60’			
IIIA	3A	65’		B	70’	85’	75’
			F-2	70’			
			H-4	70’			
			I-1	70’			
			R-1	70’			
			R-2	70’			
			R-3	70’			
			S-2	70’			
IIIB	3B	55’		B	60’	75’	65’
			F-2	60’			
			H-4	60’			
			I-1	60’			
			R-1	60’			
			R-2	60’			
			R-3	60’			
			S-2	60’			
IV	4	65’		B	85’	85’	75’
			F-1	70’			
			F-2	85’			
			H-3	70’			
			H-4	85’			
			I-1	70’			
			M	70’			
			R-1	70’			

			R-2	70’			
			R-3	70’			
			S-1	70’			
			S-2	85’			
VA	5A	50’		B	60’	70’	60’
			F-2	60’			
			H-4	60’			
			I-1	60’			
			R-1	60’			
			R-2	60’			
			R-3	60’			
			S-2	60’			
VB	5B	40’		B	50’	60’	50’
			F-2	50’			
			H-4	50’			
			I-1	55’			
			R-1	55’			
			R-2	55’			
			R-3	55’			
			S-1	50’			
			S-2	50’			

*without 20 foot sprinkler increase
**with 20 foot sprinkler increase
*** with proposed 10 foot sprinkler increase

A review of the table clearly shows that in only eight cases would the BOCA NBC with the 20 foot height increase for an automatic sprinkler system allow building heights for specific types of construction and occupancy combinations to be as high as the IBC allowable height with the 20 foot sprinkler increase. For the vast majority of cases, however, for other than Type V construction, the BOCA NBC with the 20 foot sprinkler height increase allowed at most only a 5 foot increase, in effect, above that allowed by the IBC without the 20 foot height increase for automatic sprinklers. Thus, the IBC is allowing buildings to be built taller than they were ever allowed to be built by any of the three legacy model building codes prior to the IBC. We are not aware of any technical information being provided during the ICC drafting process to justify this extra height increase. So it is likely that there has been very little fire experience throughout the country to provide data that may indicate if the extra 20 foot height increase is acceptable and does not cause an adverse impact on fire and life safety.

We have compiled a second table which consolidates all of the outliers that would result if the 20 foot automatic sprinkler increase was reduced to 10 feet as proposed by this code change. These outliers are those occupancy groups and types of construction combinations that would exceed the total building height allowed by the IBC with the proposed 10 foot reduction in the height increase for automatic sprinklers as compared to the total building height allowed by the BOCA NBC. It is obvious that there is only a handful of outliers out of a possible 210 combinations.

Construction Type		**Height Limit (ft)**			**Maximum**		
IBC	NBC	IBC*		NBC**	IBC***	**Stories******	
IIA	2B	65’		B	85’	75’	6
			F-2	85’		6	
			H-4	85’		6	
			S-2	85’		6	
IV	4	65’		B	85’	75’	6
			F-2	85’		6	
			H-4	85’		6	
			S-2	85’		6	
VB	5B	40’		I-1	55’	50’	3
			R-1	55’		3	
			R-2	55’		3	
			R-3	55’		4	

*without 20 foot sprinkler increase
**with 20 foot sprinkler increase
***with proposed 10 foot sprinkler increase
****with 1 story sprinkler increase

A further look at the table entries above can even eliminate some of them as not being practical for the application of the height limitations. For example, the F-2’s and S-2’s can basically be discounted since they are very rare to begin with and certainly are not generally built to six stories or 85 feet in height. The R-3 entry can also be discounted since it is only allowed to be three stories in height under the BOCA NBC although it is allowed to be 4 stories under the IBC.

Basically, for Types IIA and IV construction this leaves Group B and H-4 occupancies which are 10 feet less in height than would have been allowed by the BOCA NBC. At the proposed 75 foot height limit, the average floor-to-floor height would be 12 feet 6 inches. Allowing for 3 feet of floor or roof structure including the floor or roof and the supporting beams and girders, this would accommodate an average finished ceiling height of at least 9 feet 6 inches per story which is not unreasonable. However, to accommodate these occupancies, we have further modified the text to allow the full 20 foot height increase to be consistent with the BOCA NBC.

For Type VB construction which basically allows a maximum three stories in height, at the proposed 50 foot height limit the average floor-to-floor height would be 16 feet 8 inches. Again, this should be much more than adequate for the Group I-1, R-1, and R-2 occupancies which would be 5 feet less in height than allowed by the BOCA NBC.

With this proposed code change there should be no significant impact on the existing building stock in those jurisdictions that have previously adopted the BOCA National Building Code. Yet when the buildings are sprinklered, this amendment would still allow for greater building heights than

those currently allowed by both the SBCCI Standard Building Code and the ICBO Uniform Building Code where previously adopted. Basically, this code change proposal will bring the International Building Code somewhat closer to what was previously allowed for building heights in feet by all three of the legacy model codes from which the IBC evolved.

In conclusion, the 20 foot increase in the allowable building height currently allowed by the IBC will pose more of a challenge to the responding fire department to gain access to the roof or the upper floors of such buildings. This may mandate that they utilize more sophisticated ladders and aerial equipment which complicates their fire fighting and rescue efforts. Increased height means more time will be required to gain access to the roof or the upper stories of the building which delays rescue, as well as fire fighting operations, should the fire be on the upper floors or the roof. This will potentially reduce the overall level of fire and life safety provided in these buildings even though an automatic sprinkler system is installed. Since automatic sprinkler systems are not foolproof or fail safe, they may not be available at a critical time when a fire gets out of control and the fire department must respond to deal with a fire on the upper story of the building or the roof. This is even more critical in seismically active areas where an earthquake can knock out the water supply to the sprinkler system. Earthquakes will also put a greater demand on fire departments since they will be responding to multiple incidents and they will face more challenges if the buildings are allowed to be 20 feet higher than would have been allowed by any of the legacy codes. This will certainly result in more property damage and more risk for the building occupants, as well as the fire fighters who may have to respond to an uncontrolled fire in such buildings.

Cost Impact: This code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D	
		Assembly:	ASF	AMF	DF

G124–07/08
504.2, 506.3

Proponent: John Dean, National Association of State Fire Marshals (NASFM) and Ken Kraus, Los Angeles Fire Department, CA

1. Revise as follows:

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the area increase in accordance with Section~~s~~ 506.2 ~~and 506.3~~. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.
4. <u>This increase is not permitted in addition to the area increase in accordance with Section 506.3.</u>

2. Revise as follows:

506.3 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (I_s = 2) for buildings with more than one story above grade plane and an additional 300 percent (I_s = 3) for buildings with no more than one story above grade plane. ~~These increases are permitted in addition to the height and story increases in accordance with Section 504.2.~~

Exception: The area limitation increases shall not be permitted for the following conditions:

1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.
2. The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.
4. <u>These increases are not permitted in addition to the story increases in accordance with Section 504.2.</u>

Reason: **Dean.** Code officials recognize and support the benefits of automatic fire sprinkler protection in buildings. The need for a balanced

approach to fire protection is also recognized and is the basis for this proposal which permits the use of a sprinkler system for an increase in height or area but not both. During California's statewide code adoption process, building and fire code officials reviewed data from various sources in an attempt to justify the increased building size over the allowable areas/heights in all three legacy codes. What they concluded was that there appeared to be little science behind the table values and formulas and code officials are not comfortable with the elimination of redundancy from the code and an over-reliance on fire sprinkler systems. Several factors support the need to restore balance to this code:

- There is a public expectation of the level of safety inherent in the current codes which become policy upon local adoption. The west coast has a lower fire loss record than the rest of the country, which may be, at least partially attributed to construction requirements. There is an increase in risk that accompanies larger building sizes which cannot be justified in light of national fire statistics that are among the worst of any other industrialized nation.
- There are no redundant mitigating protective features to address the potential for sprinkler failure due to a disruption in water supply, mechanical failure, lack of proper maintenance, human error, or temporary disruptions to sprinkler systems that occur during typical remodeling and tenant improvement projects. Furthermore, reductions in water supply usually result after weather-related or seismic events, which would render an automatic sprinkler system ineffective if a fire were to occur. What is the true reliability of a sprinkler system? A recent article cites 89% as the figure when both the performance and operational reliability are factored in. They are out of service for maintenance, construction, (tenant improvements), unintentional human error. There is also a vulnerability factor- besides seismic, we have experience where systems were taken out by vehicle crash or explosion. In instances of improper design/use or arson, the system can be overcome. Sprinkler systems often don't extinguish the fire and there can be tremendous smoke generation and spread (particularly smoldering or shielded fires, etc). In fact, sprinklers drive the smoke lower and impede visibility, building size becomes more of an issue to both rescue (panic) and firefighting.
- The quantity and capability of emergency response resources is based on the same infrastructures and building designs that have existed in the United States for decades. Therefore, the level of fire and life safety would be decreased below what we have today in terms of building size. Public safety departments are staffed for current building sizes and larger buildings may lead to larger fires and need for staffing/tactical/infrastructure changes which may not be financially or politically feasible.
- This results in a decreased level of public safety because fire rescue and fire suppression responders would be required to accomplish their emergency response tasks in larger multi-story buildings without the benefit of increased fire protection based on a combination of sprinkler, fire-resistive construction, and fire walls.

By limiting the use of a fire sprinkler system to an increase in height or area, but not both, serves to restore balance to the code by reducing over reliance on those systems.

Kraus: The intention of this code change proposal is to trim the Height and Area provisions of the IBC by allowing additional height **or** area as a tradeoff for fire sprinklers. Currently, if you install sprinklers for the benefit of additional height, you may also then also, without providing any further protection, add additional area. The same is true if you install sprinklers in order to take the additional area provision.
There are many ways to adjust the height and allowances of the IBC. I have chosen this particular section and mechanism because previous similar proposals have seemed to resonate with the membership, i.e., Final Action Hearing discussions.

There exist 3 primary reasons that mandate modification to the height and area provisions of the International Building Code, specifically:

1 – The lack of fire history for buildings constructed to the current IBC height and area requirements.

During previous code hearings and at various committee meetings this sentiment was offered to console individuals that, after calculating height and area values under the IBC, found the IBC allowed buildings to be constructed taller and much larger (by a factor of 2 to 3) than any legacy code or BCMC recommendations. This reality came to the forefront after the Orlando code development hearing and caused, presumably and in part, the CTC BFP Work Group to rethink height and area. Once the Work Group identified some 50 "anomalies", concern grew when the science used to formalize Table 503 values could not be harnessed to the point that rendered confidence.
Add to this, the fact that the legacy groups had somewhat different height and area enhancements, (increased allowances or multipliers for location on property, type of construction, multiple stories etc). While these factors seemed to stand the test of time regionally, the additive combining of these elements and their influence on the suspect tabular values brings into question the efficacy of IBC Chapter 5 which allows buildings to be constructed both taller and larger that any legacy code.

These comments should not be considered a criticism of the effort of the drafting committee whose task was formidable and time constraints demanding.

2 - The value afforded to fire sprinkler systems.

While Fire sprinklers are well established as the single most important fire protection element in the fire and life safety toolbox they are not a panacea. The dynamic nature of fire incidents and the potential for life loss preclude the acceptance or over reliance on a single protective. Various and diverse tools must be employed to ensure that structures react in a predictable manner even when certain elements don't perform as designed. There are times when sprinklers don't perform satisfactorily. Some examples are:
Interruption of water supply due to natural disaster, intentional acts, unintentional careless acts (maintenance/construction).
Ineffective activation due to change in commodity or construction feature, improper storage, faulty sprinkler heads.

Each Legacy group had numerous tradeoffs for sprinklers but also made deliberate decisions to not institute other tradeoffs. By melding together each regions protection package, the IBC effectively voids the intentional non-inclusion of tradeoffs by the legacy groups.

3 - A prevailing rationale used in selecting the tabular values in 503, i.e., not to create non-compliant buildings upon adoption of the IBC.

This problem is faced each time a local or state jurisdiction adopts a new code or updates existing requirements. Buildings built to previous editions are automatically out of compliance with the new code. This perception is tempered by the fact that these buildings are still regulated by the code in effect when they were built, (except for retroactive requirements).

While not creating non-compliant buildings is a justifiable consideration, it is not a primary intent of the IBC. The intent of the IBC is to safeguard the public health, safety and general welfare through various means and to provide safety to life property and emergency responders. Over reliance on the non-complaint building concern may have, in some cases, caused these primary tenets to be relegated to secondary in importance.

Regarding related / concurrent proposals. I respect and support both the Balanced Fire Protection Work Group and their efforts. Time constraints have prevented me from fully assimilating their IBC Chapter 5 proposal.

I urge the Committee to weigh in the balance this proposal as a reasonable method of addressing an element of what has been the single most debated issue since the issuance of the final draft of the IBC.

Cost Impact: Dean.: The code change proposal will not increase the cost of construction.
Kraus: This code change will increase the cost of construction.

Public Hearing: Committee:	AS	AM	D	
	Assembly:	ASF	AMF	DF

G125–07/08
504.2, 506.3

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases ~~are~~ shall be permitted in addition to the area increase in accordance with Sections 506.2 and 506.3. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

504.2.1 Height increase limitations~~. Exceptions:~~ The maximum height and maximum number of stories increases permitted in Section 504.2 shall not be permitted for the following conditions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.
4. Buildings of Type IIB, IIIB, or VB construction where the area increase permitted by Section 506.3 is used.

506.3 Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (*Is* = 2) for buildings with more than one story above grade plane and an additional 300 percent (*Is* = 3) for buildings with no more than one story above grade plane. These increases ~~are~~ shall be permitted in addition to the height and story increases in accordance with Section 504.2.

506.3.1 Area increase limitations. ~~Exception:~~ The area limitation increases permitted in section 506.3 shall not be permitted for the following conditions:

1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.
2. The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.
4. Buildings of Type IIB, IIIB, or VB construction where the height and story increases permitted by Section 504.2 are used.

Reason: The purpose of this code change proposal is to eliminate the current allowance in the code that permits both a height increase in stories and feet, as well as an area increase where an automatic sprinkler system is installed in buildings constructed of the non-rated types of construction, i.e. Types IIB, IIIB, and VB. We have focused in on the non-rated types of construction since we believe they pose the greatest challenge to fire and life safety should they experience a fire. If such buildings are allowed to take advantage of both the height and area increase for the installation of an automatic sprinkler system, they will be subject to greater fire losses should the sprinkler system not operate as designed. Since an automatic sprinkler system is not 100 percent foolproof, we believe this is an over reliance on the use of that sprinkler system to allow for these significant increases in the building heights and areas. These buildings have basically no built-in passive fire-resistive protection so that a fire that gets out of control could readily spread to multiple stories and cause early collapse of the building construction. It has been well documented that automatic sprinkler systems have a failure performance rate of somewhere in the neighborhood of 10 to 15 percent of all building fires involving sprinklers where the fire was judged to be large enough that it should have activated the sprinkler system.

What is even more disconcerting is that a comparison of the three legacy model codes will show that the utilization of both the height increase and the area increase almost always results in a larger building in both terms of height and area than was previously allowed by those legacy model codes.

Please refer to the example comparing the maximum allowable heights and areas for a Group B office building of Type IIB construction based on the current provisions in the IBC versus the three legacy model building codes. The example also shows what the maximum allowable areas and building heights would be if this code change proposal were approved. One can see that the allowable areas and heights under the current IBC are significantly greater for virtually every case. However, the implementation of the proposed code change indicates that the maximum allowable building areas and heights are generally still greater but not nearly as much.

We have also compiled tables comparing the maximum allowable heights and areas for other occupancies for these non-rated types of

construction. Again, they clearly show the significantly larger building areas and heights permitted by the current IBC as compared to the previous legacy model codes for the vast majority of cases. However, this code change proposal will reduce those very large heights and areas so that they won't be nearly as excessive as they currently are. This will result in allowable building heights and areas that are more comparable to those that have been traditionally allowed by the previous legacy model building codes.

Why is this important? Because we don't have any substantiated fire record for these greatly larger buildings that have not been previously allowed by the legacy model building codes. We can only assume that allowing larger buildings than previously allowed based on the same type of construction for a given occupancy can only result in an increase in fire loss statistics over time as these larger buildings are constructed and occupied and suffer fires over their lifetime. For these reasons, we recommend that this code change proposal be approved as submitted.

Example: Group B Office Building

Type IIB Construction

Area Per Story

	ICC IBC		BOCA NBC		ICBO UBC		SBCCI SBC	
	Area	Height	Area	Height	Area	Height	Area	Height
Base	23,000 s.f.	4 st. 55'	14,400 s.f.	3 st. 40'	12,000 s.f.	2 st. 55'	17,000 s.f.	2 st. 55'
Max.	86,250 s.f.*	5 st. 75'	47,520 s.f.	4 st. 60'	48,000 s.f.	2 st. 55'	51,000 s.f.	5 st. 55'
	51,750 s.f.**				or			
					24,000 s.f.	3 st. 55'		

As Revised by this Proposal

Max.	86,250 s.f.*	4 st. 55'
	64,688 s.f.**	
	or	
Max.	40,250 s.f.*	5 st. 75'
	30,188 s.f.**	

Total Building Area

Base	69,000 s.f.	4 st. 55'	43,200 s.f.	3 st. 40'	24,000 s.f.	2 st. 55'	34,000 s.f.	2 st. 55'
Max.	258,750 s.f.	5 st. 75'	190,080 s.f.	4 st. 60'	96,000 s.f.	2 st. 55'	204,000 s.f.	4 st. 55'
					or		or	
					48,000 s.f.	3 st. 55'	255,000 s.f.	5 st. 55'

As Revised by this Proposal

Max.	258,750 s.f.	4 st. 55'
	or	
Max.	120,750 s.f	5 st. 75'

*Maximum area allowed for any story provided the total building area does not exceed that allowed as indicated below.
**Maximum area allowed per story if evenly divided between all the stories allowed.

"Double Dipping"

Type IIB Construction

8/20/2007

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	Area Only Increase IBC	Height Only Increase IBC
A-2	106,875 3 st.	21,600 2 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 2 st.	49,875 3 st.
A-3	106,875 3 st.	83,160 3 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 2 st.	49,875 3 st.
B	258,750 5 st.	190,800 4 st.	48,000 3 st. 96,000 2 st.	255,000 5 st.	258,750 4 st.	120,750 5 st.
E	163,125 3 st.	142,560 3 st.	54,000 2 st. 81,000 1 st.	48,000 2 st. 48,000 1 st.	108,750 2 st.	76,125 3 st.
F-1	174,375 3 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	252,000 4 st.	116,250 2 st.	81,375 3 st.
I-1	112,500 4 st.	110,880 4 st.	NP NP	180,000 5 st.	112,500 3 st.	52,500 4 st.
I-2	52,250 1 st.	32,400 1 st.	NP NP	40,000 1 st.	52,250 1 st.	52,250 1 st.
M	140,625 5 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	135,000 5 st.	140,625 4 st.	65,625 5 st.
R-1/ R-2	180,000 5 st.	126,720 4 st.	36,400 3 st. 72,800 2 st.	180,000 5 st.	180,000 4 st.	84,000 5 st.
S-1	196,875 4 st.	83,160 3 st.	48,000 3 st. 96,000 2 st.	192,000 4 st.	196,875 3 st.	91,875 4 st.

"Double Dipping"

Type IIIB Construction

8/20/2007

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	Area Only Increase IBC	Height Only Increase IBC
A-2	106,875 3 st.	21,600 2 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 2 st.	49,875 3 st.
A-3	106,875 3 st.	83,160 3 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 2 st.	49,875 3 st.
B	213,750 5 st.	190,080 4 st.	48,000 3 st. 96,000 2 st.	210,000 5 st.	213,750 4 st.	99,750 5 st.
E	163,125 3 st.	142,560 3 st.	54,000 2 st. 81,000 1 st.	48,000 2 st. 48,000 1 st.	108,750 2 st.	76,125 3 st.
F-1	135,000 3 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	180,000 4 st.	90,000 2 st.	63,000 3 st.
I-1	112,500 4 st.	110,880 4 st.	NP NP	180,000 5 st.	112,500 3 st.	52,500 4 st.
I-2	NP NP	NP NP	NP NP	NP NP	NP NP	NP NP
M	140,625 5 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	135,000 5 st.	140,625 4 st.	65,625 5 st.
R-1/ R-2	180,000 5 st.	126,720 4 st.	36,400 3 st. 72,800 2 st.	180,000 5 st.	180,000 4 st.	84,000 5 st.
S-1	196,875 4 st.	83,160 3 st.	48,000 3 st. 96,000 2 st.	192,000 4 st.	196,875 3 st.	91,875 4 st.

"Double Dipping"

Type VB Construction

8/20/2007

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	Area Increase Only IBC	Height Increase Only IBC
A-2	45,000 2 st.	10,800 2 st.	24,000 2 st. 36,000 1 st.	20,000 2 st. 20,000 1 st.	28,500 1 st.	21,000 2 st.
A-3	45,000 2 st.	37,800 2 st.	24,000 2 st. 36,000 1 st.	20,000 3 st. 20,000 2 st.	28,500 1 st.	21,000 2 st.
B	101,250 3 st.	71,280 3 st.	32,000 3 st. 64,000 2 st.	54,000 3 st. 54,000 2 st.	67,500 2 st.	47,250 3 st.
E	71,250 2 st.	64,800 2 st.	36,400 2 st. 54,600 1 st.	32,000 2 st. 32,000 1 st.	45,125 1 st.	33,250 2 st.
F-1	63,750 2 st.	43,200 2 st.	32,000 3 st. 64,000 2 st. 48,000 1 st.	40,000 2 st. 40,000 1 st.	40,375 1 st.	29,750 2 st.
I-1	50,625 3 st.	41,580 3 st.	NP NP	42,000 3 st. 42,000 2 st. 28,000 1 st.	33,750 2 st.	23,625 3 st.
I-2	NP NP	NP NP	NP NP	NP NP	NP NP	NP NP
M	67,500 2 st.	43,200 2 st.	32,000 3 st. 64,000 2 st. 48,000 1 st.	36,000 3 st. 36,000 2 st. 24,000 1 st.	42,750 1 st.	31,500 2 st.
R-1/ R-2	78,750 3 st.	47,520 3 st.	24,000 3 st.	42,000 3 st.	52,500 2 st.	36,750 3 st.

			48,000 2 st. 36,000 1 st.	42,000 2 st. 28,000 1 st.		
S-1	67,500 2 st.	37,800 2 st.	32,000 3 st. 64,000 2 st. 48,000 1 st.	24,000 2 st. 24,000 1 st.	42,750 1 st.	31,500 2 st.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G126–07/08
504.2, 506.3

Proponent: Ken Kraus, Los Angeles Fire Department, CA

Revise as follows:

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the area increase in accordance with Sections ~~s~~ 506.2 and in addition to the area increase in accordance with Section 506.3 except in areas of interrupted water supply. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

506.3 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (I_s = 2) for buildings with more than one story above grade plane and an additional 300 percent (I_s = 3) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2 except in areas of interrupted water supply.

Exception: The area limitation increases shall not be permitted for the following conditions:

1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.
2. The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

Reason: The purpose of this code change is to reduce the reliance of firefighters and the community on sprinkler systems in areas of the country where the water supply may be interrupted by natural disaster or water system operation issues in the event of an emergency. Sections 504.2 and 506.3 are just two of many provisions found in the code where it is assumed in times of emergency the water supply will be available and reliable for fire suppression systems. In many parts of the country that assumption may not be an acceptable risk. In areas or regions where buildings may remain without reliable water supply after a natural disaster it is an unacceptable risk to firefighters and communities to increase **both** the height and allowable area based on the assumption the water supply will be operational. History has shown that fire after a disaster can be more destructive to life and property than the disaster itself.

A code change that is being heard by the Fire Safety committee will include the definition for areas of interrupted water supply as follows:

AREAS OF INTERRUPTED WATER SUPPLY. Regions or areas where the water supply available for fire suppression is subject to extended periods of failure due to natural disaster or other factors, as determined by the building official to meet any of the following conditions:

1. Areas, regions or geologic features where the 0.2 second spectral response acceleration in Figure 1613.5(1) is 150% or greater; or alluvial valleys located between or adjacent to geologic features or areas where the 0.2 second spectral response acceleration in Figure 1613.5(1) is 150% or greater.
2. Flood hazard areas defined in Section 1612.3.
3. Hurricane-prone regions defined in Section 1609.2.
4. Areas where the water system is not deemed to be operational or reliable in the event of an emergency as determined by the building official.

Cost Impact: This provision will increase the cost of construction in certain geographic areas or regions as defined.

Analysis: The committee is requested to state its intent regarding this code change proposal should the definition of "**AREAS OF INTERRUPTED WATER SUPPLY.** " given in the code change proposal for the IBC-Fire Safety committee be disapproved.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

G127–07/08
504.2, 506.4.1

Proponent: Jason Thompson, PE, National Concrete Masonry Association NCMA, representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the area increase in accordance with Sections 506.2 and 506.3. ~~For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.~~

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

506.4.1 (Supp) Area determination. The total allowable building area of a building with more than one story above grade plane shall be determined by multiplying the allowable area per story (*Aa*), as determined in Section 506.1, by the number of stories above grade plane as listed below:

1. For buildings with two stories above grade plane, multiply by 2;
2. For buildings with three or more stories above grade plane, multiply by 3.~~; and~~
3. ~~No story shall exceed the allowable area per story (*Aa*), as determined in Section 506.1, for the occupancies on that story.~~

Exceptions:

1. ~~Unlimited area buildings in accordance with Section 507.~~

~~2. The maximum area of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story *(Aa)*, as determined in Section 506.1, by the number of stories above grade plane.~~

Reason: The Masonry Alliance of Codes and Standards (MACS) has decided to submit this code change proposal in order to assure that the ICC Class A voting members have an opportunity to review and discuss during the ICC code development hearings to be held in February, 2008 in Palm Springs, CA. Basically, we are resubmitting Code Change G118-06/07 which was originally submitted by the California Fire Chiefs Association and the Tri-Chapters Code Committee for the previous code development cycle. However, it was not specifically heard at the ICC Code Development Committee Hearings held in September, 2007 in Lake Buena Vista, FL because of the decision by many interested parties including the California Fire Chiefs Association and the ICC Tri-Chapters Code Committee to participate in a Study Group to evaluate height and area requirements of the IBC based on the significant number of code change proposals that expressed concerns about how the height and area limits were established and determined. Since that Study Group did not produce any Public Comments for the ICC Final Action Hearings in Rochester, NY to address this issue, we thought it would be appropriate to make sure that it is on the agenda for this final code development cycle before the publication of the 2009 edition of the IBC. We have also used the same reason statement that was provided in that original code change proposal. We would also point out that an identical code change proposal was also submitted by the Building Officials Association of Florida (BOAF) Code Development Committee which was designated as G117-06/07. We have not included their reason statement since we think the following statement adequately covers their concerns as well.

This code change proposes to eliminate the special allowances given for Group R occupancy buildings that are protected with an NFPA 13R automatic sprinkler system as specified in Section 903.3.1.2. Currently, Section 504.2 will allow an increase in the building height of one story and 20 feet where an NFPA 13R sprinkler system is provided as long as the building does not exceed a total height of four stories or 60 feet which is within the scope limitations of the NFPA 13R standard. Furthermore, Section 506.4 allows an area increase for the installation of an NFPA 13R sprinkler system for Group R buildings that are greater than three stories in height. We do not believe it is appropriate to provide for such allowances for the types of construction which, in essence, lessen the built-in fire-resistive passive protection where an NFPA 13R sprinkler system is installed.

NFPA 13R sprinkler systems are primarily provided for life safety. They were developed for that purpose as clearly stated in Section 1.2 of the 2002 edition. It is interesting to quote the Annex A discussion of the purpose of NFPA 13R which states: "Various levels of sprinkler protection are available to provide life safety and property protection. This standard is designed to provide a high, but not absolute, level of life safety and a lesser level of property protection. Greater protection to both life and property could be achieved by sprinklering all areas in accordance with NFPA 13… it should be recognized that the omission of sprinklers from certain areas could result in the development of untenable conditions in adjacent spaces. Where evacuation times could be delayed, additional sprinkler protection and other fire protection features, such as detection and compartmentation, could be necessary." We believe that says it all about an NFPA 13R sprinkler system.

However, the intent of the IBC as expressed in Section 101.3 Intent is as follows: "The purpose of this code is to establish the minimum requirements to safeguard the public health, safety, and general welfare… and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations." We believe that allowing the use of an NFPA 13R sprinkler system to increase the size of a building would be counter to the intent and purpose of the IBC. Types of construction are designed to limit the height and area of buildings based on the occupancy and the degree of built-in fire-resistive protection and use of combustible or noncombustible construction materials. Buildings are allowed to get larger in area and taller in height with more fire-resistance built in and the lesser use of combustible construction for the building's structural elements. Therefore, property protection is a critical outcome of the use of types of construction. Of course, type of construction also plays a role in life safety, especially in multi-story buildings, and has an impact on fire fighter safety as well. But an NFPA 13R sprinkler system is basically a partial sprinkler system because the standard does not require sprinklers in many concealed areas including attics. So why should a building protected with an NFPA 13R sprinkler system basically enjoy the same increases as a building more completely protected with an NFPA 13 sprinkler system?

Within the last few years there have been many fires involving buildings protected with NFPA 13R sprinkler systems which have burned to the ground. In most of those cases, the fire was able to get into the unprotected attic space and spread throughout the building and then burn downward, overpowering the sprinkler system. Certainly, allowable increases in height and area are not appropriate for sprinkler systems that can allow a building to be burned to the ground.

The Masonry Alliance for Codes and Standards (MACS) is in full support of this code change proposal and agrees with the original proponents supporting statement as well. We think the issues have been clearly stated and adequate reasons given to support this particular code change proposal. Therefore, we respectfully request the Committee approve this code change proposal as submitted for the reasons stated.

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Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee:	AS	AM	D	
	Assembly:	ASF	AMF	DF

G133–07/08

506.3

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

506.3 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional ~~200~~ 100 percent (I_s = ~~2~~ 1) for buildings with more than one story above grade plane and an additional ~~300~~ 200 percent (I_s = ~~3~~ 2) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2.

Exception: The area limitation increases shall not be permitted for the following conditions:

1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.
2. The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

Reason: We are submitting this code change proposal as a follow up to Code Change Proposal G120-06/07 which was submitted during the last code development cycle by the Building Officials Association of Florida (BOAF) Code Development Committee. However, that code change proposal was not heard during the initial Code Development Committee Hearings held in Lake Buena Vista, FL because it was included into a group of code change proposals to be studied by an Ad Hoc Working Group.

This code change proposal is submitted in the spirit of compromise to hopefully serve as a vehicle for reaching consensus on many of the concerns expressed about the excessive allowable heights and areas in the current International Building Code (IBC) as compared to those allowed by the previous legacy codes. To assist the Committee in making an analysis as to how this will impact the existing building stock, we have provided some tables which show comparisons of the impact on this code change proposal to various selected occupancies as it relates to the current IBC, the IBC as revised and the previous legacy model codes.

Automatic Sprinkler Increase

100% Reduction

Type IIB Construction

8/20/2007

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	Revised IBC 2 Stories	Revised IBC ≥ 3 Stories
A-2	106,875 3 st.	21,600 2 st.	36,400 2 st.	48,000 3 st. 48,000 2 st.	52,250	78,375 3 st.
A-3	106,875 3 st.	83,160 3 st. 75,600 2 st.	36,400 2 st.	48,000 3 st. 48,000 2 st.	52,250	78,375 3 st.
B	258,750 5 st.	190,800 4 st. 129,600 2 st.	48,000 3 st. 96,000 2 st.	255,000 5 st. 102,000 2 st.	126,500	189,750 5 st.
E	163,125 3 st.	142,560 3 st. 129,600 2 st.	54,000 2 st.	48,000 2 st.	79,750	119,625 3 st.
F-1	174,375 3 st.	95,040 3 st. 86,400 2 st.	48,000 3 st. 96,000 2 st.	252,000 4 st. 126,000 2 st.	85,250	127,875 3 st.
I-1	112,500 4 st.	110,880 4 st. 75,600 2 st.	NP NP	180,000 5 st. 72,000 2 st.	55,000	82,500 4 st.
I-2	52,250	32,400	NP	40,000	N/A	N/A

	1 st.	1 st.	NP	1 st.		
M	140,625 5 st.	95,040 3 st. 86,400 2 st.	48,000 3 st. 96,000 2 st.	135,000 5 st. 54,000 2 st.	68,750	103,125 5 st.
R-1/ R-2	180,000 5 st.	126,720 4 st. 86,400 2 st.	36,400 3 st. 72,800 2 st.	180,000 5 st. 72,000 2 st.	88,000	132,000 5 st.
S-1	196,875 4 st.	83,160 3 st. 75,600 2 st.	48,000 3 st. 96,000 2 st.	192,000 4 st. 96,000 2 st.	96,250	144,375 4 st.

Automatic Sprinkler Increase

100% Reduction

Type IIIB Construction

8/20/2007

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	Revised IBC 2 Stories	Revised IBC ≥ 3 Stories
A-2	106,875 3 st.	21,600 2 st.	36,400 2 st.	48,000 3 st. 48,000 2 st.	52,250	78,375 3 st.
A-3	106,875 3 st.	83,160 3 st. 75,600 2 st.	36,400 2 st.	48,000 3 st. 48,000 2 st.	52,250	78,375 3 st.
B	213,750 5 st.	190,080 4 st. 129,600 2 st.	48,000 3 st. 96,000 2 st.	210,000 5 st. 84,000 2 st.	104,500	156,750 5 st.
E	163,125 3 st.	142,560 3 st. 129,600 2 st.	54,000 2 st.	48,000 2 st.	79,750	119,625 3 st.
F-1	135,000 3 st.	95,040 3 st. 86,400 2 st.	48,000 3 st. 96,000 2 st.	180,000 4 st. 90,000 2 st.	66,000	99,000 3 st.
I-1	112,500 4 st.	110,880 4 st. 75,600	NP NP	180,000 5 st. 72,000	55,000	82,500 4 st.

		2 st.		2 st.		
I-2	NP NP	NP NP	NP NP	NP NP	NP	NP NP
M	140,625 5 st.	95,040 3 st. 86,400 2 st.	48,000 3 st. 96,000 2 st.	135,000 5 st. 54,000 2 st.	68,750	103,125 5 st.
R-1/ R-2	180,000 5 st.	126,720 4 st. 86,400 2 st.	36,400 3 st. 72,800 2 st.	180,000 5 st. 72,000 2 st.	88,000	132,000 5 st.
S-1	196,875 4 st.	83,160 3 st. 75,600 2 st.	48,000 3 st. 96,000 2 st.	192,000 4 st. 96,000 2 st.	96,250	144,375 4 st.

Automatic Sprinkler Increase

100% Reduction

Type VB Construction

8/20/2007

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	Revised IBC 2 Stories	Revised IBC ≥ 3 Stories
A-2	45,000 2 st.	10,800 2 st.	24,000 2 st.	20,000 2 st.	33,000	N/A 2 st.
A-3	45,000 2 st.	37,800 2 st.	24,000 2 st.	20,000 3 st. 20,000 2 st.	33,000	N/A 2 st.
B	101,250 3 st.	71,280 3 st. 64,800 2 st.	32,000 3 st. 64,000 2 st.	54,000 3 st. 54,000 2 st.	49,500	74,250 3 st.
E	71,250 2 st.	64,800 2 st.	36,400 2 st.	32,000 2 st.	52,250	N/A 2 st.
F-1	63,750 2 st.	43,200 2 st.	32,000 3 st. 64,000 2 st.	40,000 2 st.	46,750	N/A 2 st.
I-1	50,625 3 st.	41,580 3 st. 37,800 2 st.	NP NP	42,000 3 st. 42,000 2 st.	24,750	37,125 3 st.

I-2	NP NP	NP NP	NP NP	NP NP	NP	NP NP
M	67,500 2 st.	43,200 2 st.	32,000 3 st. 64,000 2 st.	36,000 3 st. 36,000 2 st.	49,500	N/A 2 st.
R-1/ R-2	78,750 3 st.	47,520 3 st. 43,200 2 st.	24,000 3 st. 48,000 2 st.	42,000 3 st. 42,000 2 st.	38,500	57,750 3 st.
S-1	67,500 2 st.	37,800 2 st.	32,000 3 st. 64,000 2 st.	24,000 2 st.	49,500	N/A 2 st.

Cost Impact: This code change will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G137–07/08

506.4.1

Proponent: John Dean, National Association of State Fire Marshals (NASFM) and Ken Kraus, Los Angeles Fire Department, CA

Revise as follows:

506.4.1 (Supp) Area determination. The total allowable building area of a building with more than one story above grade plane shall be determined by multiplying the allowable area per story (A_a), as determined in Section 506.1, by 2. ~~the number of stories above grade plane as listed below:~~

~~1. For buildings with two stories above grade plane, multiply by 2;~~
~~2. For buildings with three or more stories above grade plane, multiply by 3; and~~
~~3.~~ No story shall exceed the allowable area per story (*Aa*), as determined in Section 506.1, for the occupancies on that story.

Exceptions:

~~1.~~ Unlimited area buildings in accordance with Section 507.
~~2. The maximum area of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story *(Aa)*, as determined in Section 506.1, by the number of stories above grade plane.~~

Reason: **Dean:** NASFM proposes a reduction of the total allowable building area from three to two times that allowed for a single floor area based on the calculations of Aa (allowable area) per floor as determined in Section 506.1.

Two of the three Legacy Codes did not permit an architect to multiply the allowable floor space by a factor of three and the third only addressed this multiplier in limited situations. The National Association of State Fire Marshals (NASFM) understands the economic benefits to developers of being able to construct much larger buildings with less built-in fire-resistance on a defined parcel of land. But the economic benefits to developers do not justify the increased risk to occupants and emergency responders. Nor do they justify the on-going costs to owners and tenants.

Taken together with other provisions of the International Building Code (IBC), the current allowance means that occupancies – including health care facilities, schools, residences and office buildings – may be built taller and larger, with less built-in fire protection. If firefighters must enter a burning building to rescue patients, students, physically challenged or otherwise immobile persons, they now face the prospect of climbing higher and traveling further into hostile conditions. The longer they remain in a burning building, the greater the risk of structural collapse. In addition, our most vulnerable structures – tall buildings – will present challenges that many American fire departments are not equipped to handle. As these

buildings are allowed to expand in area and in height, without a corresponding increase in built in fire resistance, the risks to occupants and emergency first responders grow exponentially. Larger, taller buildings with less built-in passive protection also invite increases in fire load comprising materials that generate higher temperatures much more quickly. Due to the increase in size, coupled with limited fire service resources, tall buildings will be required to sustain themselves for longer periods of time.

Firefighters take responsibility for their own safety. The National Institute of Occupational Safety and Health (NIOSH) has advised fire departments to refrain from sending firefighters into buildings if there are concerns about structural collapse. NASFM concurs with this advice from NIOSH, and encourages fire departments to understand the implications of the fire protection requirements in the IBCi. Fire chiefs often bear responsibility for plan review, inspections and fire fighter safety. As a result of the NIOSH advisory, they have little choice but to use what they know about a building to prepare for suppression activities.

It makes little sense to await the loss of life and property before we consider returning to proven safety practices. In fact, "waiting and seeing" begs the question, "How many lives must be lost to justify a return to what we know to be safe?" Our intuitive presumption would be that making buildings larger, both in height and area, with less built-in passive fire resistive protection and the use greater use of combustible materials can only result in greater property loss and the potential for greater loss of life. We all agree that one life lost is one too many. So let us prevent the loss of that one life.

The more responsible policy is to return to the well-tested requirements of the Legacy Codes, so that emergency responders and the persons they are sworn to protect may be confident in the safety of buildings.

Kraus: The intention of this code change proposal is to reduce the total building area for buildings with 3 or more stories above grade.

There are many ways to adjust the height and area allowances of the IBC. I have chosen this particular section and mechanism because it was not a primary mechanism of any of the legacy groups to calculate total building area for buildings 3 stories and taller. Eliminating the 3X multiplier significantly reduces the area of these buildings, bringing the IBC closer to alignment with areas allowed previously (although, generally they will still be larger).

The following text is substantially similar to the supporting information for proposed changes to 504.2 and 506.4.

There exist 3 primary reasons that mandate modification to the height and area provisions of the *International Building Code*, specifically:

1 – The lack of fire history for buildings constructed to the current IBC height and area requirements.

During previous code hearings and at various committee meetings this sentiment was offered to console individuals that, after calculating height and area values under the IBC, found the IBC allowed buildings to be constructed taller and much larger (by a factor of 2 to 3) than any legacy code or BCMC recommendations. This reality came to the forefront after the Orlando code development hearing and caused, presumably and in part, the CTC BFP Work Group to rethink height and area. Once the Work Group identified some 50 "anomalies", concern grew when the science used to formalize Table 503 values could not be harnessed to the point that rendered confidence.

Add to this, the fact that each legacy group had somewhat different height and area enhancements, (increased allowances or multipliers for location on property, type of construction, multiple stories etc). While these factors seemed to stand the test of time regionally, the additive combining of these elements and their influence on the suspect tabular values brings into question the efficacy of IBC Chapter 5 which allows buildings to be constructed both taller and larger that any legacy code.

These comments should not be considered a criticism of the effort of the drafting committee whose task was formidable and time constraints demanding.

2 - The value afforded to fire sprinkler systems.

While Fire sprinklers are well established as the single most important fire protection element in the fire and life safety toolbox they are not a panacea. The dynamic nature of fire incidents and the potential for life loss preclude the acceptance or over reliance on a single protective. Various and diverse tools must be employed to ensure that structures react in a predictable manner even when certain elements don't perform as designed. There are times when sprinklers don't perform satisfactorily. Some examples are:

Interruption of water supply due to natural disaster, intentional acts, unintentional careless acts (maintenance/construction). Ineffective activation due to change in commodity or construction feature, improper storage, faulty sprinkler heads.

Each Legacy group had numerous tradeoffs for sprinklers but also made deliberate decisions to not institute other tradeoffs. By melding together each regions protection package, the IBC effectively voids the intentional non-inclusion of tradeoffs by the legacy groups.

3 - A prevailing rationale used in selecting the tabular values in 503, i.e., not to create non-compliant buildings upon adoption of the IBC.

This problem is faced each time a local or state jurisdiction adopts a new code or updates existing requirements. Buildings built to previous editions are automatically out of compliance with the new code. This perception is tempered by the fact that these buildings are still regulated by the code in effect when they were built, (except for retroactive requirements).

While not creating non-compliant buildings is a justifiable consideration, it is not a primary intent of the IBC. The intent of the IBC is to safeguard the public health, safety and general welfare through various means and to provide safety to life property and emergency responders. Over reliance on the non-complaint building concern may have, in some cases, caused these primary tenets to be relegated to secondary in importance.

Regarding related / concurrent proposals. I respect and support both the Balanced Fire Protection Work Group and their efforts. Time constraints have prevented me from fully assimilating their IBC Chapter 5 proposal.

I urge the Committee to consider this proposal as a reasonable method of bringing the IBC area allowances more in line with those found in the basis documents. The disparity between the 3 story IBC areas and the legacy codes is too great to accept without additional mitigating protectives.

Cost Impact: Dean: The code change proposal will not increase the cost of construction.
Kraus: This code change will increase the cost of construction.

Public Hearing: Committee:	AS	AM	D		
	Assembly:	ASF	AMF	DF	

G138–07/08

506.4.1, 506.4.1.1

Proponent: Jason Thompson, PE, National Concrete Masonry Association, representing the Masonry Alliance for

Codes and Standards (MACS)

Revises as follows:

506.4.1 (Supp) Area determination. The total allowable building area of a building with more than one story above grade plane shall be determined by multiplying the allowable area per story (*Aa*), as determined in Section 506.1, by 2. ~~the number of stories above grade plane as listed below:~~

~~1. For buildings with two stories above grade plane, multiply by 2;~~
~~2. For buildings with three or more stories above grade plane, multiply by 3; and~~
~~3.~~ No story shall exceed the allowable area per story (A_a), as determined in Section 506.1, for the occupancies on that story.

Exceptions~~:~~

~~1.~~ Unlimited area buildings in accordance with Section 507.
~~2. The maximum area of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story (A_a), as determined in Section 506.1, by the number of stories above grade plane.~~

506.4.1.1 (Supp) Mixed occupancies. In buildings with mixed occupancies, the allowable area per story (A_a) shall be based on the most restrictive provisions for each occupancy when the mixed occupancies are treated according to Section 508.3.2. When the occupancies are treated according to Section 508.3.3 as separated occupancies, the maximum total building area shall be such that the sum of the ratios for each such area on all ~~floors~~ stories as calculated according to Section 508.3.3.2 shall not exceed 2 for ~~two-story buildings and 3 for~~ buildings ~~three~~ with two or more stories ~~or higher~~ above grade plane.

Reason: The Masonry Alliance of Codes and Standards (MACS) has decided to submit this code change proposal in order to assure that the ICC Class A voting members have an opportunity to review and discuss during the ICC code development hearings to be held in February, 2008 in Palm Springs, CA. Basically, we are resubmitting Code Change G121-06/07 which was originally submitted by the California Fire Chiefs Association and the Tri-Chapters Code Committee for the previous code development cycle. However, it was not specifically heard at the ICC Code Development Committee Hearings held in September, 2007 in Lake Buena Vista, FL because of the decision by many interested parties including the California Fire Chiefs Association and the ICC Tri-Chapters Code Committee to participate in a Study Group to evaluate height and area requirements of the IBC based on the significant number of code change proposals that expressed concerns about how the height and area limits were established and determined. Since that Study Group did not produce any Public Comments for the ICC Final Action Hearings in Rochester, NY to address this issue, we thought it would be appropriate to make sure that it is on the agenda for this final code development cycle before the publication of the 2009 edition of the IBC. We have also used the same reason statement that was provided in that original code change proposal. We would also point out that an identical code change proposal was also submitted by the Building Officials Association of Florida (BOAF) Code Development Committee which was designated as G123-06/07, the National Association of State Fire Marshals (NASFM) submitted code change proposal G122/06/07, and the California State Fire Marshal (CSFM) submitted code change proposal G116-06/07. We have not included their reason statement since we think the following statement adequately covers their concerns as well.

This code change proposal is actually a companion code change to another code change proposal we have jointly submitted to revise Sections 504.2 and 506.3 regarding allowable height and area increases for the installation of an automatic sprinkler system. Most of our concerns that have been expressed in our supporting statement for that code change proposal also hold true for this code change proposal.

The overall concern we have is that the combination of allowable height and area increases along with the 3x multi-story multiplier of the allowable area for a single floor for buildings greater than 2 stories in height creates extremely large buildings with lesser degrees of fire-resistive protection and more use of combustible construction materials than we have previously been exposed to. This will potentially place a significant challenge on our fire service who must respond to fires in these buildings at some time in their lives. We cannot totally rely upon the automatic sprinkler system to perform as intended since we know through experience that they are not foolproof. In fact, we are familiar with studies that indicate sprinklers have a failure rate in the range of 10 to 15 percent which we feel is unacceptable for such potentially large buildings. We are also concerned here in California because of the possibility of having severe earthquakes which will disrupt the water supplies to the sprinkler systems, as well as potentially damage the sprinkler systems themselves, so they cannot function as designed.

As another facet of our approach to bringing the allowable heights and areas for buildings under the International Building Code (IBC) into more realistic values that we believe we can safely live with, we have also proposed this code change to reduce the 3x multiplier for multi-story building areas to 2x that allowed for a single floor area. This results in an overall reduction of 33 percent of the total building area that is presently allowed by the IBC. This is also what we're used to in California where the code we are currently under, the 1997 ICBO Uniform Building Code (UBC), also utilizes the 2x multiplier for multi-story buildings. Our fire service infrastructure is geared to deal with buildings that are much smaller in size than those that can be constructed in accordance with the current requirements of the IBC. Therefore, it is essential that these large buildings be reduced in size.

Another of our main concerns regarding the generous allowance for increases in allowable areas of multi-story buildings is that it will often result in a building being constructed without any built-in passive fire-resistive protection and with a greater use of combustible materials than would have been the case if the area limits had been lower. Thus, we will end up with more buildings that can potentially be life threatening, not only to the building occupants, but also to the safety of the fire fighters who must enter the buildings to fight the fires that may be out of control by the time they arrive on the scene. And, of course, this will also contribute to more property loss in the long term.

In researching this issue as we worked our way through the California State Fire Marshal's code amendment/adoption process which is currently underway, we discovered that the IBC will allow even larger buildings than any of the previous legacy model codes allowed. We have reviewed a study conducted by the Portland Cement Association which evaluated this very issue of the 3x multi-story multiplier. In the summary of

that study the following conclusions were noted regarding a comparison of the three legacy model codes to the IBC. It was concluded that the average of the aggregate allowable floors areas permitted by the IBC exceeded those of the legacy codes by the following percentages:

BOCA NBC 30%
ICBO UBC 152%
SBCCI SBC 102%

Obviously, if the 3x multiplier is reduced to a 2x multiplier, it will impact the three story building as well as those buildings greater than three stories which are currently impacted by the 3x multiplier. The average value differences will drop significantly and fall within a reasonable range for the three legacy model codes. Yet, for the most part, they will still allow greater areas than would have been allowed prior to the IBC.

In conclusion, we feel very uncomfortable with the current area allowances that the IBC permits which allow for buildings to be built larger for the same type of construction and occupancy classification than they would have been allowed to have been built under the previous legacy model building codes. We will be allowing those buildings to be constructed without any knowledge of how they would have performed in the past since they were actually never constructed under any of the previous model codes. Thus, there is no track record to indicate if they have performed to an acceptable level of fire and life safety. Without adequate technical justification to support such large building areas, we believe it is prudent to begin to adjust these allowable areas downward by reducing the multi-story multiplier from 3x to 2x that allowed for a single story building.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee:	AS	AM	D	
	Assembly:	ASF	AMF	DF

G139–07/08

506.4.1

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

506.4.1 (Supp) Area determination. The total allowable building area of a building with more than one story above grade plane shall be determined by multiplying the allowable area per story (*Aa*), as determined in Section 506.1, by the number of stories above grade plane as listed below:

1. For buildings with two stories above grade plane, multiply by 2;
2. For buildings <u>of other than Types IIB, IIIB, and VB construction</u> with three or more stories above grade plane, multiply by 3; and
3. No story shall exceed the allowable area per story (*Aa*), as determined in Section 506.1, for the occupancies on that story.

Exceptions:

1. Unlimited area buildings in accordance with Section 507.
2. The maximum area of a building <u>of other than Type IIB, IIIB, or VB construction</u> equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story *(Aa),* as determined in Section 506.1, by the number of stories above grade plane.

Reason: The purpose of this code change is to reduce the total allowable building area from three times to two times that allowed for a single floor area based on the calculations of A_a (allowable area) per floor. The overall volume of the building determined by the allowable area per floor and the allowable number of stories and height of the building is significantly greater in the majority of cases than was allowed by any of the legacy model codes. By limiting the total building area to twice that allowed for a single floor, the volume of the building will be significantly reduced, but will be more in line with the legacy codes in most cases.

The proposed approach of limiting the total allowable building area to twice that allowed for a single floor area is the same as that used in the ICBO UBC, and is similar to the approach that was used in the BOCA NBC.

However, this proposed code change limits the 2x multiplier for multistory buildings to those buildings of the non-fire-resistance rated types of construction which include Types IIB, IIIB, and VB construction. This represents a compromise between previous code change submittals that were made by the Building Officials Association of Florida (BOAF) Code Development Committee (G123-06/07), the California Fire Chiefs Association/Tri-chapters Code Committee (G121-06/07) and the National Association of State Fire Marshals (NASFM) (G122-06/07). These code change proposals were not actually discussed during the ICC Code Development Committee Hearings held in Lake Buena Vista, FL for the beginning of the last cycle due to the fact that they were incorporated into an effort to study these issues and come out with a consensus on how to deal with the concerns expressed about the excessive allowable heights and areas in the current International Building Code (IBC). What we are attempting to do with this code change proposal is to provide a vehicle for reaching consensus on this issue by compromising with the limitation of the 3x multiplier not being applicable to multistory buildings of the non-fire-resistance rated types of construction. Obviously, those types of construction are the greatest concern since they have no built in passive fire-resistive protection to protect the structure from early collapse during an uncontrolled fire condition.

We have also put together some tables comparing the allowable heights and areas of the current IBC to the IBC as it would be modified if this code change proposal were approved, as well as to the three legacy model codes to the show the maximum allowable areas permitted by those codes. This should help the Committee to understand the overall impact of this code change on the existing building stock throughout the country.

Multi-Story Multiplier

3x vs. 2x

Type IIB Construction

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	3 x Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	2 x Revised IBC
A-2	106,875 3 st.	21,600 2 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 3 st.
A-3	106,875 3 st.	83,160 3 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 3 st.
B	258,750 4 st.	190,800 4 st.	48,000 3 st. 96,000 2 st.	255,000 5 st.	172,500 4 st.
E	163,125 3 st.	142,560 3 st.	54,000 2 st. 81,000 1 st.	48,000 2 st. 48,000 1 st.	108,750 3 st.
F-1	174,375 3 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	252,000 4 st.	116,250 3 st.
I-1	112,500 4 st.	110,880 4 st.	NP NP	180,000 5 st.	75,000 4 st.
I-2	52,250 1 st.	32,400 1 st.	NP NP	40,000 1 st.	52,250 1 st.
M	140,625 3 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	135,000 5 st.	93,750 3 st.
R-1/ R-2	180,000 4 st.	126,720 4 st.	36,400 3 st. 72,800 2 st.	180,000 5 st.	120,000 4 st.
S-1	196,875	83,160	48,000	192,000	131,250

	3 st.	3 st.	3 st. 96,000 2 st.	4 st.	3 st.

Multi-Story Multiplier

3x vs. 2x

Type IIIB Construction

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	3 x Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	2 x Revised IBC
A-2	106,875 3 st.	21,600 2 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 3 st.
A-3	106,875 3 st.	83,160 3 st.	36,400 2 st. 54,600 1 st.	48,000 3 st. 48,000 2 st.	71,250 3 st.
B	213,750 4 st.	190,080 4 st.	48,000 3 st. 96,000 2 st.	210,000 5 st.	142,500 4 st.
E	163,125 3 st.	142,560 3 st.	54,000 2 st. 81,000 1 st.	48,000 2 st. 48,000 1 st.	108,750 3 st.
F-1	135,000 3 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	180,000 4 st.	90,000 3 st.
I-1	112,500 4 st.	110,880 4 st.	NP NP	180,000 5 st.	75,000 4 st.
I-2	NP NP	NP NP	NP NP	NP NP	NP NP
M	140,625 3 st.	95,040 3 st.	48,000 3 st. 96,000 2 st.	135,000 5 st.	93,750 3 st.
R-1/ R-2	180,000 4 st.	126,720 4 st.	36,400 3 st. 72,800 2 st.	180,000 5 st.	120,000 4 st.

S-1	196,875 3 st.	83,160 3 st.	48,000 3 st. 96,000 2 st.	192,000 4 st.	131,250 3 st.

Multi-Story Multiplier

3x vs. 2x

Type VB Construction

Maximum Allowable Total Building Area (sf)

Maximum Allowable Building Height (stories)

Occ.	3 x Current IBC	BOCA NBC	ICBO UBC	SBCCI SBC	2 x Revised IBC
A-2	45,000 2 st.	10,800 2 st.	24,000 2 st. 36,000 1 st.	20,000 2 st. 20,000 1 st.	45,000 2 st.
A-3	45,000 2 st.	37,800 2 st.	24,000 2 st. 36,000 1 st.	20,000 3 st. 20,000 2 st.	45,000 2 st.
B	101,250 3 st.	71,280 3 st.	32,000 3 st. 64,000 2 st.	54,000 3 st. 54,000 2 st.	67,500 3 st.
E	71,250 2 st.	64,800 2 st.	36,400 2 st. 54,600 1 st.	32,000 2 st. 32,000 1 st.	71,250 2 st.
F-1	63,750 2 st.	43,200 2 st.	32,000 3 st. 64,000 2 st. 48,000 1 st.	40,000 2 st. 40,000 1 st.	63,750 2 st.
I-1	50,625 3 st.	41,580 3 st.	NP NP	42,000 3 st. 42,000 2 st. 28,000 1 st.	33,750 3 st.
I-2	NP NP	NP NP	NP NP	NP NP	NP NP
M	67,500 2 st.	43,200 2 st.	32,000 3 st.	36,000 3 st.	67,500 2 st.

			64,000 2 st. 48,000 1 st.	36,000 2 st. 24,000 1 st.	
R-1/ R-2	78,750 3 st.	47,520 3 st.	24,000 3 st. 48,000 2 st. 36,000 1 st.	42,000 3 st. 42,000 2 st. 28,000 1 st.	52,500 3 st.
S-1	67,500 2 st.	37,800 2 st.	32,000 3 st. 64,000 2 st. 48,000 1 st.	24,000 2 st. 24,000 1 st.	67,500 2 st.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

G224–07/08
Appendix L (New)

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Alliance for Fire and Smoke Containment and Control (AFSCC)

NOTE: Strikeout/underline format is being used for the purpose of identifying where changes are being proposed to the current text in Chapter 5 for ease in understanding the text being proposed as a new Appendix L. The Chapter 5 component of this code change proposal is intended to be entirely new text that can be adopted by a local jurisdiction to replace Chapter 5 in the body of the code or that can be used as a code compliance alternate method to Chapter 5. The revisions proposed to specific subsections of Section 903.2 are intended to be used in conjunction with Chapter 5 in Appendix L when Appendix L is adopted or allowed to be used as an acceptable alternate method by a local jurisdiction in order to provide a complete package.

Add new Appendix L as follows:

APPENDIX CHAPTER L
GENERAL BUILDING COMPARTMENTATION AND HEIGHT

This Appendix is intended for adoption by local jurisdictions that want to substitute the text herein for the text in Chapter 5 of the *International Building Code* and to modify portions of Section 903.2 of the International Building Code. This Appendix can also be used as an alternative to the International Building Code requirements for allowable building heights and areas based on Section 104.11 of the International Building Code. The provisions contained in this Appendix are otherwise not mandatory unless specifically referenced in the adopting ordinance of the local jurisdiction.

L501.1 Scope. The provisions of this chapter control the height and ~~area of~~ the type and number of fire compartments within all structures hereafter erected and additions to existing structures

[F] L501.2 (Supp) Address identification. New and existing buildings shall be provided with approved address numbers or letters. Each character shall be a minimum 4 inches (102 mm) high and a minimum of 0.5 inch (12.7 mm)

wide. They shall be installed on a contrasting background and be plainly visible from the street or road fronting the property. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure.

SECTION L502
DEFINITIONS

L502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

AREA, ~~BUILDING~~ FIRE COMPARTMENT. The area included within surrounding exterior walls, compartment walls, (or exterior walls and firewalls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the ~~building~~ fire compartment area if such areas are included within the horizontal projection of the roof or floor above.

(Supp) BASEMENT. A story that is not a story above grade plane (See "Story above grade plane" in Section 202).

EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairs and ladders necessary to access the platform (see Section 505.5).

FIRE COMPARTMENT. An area enclosed and bounded by fire walls, fire barrier walls, exterior walls, or fire-resistance-rated horizontal assemblies of a building.

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

MEZZANINE. An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505.

SECTION L503
GENERAL HEIGHT AND FIRE COMPARTMENT AREA LIMITATIONS

L503.1 (Supp) General. The height and maximum area of any fire compartment and the number of fire compartments in a buildings shall not exceed the limits specified in Tables 503.1(1), 503.1(2), 503.1(3) and 503.1(4) based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more fire walls complying with Section 705 shall be considered to be a separate building.

(Delete existing Table 503 entire in its entirety and replace with Tables L503.1(1) through L503.1(4))

~~TABLE 503~~
~~ALLOWABLE HEIGHT AND BUILDING AREAS[a]~~
~~Height limitations shown as stories and feet above grade plane.~~
~~Area limitations as determined by the definition of "Area, building," per story~~

TABLE L503.1(1)
MAXIMUM ALLOWABLE BUILDING HEIGHT (Feet and Stories above grade plane)

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
Feet	UL	160	65	55	65	50	65	55	40
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
S-2	UL	11	5	4	4	5	5	4	2
F-2	UL	11	5	3	4	3	5	3	2
B	UL	11	5	4	5	3	5	4	2
R-1, R-2, R-4	UL	11	4	4	4	3	4	4	2
R-3	UL	11	4	4	4	3	4	4	3
M	UL	11	4	4	4	3	4	4	1
F-1	UL	11	4	2	3	2	4	2	1
S-1	UL	11	4	3	3	3	4	3	1
A-3, A-4	UL	11	3	2	3	2	3	2	1
M	UL	11	4	4	4	2	4	4	1
A-2	UL	11	3	2	3	2	3	2	1
I-1	UL	9	4	3	4	3	4	3	2
H-4	UL	7	5	3	5	3	5	3	2
H-3	UL	6	4	2	4	2	4	2	1
U	UL	5	4	2	3	2	4	2	1
A-1	UL	5	3	2	3	2	3	2	1
I-4	UL	5	3	2	3	1	2	3	1
E	UL	5	3	2	3	1	3	2	1
H-5	4	4	3	3	3	3	3	3	2
I-2	UL	4	2	1	1	1	1	NP	NP
I-3	UL	4	2	1	2	2	2	1	1
H-2	UL	3	2	1	2	1	2	1	1
H–1	1	1	1	1	1	1	1	1	NP

UL = unlimited in height
NP = not permitted

TABLE L503.1(2)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS [a, b, c]

OCCUPANCY	TYPE IA/IB	TYPE IIA	TYPE IIIA	TYPE IV AND VA	TYPE IIB AND IIIB	TYPE VB
S-2, F-2	30,267	16,933	16,933	10,933	7,867	4,800
A-3, A-4, B, H-4, I, R, E	26,706	14,941	14,941	9,647	6,941	4,235
A-1, A-2, M	22,700	12,700	12,700	8,200	5,900	3,600
F-1, S-1, H-5	19,739	11,043	11,043	7,130	5,130	3,130

H–1, H-2, H-3	NP	NP	NP	NP	NP	NP

a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.
c. Round table values off to nearest 1000.

NP = not permitted

TABLE L503.1(3)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a, b, c]

OCCUPANCY	TYPE IA/IB	TYPE IIA	TYPE IIIA	TYPE IV AND VA	TYPE IIB AND IIIB	TYPE VB
S-2, F-2	423,733	237,067	169,333	109,333	78,667	48,000
A-3, A-4, B, H-4, I, R, E	373,882	209,176	149,412	96,471	69,412	42,353
A-1, A-2, M	227,000	127,000	63,500	41,000	29,500	18,000
F-1, S-1, H-5	98,696	55,217	40,861	26,383	18,983	11,583
H–1, H-2, H-3	67,192	37,592	37,592	24,272	17,464	10,656

a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.
c. Round table values off to nearest 1000.

TABLE L503.1(4)
MAXIMUM BUILDING AREA FACTOR

ACTUAL BUILDING HEIGHT, STORIES	NUMBER OF STORIES ALLOWED BY TABLE 503.1(1								
	1	2	3	4	5	6	7	8	9
1	4	8	12	16	20	24	28	32	36
2	-	6	9	12	15	18	21	24	27
3	-	-	6	8	10	12	14	16	18

L503.2 Building area. The maximum allowable building area shall not exceed the maximum area of fire compartments in accordance with Tables 503.1(2) or 503.1(3) multiplied by the number in Table 503.1(4). A building shall be considered one fire compartment except where subdivided by compartment fire barriers conforming with this section.

L503.2.1 Absolute maximum allowable building area. Regardless of the provisions in Section 503.2, the maximum allowable building area shall not exceed 500,000 square feet.

Exception: Type I construction for buildings containing any occupancy group other than Groups H-1, H-2, H-3, I-1, I-4, S-1, S-2 and U.

L503.2.2 Enclosure. Each fire compartment shall be enclosed by exterior walls, roof, fire rated horizontal assemblies or fire compartment barrier walls. If a building has more than one fire compartment, each fire compartment shall be separated by horizontal or vertical compartment barrier having a fire resistance rating determined in accordance with

Table 503.2.2.

L503.2.3 Fire compartment barriers. Fire compartment barriers separating a building into fire compartments shall comply with Sections 503.2.3.1 and 503.2.3.2 and Table 503.3.2.

TABLE L503.2.2
FIRE COMPARTMENT FIRE RESISTANCE (hrs)

	SPRINKLERED	**NON-SPRINKLERED**
Assembly		
A-1	2	2
A-2	2	2
A-3	2	2
A-4	2	2
A-5	NA	NA
Business		
B	1	2
Educational		
E	2	2
Factory and Industry		
F-1	2	3
F-2	1	2
Hazardous		
H-1	4	4
H-2	3	4
H-3	3	3
H-4	1	2
H-5	2	2
Institutional		
I-1	2	2
I-2	2	2
I-3	2	2
I-4	2	3
Mercantile		
M	1	2
Residential		

R-1	2	2
R-2	2	2
R-3	2	2
R-4	2	2
Storage		
S-1	2	3
S-2	1	2
Utility		
U	1	1

NA = Not Applicable

L503.2.3.1 Horizontal fire compartment barriers. Horizontal fire compartment barriers shall be constructed in accordance with Section 711.

L503.2.3.2 Vertical fire barriers. Vertical fire compartment barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above or to a termination point at least 30 inches above both adjacent roofs and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, including but not limited to spaces such as above a suspended ceiling.

L503.2.3.2.1 Vertical continuity. Fire compartment barriers shall extend from the foundation to a termination point at least 30 inches above both adjacent roofs.

Exceptions:

1. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab provided:
   1.1. The lower roof assembly within 4 feet (1220 mm) of the wall has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
   1.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
   1.3. Each building shall be provided with not less than a Class B roof covering.
2. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck, or slabs where both buildings are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire compartment barrier.
3. In buildings of Type III, IV and V construction, walls shall be permitted to terminate at the underside of combustible roof sheathing or decks provided:
   3.1. There are no openings in the roof within 4 feet (1220 mm) of a fire wall,
   3.2. The roof is covered with a minimum Class B roof covering, and
   3.3. The roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with 5/8 inch (15.9 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm) on both sides of the fire wall.
4. Buildings located above a parking garage designed in accordance with Section 509.2 shall be permitted to have the fire compartment barriers for the buildings located above the parking garage extend from the horizontal separation between the parking garage and the buildings.

L503.2.3.2.2 Supporting construction. The supporting construction for fire compartment barrier walls shall be protected to afford the required fire-resistance rating of the fire compartment barrier supported.

L503.2.3.3 Glazed openings. Glazed openings in fire compartment barriers shall be limited to those in fire doors

complying with 715.4.

L503.2.3.4 Fire compartment doors. Doors in fire compartment barriers shall have a fire protection rating of at least 1 hour in accordance with Table 503.2.3.4. Doors in fire compartment barriers shall limit temperature rise to 450°F (250°C) when tested in accordance with NFPA 252.

TABLE L503.2.3.4
FIRE PROTECTION RATING OF DOORS IN FIRE COMPARTMENT BARRIERS (HRS)

FIRE COMPARTMENT BARRIER	DOOR IN FIRE COMPARTMENT BARRIER
1 hr.	1 hr.
2 hr.	1½ hr.
3 hr.	2 hr.

L503.2.3.5 Other openings fire compartment barriers. Openings in 1-hour fire compartment barriers for air-handling shall be protected with fire dampers having a fire protection rating of 1 hour.

L503.3 Smoke management for adjacent fire compartments. Where adjacent fire compartments share a common fire compartment wall or horizontal assembly, or both, for the purpose of creating separate fire compartments, a method of smoke management shall be provided in accordance with Section 503.3.1 for such fire compartments that meet any of the following conditions:

1. The fire compartment is not protected with an automatic sprinkler system in accordance with Section 903.3.1 and contains one or more stories located more than one story above grade plane or
2. The fire compartment contains one or more stories located more than two stories above grade plane having any of the following occupancies:
   - 2.1. Group A occupancy with an occupant load of 300 or more persons;
   - 2.2. Group I-1 occupancy; or
   - 2.3. Group I-2 occupancy.

L503.4 Smoke management methods. Smoke management as required by Section 503.3 shall comply with any one or a combination of any of the following methods, as applicable:

1. Door openings, joints and penetrations in fire compartment separation walls and horizontal assemblies shall be protected as required for smoke barriers in accordance with the following:
   - 1.1. Door openings shall comply with Section 715.4.3.1.
   - 1.2. Penetrations shall comply with Section 712.5.
   - 1.3. Joints shall comply with Section 713.6.
   - 1.4. Ducts and air transfer openings shall comply with Section 716.5.5.
2. Openings in fire compartment separation horizontal assemblies shall be protected by shaft enclosures in accordance with Section 707. For the purpose of smoke management at fire compartment separations, Section 707.2 shall not apply.
3. Exit stair enclosures penetrating a fire compartment separation horizontal assembly shall be protected as for smokeproof enclosures in accordance with Section 909.20.
4. One or more of the following mechanical methods shall be permitted to be used for smoke management in lieu of Items 1 and 2 above:
   - 4.1. The pressurization method in accordance with Section 909.6
   - 4.2. The air flow design method in accordance with Section 909.7 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1
   - 4.3. The exhaust method in accordance with Section 909.8 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1

~~**503.1.1**~~ **L503.5 Special industrial occupancies.** Buildings and structures designed to house special industrial processes that require large areas and unusual heights to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the height and area limitations of Table ~~503~~ 503.1(1) through 503.1(3).

~~**503.1.2**~~ **L503.6 Buildings on same lot.** Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the height of each building and the aggregate maximum

area of fire compartments ~~area of buildings~~ are within the limitations of Table ~~503~~ 503.1(1) through 503.1(3) as modified by Sections 504 ~~and 506~~. The provisions of this code applicable to the aggregate building shall be applicable to each building.

~~**503.1.3**~~ **L503.7 Type I construction.** Buildings of Type I construction permitted to be of unlimited tabular heights ~~and areas~~ or number of fire compartments are not subject to the special requirements that allow unlimited fire compartments ~~area buildings~~ in Section 507 or unlimited height in Sections 503.5~~1.1~~ and 504.3 or increased height and areas for other types of construction.

SECTION L504
HEIGHT

L504.1 General. The height permitted by Table 503.1(1) shall be increased in accordance with this section.

Exception: The height of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited if the building is provided with an automatic fire-extinguishing system in accordance with Chapter 9 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

L504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503.1(1) for maximum height ~~is~~ shall be increased by ~~20~~ 5 feet (6096 mm) and the maximum number of stories ~~is~~ shall be increased by one. ~~These increases are permitted in addition to the area increase in accordance with Sections 506.2 and 506.3. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.~~

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

L504.3 Roof structures. Towers, spires, steeples and other roof structures shall be constructed of materials consistent with the required type of construction of the building except where other construction is permitted by Section 1509.2.1. Such structures shall not be used for habitation or storage. The structures shall be unlimited in height if of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable height if of combustible materials (see Chapter 15 for additional requirements).

SECTION L505
MEZZANINES

L505.1 General. A mezzanine or mezzanines in compliance with Section 505 shall be considered a portion of the story below. Such mezzanines shall not contribute to either the ~~building~~ fire compartment area or number of stories as regulated by Section 503.1. The area of the mezzanine shall be included in determining the fire area defined in Section 702. The clear height above and below the mezzanine floor construction shall not be less than 7 feet (2134 mm).

L505.2 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the floor area of that room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the floor area of the room.

Exceptions:

1. The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.5~~1.1~~ shall not exceed two-thirds of the floor area of the room.
2. The aggregate area of mezzanines in buildings and structures of Type I or II construction shall not exceed one-half of the floor area of the room in buildings and structures equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 and an approved emergency voice/alarm communication system in accordance with Section 907.2.12.2.

L505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1014.3. Where a stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing. Accessible means of egress shall be provided in accordance with Section 1007.

Exception: A single means of egress shall be permitted in accordance with Section 1015.1.

L505.4 (Supp) Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more means of egress is not required to be open to the room in which the mezzanine is located if at least one of the means of egress provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In other than Groups H and I occupancies no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.

L505.5 (Supp) Equipment platforms. Equipment platforms in buildings shall not be considered as a portion of the floor below. Such equipment platforms shall not contribute to either the building area or the number of stories as regulated by Section 503.1. The area of the equipment platform shall not be included in determining the fire area in accordance with Section 903. Equipment platforms shall not be a part of any mezzanine and such platforms and the walkways, stairs and ladders providing access to an equipment platform shall not serve as a part of the means of egress from the building.

L505.5.1 Area limitations. The aggregate area of all equipment platforms within a room shall not exceed two-thirds of the area of the room in which they are located. Where an equipment platform is located in the same room as a mezzanine, the area of the mezzanine shall be determined by Section 505.2 and the combined aggregate area of the equipment platforms and mezzanines shall not exceed two-thirds of the room in which they are located.

[F] L505.5.2 Fire suppression. Where located in a building that is required to be protected by an automatic sprinkler system, equipment platforms shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in Section 903.3.

L505.5.3 Guards. Equipment platforms shall have guards where required by Section 1013.1.

~~**SECTION 506**~~
~~**AREA MODIFICATIONS**~~

~~**506.1 General.** The areas limited by Table 503 shall be permitted to be increased due to frontage (I_f) and automatic sprinkler system protection (I_s) in accordance with the following:~~

~~$$A_a = \{A_t + [A_t \times I_f] + [A_t \times I_s]\}$$~~ ~~**(Equation 5-1)**~~

~~where:~~

~~A_a = Allowable area per story (square feet).~~
~~A_t = Tabular area per story in accordance with Table 503 (square feet).~~
~~I_f = Area increase factor due to frontage as calculated in accordance with Section 506.2.~~
~~I_s = Area increase factor due to sprinkler protection as calculated in accordance with Section 506.3.~~

506.2 Frontage increase. Every building shall adjoin or have access to a public way to receive an area increase for frontage. Where a building has more than 25 percent of its perimeter on a public way or open space having a minimum width of 20 feet (6096 mm), the frontage increase shall be determined in accordance with the following:

$$I_f = [F/P - 0.25]W/30 \quad \textbf{(Equation 5-2)}$$

where:

I_f = Area increase due to frontage.
F = Building perimeter that fronts on a public way or open space having 20 feet (6096 mm) open minimum width (feet).
P = Perimeter of entire building (feet).
W = Width of public way or open space (feet) in accordance with Section 506.2.1.

506.2.1 (Supp) Width limits. The value of W shall be at least 20 feet (6096 mm). Where the value of W varies along the perimeter of the building, the calculation performed in accordance with Equation 5-2 shall be based on the weighted average of each portion of exterior wall and open space where the value of W is greater than or equal to 20 feet (6096 mm). Where the value of W exceeds 30 feet (9144 mm), a value of 30 feet (9144 mm) shall be used in calculating the weighted average, regardless of the actual width of the open space.

Exception: The value of W divided by 30 shall be permitted to be a maximum of 2 when the building meets all requirements of Section 507 except for compliance with the 60-foot (18 288 mm) public way or yard requirement, as applicable.

506.2.2 Open space limits. Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved fire lane.

506.3 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent ($I_s = 2$) for buildings with more than one story above grade plane and an additional 300 percent ($I_s = 3$) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2.

Exception: The area limitation increases shall not be permitted for the following conditions:

1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.
2. The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

506.4 (Supp) Buildings with more than one story. The total allowable building area of a building with more than one story shall be determined in accordance with this section. The actual aggregate building area at all stories in the building shall not exceed the total allowable building area.

Exception: A single basement need not be included in the total allowable building area, provided such basement does not exceed the area permitted for a building with no more than one story above grade plane.

506.4.1 (Supp) Area determination. The maximum area of a building with more than one story above grade plane shall be determined by multiplying the allowable area of the first story (A_a), as determined in Section 506.1, by the number of stories above grade plane as listed below:

1. For buildings with two stories above grade plane, multiply by 2;
2. For buildings with three or more stories above grade plane, multiply by 3; and
3. No story shall exceed the allowable area per story (A_a), as determined in Section 506.1, for the occupancies on that story.

~~**Exceptions:**~~

~~1. Unlimited area buildings in accordance with Section 507.~~
~~2. The maximum area of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story (A_a), as determined in Section 506.1, by the number of stories above grade plane.~~

~~**506.4.1.1 (Supp) Mixed occupancies.** In buildings with mixed occupancies, the allowable area per story (A_a) shall be based on the most restrictive provisions for each occupancy when the mixed occupancies are treated according to Section 508.3.2. When the occupancies are treated according to Section 508.3.3 as separated occupancies, the maximum total building area shall be such that the sum of the ratios for each such area on all floors as calculated according to Section 508.3.3.2 shall not exceed 2 for two story buildings and 3 for buildings three stories or higher.~~

SECTION ~~507~~ L506
FIRE COMPARTMENTS PERMITTED TO BE UNLIMITED IN AREA ~~BUILDINGS~~

~~**507.1**~~ **L506.1 General.** The area of a fire compartment shall not be limited and only one fire compartment is required in buildings meeting the requirements of Sections 506~~7~~.2 through 506~~7~~.11. ~~The area of buildings of the occupancies and configurations specified herein shall not be limited.~~

~~**507.2**~~ **L506.2 (Supp) Nonsprinklered, one story.** The area of the fire compartment in a Group F-2 or S-2 occupancy ~~building~~ no more than one-story in height, shall not be limited when the building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~**507.3**~~ **L506.3 (Supp) Sprinklered, one story.** The area of the fire compartment in a Group B, F, M or S occupancy ~~building~~ no more than one-story above grade plane, or the fire compartment in a Group A-4 occupancy ~~building~~ no more than one-story above grade plane, of other than Type V construction, shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) n width.

Exceptions:

1. ~~Buildings and~~ The fire compartment in structures of Type I and II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such ~~buildings~~ fire compartment conform to the requirements of Sections 506~~7~~.2 and 903.3.1.1 and NFPA 230.
2. The automatic sprinkler system shall not be required in ~~areas~~ parts of fire compartments that are occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-4, provided that:
   2.1. Exit doors directly to the outside are provided for occupants of the participant sports areas; and
   2.2. The ~~building~~ fire compartment is equipped with a fire alarm system with manual fire alarm boxes installed in accordance with Section 907.
3. Group A-1 and A-2 occupancies of other than Type V construction shall be permitted, provided:
   3.1. All assembly occupancies are separated from other spaces as required for separated occupancies in Section 508.4.4 with no reduction allowed in the fire-resistance rating of the separation based upon the installation of an automatic sprinkler system;
   3.2. Each Group A occupancy shall not exceed the maximum allowable area permitted in Section 503.1; and
   3.3. All required exits shall discharge directly to the exterior.

~~**507.4**~~ **L506.4 (Supp) Two story.** The area of the fire compartment in a Group B, F, M or S occupancy ~~building~~ no more than two stories above grade plane shall not be limited when the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~**507.5**~~ **L506.5 Reduced open space.** The permanent open space of 60 feet (18 288 mm) required in Sections 507.2, 507.3, 507.4, 507.6 and 507.10 shall be permitted to be reduced to not less than 40 feet (12 192 mm), provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the building.

2. The exterior wall facing the reduced open space shall have a minimum fire-resistance rating of 3 hours.
3. Openings in the exterior wall facing the reduced open space shall have opening protectives with a minimum fire protection rating of 3 hours.

~~507.6~~ **L506.6 (Supp) Group A-3 buildings.** The area of the fire compartment in a Group A-3 occupancy ~~building~~ no more than one-story above grade plane, used as a place of religious worship, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor swimming pool or tennis court of Type II construction shall not be limited when all of the following criteria are met:

1. The fire compartment ~~building~~ shall not have a stage other than a platform.
2. The fire compartment ~~building~~ shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all exits are provided with ramps complying with Section 1010.1 to the street or grade level.
4. The building shall be surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.7~~ **L506.7 (Supp) Group H occupancies.** Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area fire compartments ~~buildings~~ containing Group F and S occupancies, in accordance with Sections 507.3 and 507.4 and the limitations of this section. The aggregate floor area of the Group H occupancies located at the perimeter of the unlimited area fire compartment ~~building~~ shall not exceed 10 percent of the area of the building nor the area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3) ~~as modified by Section 506.2~~, based upon the percentage of the perimeter of each Group H floor area that fronts on a street or other unoccupied space. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the fire compartment area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3). Group H occupancies shall be separated from the rest of the unlimited area building and from each other in accordance with Table 508.4. For two-story unlimited area fire compartments ~~buildings~~, the Group H occupancies shall not be located more than one story above grade plane unless permitted by the allowable height in stories and feet as set forth in Table 503.1(1) based on the type of construction of the unlimited area building.

~~507.8~~ **L506.8 (Supp) Aircraft paint hangar.** The area of the fire compartment for a Group H-2 aircraft paint hangar no more than one-story above grade plane, shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.4 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

~~507.9~~ **L506.9 (Supp) Group E buildings.** The area of the fire compartment for a Group E occupancy ~~building~~ no more than one-story above grade plane, of Type II, IIIA or IV construction shall not be limited when the following criteria are met:

1. Each classroom shall have not less than two means of egress, with one of the means of egress being a direct exit to the outside of the building complying with Section 1018.
2. The fire compartment ~~building~~ is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The fire compartment ~~building~~ is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.10~~ **L506.10 (Supp) Motion picture theaters.** In fire compartment ~~buildings~~ of Type II construction, the area of the fire compartment for a motion picture theater located on the first story above grade plane shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.11~~ **L506.11 Covered mall buildings and anchor stores.** The area of the fire compartment for a covered mall buildings and anchor stores not exceeding three stories in height that comply with Section 402.6 shall not be limited.

SECTION ~~508~~ L507
MIXED USE AND OCCUPANCY

~~508.1~~ **L507.1 (Supp) General.** Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 509.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. Live/Work Units in accordance with Section 419 are not considered separate occupancies.

~~508.2~~ **L507. 2 (Supp) Accessory occupancies** Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.5.3.

~~508.2.1~~ **L507.2.1 (Supp) Area limitations.** Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story in which they are located and shall not exceed the tabular values in Tables 503.1(2) and 503.1(3), ~~without area increases in accordance with Section 506 for such accessory occupancies~~

~~508.2.2~~ **L507.2.2 (Supp) Occupancy classification.** Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

~~508.2.3~~ **L507.2.3 (Supp) Allowable area and height.** The allowable area of the fire compartment and height of the building shall be based on the allowable area and height for the main occupancy in accordance with Section 503.1. The height of each accessory occupancy shall not exceed the tabular values in Table 503.1(1), without increases in accordance with Section 504 for such accessory occupancies. The area of the accessory occupancies shall be in accordance with Section 508.2.1

~~508.2.4~~ **L507.2.4 (Supp) Separation of occupancies.** No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Incidental accessory occupancies required to be separated or protected by Section 508.2.5.
3. Group R occupancies shall be separated from other accessory occupancies in accordance with Section 508.4.4

~~508.2.5~~ **L507.2.5 (Supp) Separation of incidental accessory occupancies.** The incidental accessory occupancies listed in Table 508.2.5 shall be separated from the remainder of the building or equipped with an automatic fire-extinguishing system, or both, in accordance with Table 508.2.5.

Exception: Incidental accessory occupancies within and serving a dwelling unit are not required to comply with this section.

TABLE ~~508.2.5~~ L507.2.5 (Supp)
INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cut-off rooms, not classified as Group H	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in	2 hours; or 1 hour and provide automatic fire-

occupancies other than Group F	extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary storage battery systems having a liquid capacity of more than 100 gallons used for facility standby power, emergency power or uninterrupted power supplies	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.9 kPa,
1 British thermal unit per hour = 0.293 watts, 1 horsepower = 746 watts,
1 gallon = 3.785 L.

~~**508.2.5.1**~~ **L507.2.5.1 (Supp) Fire resistance rated separation.** Where Table 508.2.5 specifies a fire-resistance rated separation, the incidental accessory occupancies shall be separated from the remainder of the building by a fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

~~**508.2.5.2**~~ **L507.2.5.2 (Supp) Nonfire-resistance rated separation and protection.** Where Table 508.2.5 permits an automatic fire extinguishing system without a fire barrier, the incidental accessory occupancies shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the fire-resistance-rated floor/ceiling assembly above or fire-resistance-rated roof/ceiling assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic closing upon detection of smoke in accordance with Section 715.4.7.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.

~~**508.2.5.3**~~ **L507.2.5.3 (Supp) Protection.** Where an automatic fire-extinguishing system or an automatic sprinkler system is provided in accordance with Table 508.2.5, only the space occupied by the incidental accessory occupancy need be equipped with such a system.

~~**508.3**~~ **L507.3 (Supp) Nonseparated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

~~**508.3.1**~~ **L507.3.1 (Supp) Occupancy classification.** Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space except that the most restrictive applicable provisions of Section 403 and Chapter 9 shall apply to the building or portion thereof in which the nonseparated occupancies are located.

~~**508.3.2**~~ **L507.3.2 (Supp) Allowable fire compartment area and height.** The allowable fire compartment area and height of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

~~**508.3.3**~~ **L507.3.3 (Supp) Separation.** No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.3.3.
2. All Group R occupancies shall be separated from other occupancies in accordance with Section 508.4.4.

~~**508.4**~~ **L507.4 (Supp) Separated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

TABLE ~~508.4~~ L507.4 (Supp)
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

OCCUPANCY	A[d], E		I		R[c]		F-2, S-2[b,c], U[c]		B, F-1, M, S-1		H-1		H-2		H-3, H-4, H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A[d], E[d]	N	N	1	2	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I	--	--	N	N	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
R[c]	--	--	--	--	N	N	1	2	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b,c], U[d]	--	--	--	--	--	--	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	--	--	--	--	--	--	--	--	N	N	NP	NP	2	3	1	2[a]
H-1	--	--	--	--	--	--	--	--	--	--	N	NP	NP	NP	NP	NP
H-2	--	--	--	--	--	--	--	--	--	--	--	--	N	NP	1	NP
H-3, H-4, H-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	NP

For SI: 1 square foot = 0.0929 m^2.

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.4.2.
b. Areas used only for private or pleasure vehicles shall be allowed to reduce separation by 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

~~508.4.1~~ L507.4.1 (Supp) Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building.

~~508.4.2~~ L507.4.2 (Supp) Allowable fire compartment area. In each story, the ~~building~~ fire compartment area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable area of each separated occupancy fire compartment shall not exceed one.

~~508.4.3~~ L507.4.3 (Supp) Allowable height. Each separated occupancy shall comply with the height limitations based on the type of construction of the building in accordance with Section 503.1.

Exception: Special provisions permitted by Section 509.

~~508.4.4~~ L507.4.4 (Supp) Separation. Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.

~~508.4.4.1~~ L507.4.4.1 (Supp) Construction. Required separations shall be fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

SECTION ~~509~~ L508
SPECIAL PROVISIONS

~~509.1~~ L508.1 (Supp) General. The provisions in this section shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights and areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in this section for such condition and other applicable requirements of this code. The provisions of Sections 509.2 through 509.8 are to be considered independent and separate from each other.

~~509.2~~ L508.2 (Supp) Horizontal building separation allowance. A building shall be considered as separate and

distinct buildings for the purpose of determining fire compartment area limitations, continuity of fire walls, limitation of number of stories and type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 3-hour fire-resistance rating.
2. The building below the horizontal assembly is no more than one story above grade plane
3. The building below the horizontal assembly is of Type IA construction.
4. Shaft, stairway, ramp and escalator enclosures through the horizontal assembly shall have not less than a 2-hour fire-resistance rating with opening protectives in accordance with Table 715.4.

   Exception: Where the enclosure walls below the horizontal assembly have not less than a 3-hour fire resistance rating with opening protectives in accordance with Table 715.4, the enclosure walls extending above the horizontal assembly shall be permitted to have a 1-hour fire-resistance rating, provided:

   1. The building above the horizontal assembly is not required to be of Type I construction;
   2. The enclosure connects less than four stories; and
   3. The enclosure opening protectives above the horizontal assembly have a minimum 1-hour fire protection rating.

5. The building or buildings above the horizontal assembly shall be permitted to have multiple Group A uses, each with an occupant load of less than 300, or Group B, M, R or S uses.
6. The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any of the following occupancies:

   1. Group S-2 parking garage used for the parking and storage of private motor vehicles;
   2. Multiple Group A, each with an occupant load of less than 300;
   3. Group B;
   4. Group M;
   5. Group R; and
   6. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).

7. The maximum building height in feet shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the grade plane.

~~509.3~~ **L508.3 (Supp) Group S-2 enclosed parking garage with Group S-2 open parking garage above.** A Group S-2 enclosed parking garage with no more than one story above grade plane and located below a Group S-2 open parking garage shall be classified as a separate and distinct building for the purpose of determining the type of construction where the following conditions are met:

1. The allowable area of the building shall be such that the sum of the ratios of the actual area divided by the allowable area for each separate occupancy shall not exceed 1.0.
2. The Group S-2 enclosed parking garage is of Type I or II construction and is at least equal to the fire resistance
   requirements of the Group S-2 open parking garage.
3. The height and the number of tiers of the Group S-2 open parking garage shall be limited as specified in Table 406.3.5.
4. The floor assembly separating the Group S-2 enclosed parking garage and Group S-2 open parking garage shall be protected as required for the floor assembly of the Group S-2 enclosed parking garage. Openings between the Group S-2 enclosed parking garage and Group S-2 open parking garage, except exit openings, shall not be required to be protected.
5. The Group S-2 enclosed parking garage is used exclusively for the parking or storage of private motor vehicles, but shall be permitted to contain an office, waiting room and toilet room having a total area of not more than 1,000 square feet (93 m_2), and mechanical equipment rooms incidental to the operation of the building.

~~509.4~~ **L508.4 Parking beneath Group R.** Where a maximum one-story above grade plane Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of stories to be used in determining the minimum type of

construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a fire-resistance rating not less than the mixed occupancy separation required in Section 508.3.3.

~~509.5~~ **L508.5 (Supp) Group R-1 and R-2 buildings of Type IIIA construction.** The height limitation for buildings of Type IIIA construction in Groups R-1 and R-2 shall be increased to six stories and 75 feet (22 860 mm) where the first-floor construction above the basement has a fire-resistance rating of not less than 3 hours and the floor area is subdivided by 2-hour fire-resistance-rated fire walls into areas of not more than 3,000 square feet (279 m_2).

~~509.6~~ **L508.6 (Supp) Group R-1 and R-2 buildings of Type IIA construction.** The height limitation for buildings of Type IIA construction in Groups R-1 and R-2 shall be increased to nine stories and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the lot and from lot lines, the exits are segregated in an area enclosed by a 2-hour fire-resistance-rated fire wall and the first-floor construction has a fire-resistance rating of not less than $1^1/_2$ hours.

~~509.7~~ **L508.7 Open parking garage beneath Groups A, I, B, M and R.** Open parking garages constructed under Groups A, I, B, M and R shall not exceed the height and area limitations permitted under Section 406.3. The height and fire compartment area of the portion of the building above the open parking garage shall not exceed the limitations in Section 503 for the upper occupancy. The height, in both feet and stories, of the portion of the building above the open parking garage shall be measured from grade plane and shall include both the open parking garage and the portion of the building above the parking garage.

~~509.7.1~~ **L508.7.1 Fire separation.** Fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711 between the parking occupancy and the upper occupancy shall correspond to the required fire-resistance rating prescribed in Table 508.3.3 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. Means of egress for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by fire barriers having at least a 2-hour fire-resistance rating as required by Section 706 with self-closing doors complying with Section 715 or horizontal assemblies having at least a 2-hour fire-resistance rating as required by Section 711, with self-closing doors complying with Section 715. Means of egress from the open parking garage shall comply with Section 406.3.

~~509.8~~ **L508.8 (Supp) Group B or M with Group S-2 open parking garage below**. Group B or M occupancies located no higher than the first story above grade plane shall be considered as a separate and distinct building for the purpose of determining the type of construction where all of the following conditions are met:

SECTION L509
SPRINKLER REQUIREMENTS

L509.1 General. When this appendix is adopted replace the sprinkler requirements for Group E, F-1, M, S-1 Occupancies and repair garages with the following requirements.

903.2.2 (Supp) Group E. An automatic sprinkler system shall be provided for portions of Group E occupancies ~~as follows:~~

~~1. Throughout all Group E fire areas greater than 20,000 square feet (1858 m_2) in area.~~
~~2. Throughout every portion of educational buildings~~ located below the lowest level of exit discharge that serves that portion of the building.

Exception: An automatic sprinkler system is not required in any fire area or area below the level of exit discharge where every classroom throughout the building has at least one exterior exit door at ground level.

[F] 903.2.3 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy ~~where one of the following conditions exists:~~

~~1. Where a Group F-1 fire area exceeds 12,000 square feet (1115 m^2);~~
~~2. Where a Group F-1 fire area is located more than three stories above grade plane; or~~

3. ~~Where the combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2)~~.

[F] 903.2.6 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy ~~where one of the following conditions exists:~~

1. ~~Where a Group M fire area exceeds 12,000 square feet (1115 m^2);~~
2. ~~Where a Group M fire area is located more than three stories above grade plane; or~~
3. ~~Where the combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2)~~.

[F] 903.2.8 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy ~~where one of the following conditions exists:~~

1. ~~A Group S-1 fire area exceeds 12,000 square feet (1115 m^2);~~
2. ~~A Group S-1 fire area is located more than three stories above grade plane; or~~
3. ~~The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2)~~.

[F] (Supp) 903.2.8.1 Repair garages. An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with Section 406~~, as shown:~~

1. ~~Buildings having two or more stories above grade plane, including basements, with a fire area containing a repair garage exceeding 10,000 square feet (929 m^2).~~
2. ~~Buildings no more than one story above grade plane, with a fire area containing a repair garage exceeding 12,000 square feet (1115 m^2).~~
3. ~~Buildings~~ with a repair garage servicing vehicles ~~parked~~ in the basement.

L509.2 Commercial parking garages. Where this appendix is adopted delete Section 903.2.9.1 of this code.

~~**[F] 903.2.9.1 Commercial parking garages.** An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m^2).~~

Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) Code Action Committee met from August 14 – August 16, 2007 to review the draft of the ICC Code Technology Committee Balanced Fire Protection Features Study Group Code Change Proposal for a new Chapter 5 Compartmentation to replace the current Chapter 5 on Heights and Areas in the International Building Code (IBC). This draft was supplied to us by our representative on the Study Group, Rick Thornberry, and was based on the revised draft which was distributed for the Study Group's August 14, 2007 teleconference. It is also our understanding that there have been further revisions which have occurred to that draft, as well as to the supporting statement, which we have not as yet seen. However, we conducted our review with the information we had available in order to develop an understanding of this very new and challenging concept which we support in general.

We developed this alternative code change proposal in the spirit of working with the Study Group to provide additional input which could be considered by the Committee and the ICC membership as they review it and prepare for the hearings and participate in the upcoming hearings to be held in Palm Springs, CA. By no means are we attempting to circumvent the diligent work of the Study Group or to not honor our commitment to continue to work with the Study Group to develop the alternative concept approach to the traditional height and area requirements in Chapter 5. Rather, it is our purpose to provide constructive input in an effort to highlight some of the technical areas where we have concerns about how the details of the concept will be implemented. Naturally, the devil is always in the details. We believe that our draft will help to facilitate even more discussion and understanding of how this compartmentation concept is intended to be implemented to provide an overall balanced fire protection approach to the construction of buildings under the IBC.

We understand that the Study Group basically put the guts of this code change proposal together in a three day meeting held on August 1 – 3, 2007 in Chicago, IL. Obviously, it would be impossible to get it exactly right within that short period of time. But during that meeting our representative contributed to the proposal and voted to support the concept that it represents realizing that there is a great deal of work required to refine it and develop it to a point where it can actually be used a substitute for Chapter 5. We realize there is still a great deal of work to be done and we want the ICC voting membership to understand that this concept is in its very formative stages and will require a lot of thoughtful and detailed input through the code development process before it is perfected to the point where it can deliver what is being promised.

It is in this spirit of cooperation and working toward the common goal of establishing a truly evolutionary concept of compartmentation to replace the traditional heights and area approach that we want to highlight some of the significant revisions we have made to the Study Group's code change proposal draft or which we believe still need to be made to reflect some of our thoughts as to areas that need additional consideration in depth as follows:

Adequate fire department access to the fire compartments.

Footnote a to Table 503.1(2) which establishes when a building and/or fire compartment is not considered to be sprinklered.

The compartment area limits for sprinklered compartments. The table we have provided is based upon a 1500 gpm fire flow rather than the 2000 gpm fire flow used in the Study Group proposal. It should be noted that the numbers for the nonsprinklered condition are also based on a 1500 gpm basic fire flow (not changed in our proposal).

Determination of the maximum building area factor and the recognition that the number of compartments allowed for the sprinklered case should be greater than for the nonsprinklered case.

Clarification of the maximum allowable building area and the establishment of an absolute maximum allowable building area regardless of

the number of compartments allowed within a building.

Clarification of what a fire compartment consists of.

Fire-resistance ratings for compartment separations especially for the sprinklered building case.

A requirement for the supporting construction of fire-resistance rated compartment enclosures providing the same degree of fire-resistance as the compartment enclosure.

Protection of openings in fire compartment barriers.

The application of smoke management methods for adjacent fire compartments that intercommunicate with each other and when the requirement for smoke management should be triggered.

The need for a definition for fire compartment barrier.

The rounding off to the nearest 1000 of the fire compartment areas in the tables.

Reformatting of the tables so that they look more like the current Table 503 which will provide for ease of transition.

Termination of vertical fire compartment barriers that intersect the roof and pass through the roof with a parapet with certain exceptions allowed.

Clarification of what is a building versus what is a compartment when there are multiple compartments within a building.

Automatic sprinkler system thresholds and application of various sprinkler trade-offs.

The revisions proposed to Chapter 9 are necessary for the proper application of Chapter 5 in the proposed new Appendix L. One of the basic concepts behind Chapter 5 in Appendix L is that it establishes, in essence, threshold fire compartment areas for providing automatic sprinkler protection. In other words, if a building designer intends to utilize fire compartments having areas greater than those allowed by Table 503.1(2), then it becomes necessary to install an automatic sprinkler system. So the areas in Table 503.1(2), in essence, replace the areas specified in the subsections of Section 903.2 proposed to be deleted. It should also be noted that the other thresholds for requiring sprinklers in the subsections of Section 903.2 remain unchanged. That is because they are based on factors other than area such as height, occupant load, life safety, or high hazard

In conclusion, we only wish that we had had more time ourselves to review the Study Group's draft and provide more suggested revisions and improvements before the code change submittal deadline. Our one last suggestion is that this new approach be developed as an Appendix Chapter so that it can gain some use as an alternate method after it has been drafted to a point where everyone feels comfortable that it will provide the necessary level of fire and life safety we intend. Then, eventually, it can be substituted for the current Chapter 5 Height and Area approach. This will allow for an orderly transition and also allow code enforcement officials, as well as designers, to become more familiar with the concept and how it is applied before it actually becomes a part of the body of the IBC.

We look forward to the upcoming code hearings in Palm Springs and the opportunity to further review, refine, and comment on the Study Group's code change proposal, as well as ours, in a spirit of cooperation and constructive criticism to arrive at the final destination we all seek.

Cost Impact: This new approach to regulation of building height and area will not increase the cost of overall construction

Public Hearing:	Committee:	AS	AM	D	
		Assembly:	ASF	AMF	DF

F298–07/08

Appendix B105.3 (New)

Proponents: Dave Collins, AIA, The Preview Group, representing AIA Codes Committee; Kate Dargan, State of California, representing California State Fire Marshal

Add new text as follows:

B105.3 Fire and Life Safety Inspection Program: In jurisdictions where there is an effective fire and life safety inspection program, the 1750 gpm (5678 L/min) fire flow values shall be allowed to be used to determine fire compartment area. For the purposes of applying the fire flow values, an effective fire and life safety inspection program shall be determined by either:

1. As documented and approved by the local governing body, or
2. As accredited by a nationally recognized fire or insurance standards setting organization

Reason: Any system, such as a code, that hopes to achieve better life safety conditions for building occupants or safety personnel that may become involved in an event depends heavily on the ability of the system to work effectively. Many standards included within the ICC Codes expect that maintenance and testing will be performed and that general inspections on a periodic basis will ascertain whether fundamental aspects of the life safety system are functioning as expected.

This code change will affect the application of the limits in Appendix B where the current limits of fire flow dictate the type of construction that is permitted in a building. The base numbers for a typical fire department response is 1,500, which will limit a building of Type VB construction to a maximum area of 3,600 sf. If there is an effective program for inspection as determined by the jurisdiction, then the number for the fire flow is increased to 1,750 cfm and will allow the same building to be increased to a maximum of 4,800 sf. The affect is across the board with all types of construction.

Communities rarely focus on the ongoing inspection and maintenance of the fire safety systems that they dictate. Why this is true is most often based of financial priorities requiring moneys to be funneled off to other efforts that are seen as essential. This code change would establish a reason for a community to reconsider such a move and perhaps concentrate on providing better services to help encourage development and ongoing higher levels of safety.

Although not directly tied to the code change submitted by this Study Group on the height and areas of buildings, this concept could also be applicable to the development of the allowable compartment areas in the future.

We are all familiar with the fact that many buildings are allowed to deteriorate and loose much of the fundamental qualities that we assume

exist when they are initially built. If the code does not forcefully recognize a means to bolster the maintenance and inspection of these buildings, who will take those aspects of building design and construction seriously in the field and in our communities?

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee:	AS	AM	D	
	Assembly:	ASF	AMF	DF