

**Ad Hoc Committee – Tall Wood Buildings  
Codes and Standards Work Group  
Draft Code Change Proposal  
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**Developed:** 3/3/17

**Revised:** 4/25/17; 5/22/17; 6/21/17; 7/7/17; 7/18/17; 8/9/17; 9/29/17; 10/9/17

**File name:** TABLE 506.2

The following is a draft code change proposal that has been developed by the Codes and Standards Work Group (WG) of the Ad Hoc Committee on Tall Wood Buildings (TWB). This draft proposal has been reviewed by the TWB Committee and is posted for information and comments. Please direct comments to the Chair of the WG: Carl Baldassarra ([cbaldassarra@wje.com](mailto:cbaldassarra@wje.com)). **This is a draft only and is subject to change prior to submittal to cdpACCESS by the January 8, 2018 deadline.**

Table 506.2  
ALLOWABLE AREA Factor ( $A_t=NS, S1, SM$ ) in SQUARE FEET

Use Group	NS - non sprklrd S1 -1 story sprklrd SM - >1 story sprklrd	Type I-A	Type I-B	Type II-A	Type II-B	Type IV-A	Type IV-B	Type IV-C	Type IV-HT	Type V- A	Type V- B
A-1	NS	UL	UL	15,500	8,500	<u>45,000</u>	<u>30,000</u>	<u>18,750</u>	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	<u>180,000</u>	<u>120,000</u>	<u>75,000</u>	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	<u>135,000</u>	<u>90,000</u>	<u>56,250</u>	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	<u>45,000</u>	<u>30,000</u>	<u>18,750</u>	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	<u>180,000</u>	<u>120,000</u>	<u>75,000</u>	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	<u>135,000</u>	<u>90,000</u>	<u>56,250</u>	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	<u>45,000</u>	<u>30,000</u>	<u>18,750</u>	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	<u>180,000</u>	<u>120,000</u>	<u>75,000</u>	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	<u>135,000</u>	<u>90,000</u>	<u>56,250</u>	45,000	34,500	18,000
A-4	NS	UL	UL	15,500	9,500	<u>45,000</u>	<u>30,000</u>	<u>18,750</u>	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	<u>180,000</u>	<u>120,000</u>	<u>75,000</u>	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	<u>135,000</u>	<u>90,000</u>	<u>56,250</u>	45,000	34,500	18,000
A-5	NS	UL	UL	UL	UL	<u>UL</u>	<u>UL</u>	<u>UL</u>	UL	UL	UL
	S1										
	SM										
B	NS	UL	UL	37,500	23,000	<u>108,000</u>	<u>72,000</u>	<u>45,000</u>	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	<u>432,000</u>	<u>288,000</u>	<u>180,000</u>	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	<u>324,000</u>	<u>216,000</u>	<u>135,000</u>	108,000	54,000	27,000
	NS	UL	UL	26,500	14,500	<u>76,500</u>	<u>51,000</u>	<u>31,875</u>	25,500	18,500	9,500

Use Group	NS - non sprklrd S1 -1 story sprnklrd SM - >1 story sprklrd	Type I-A	Type I-B	Type II-A	Type II-B	Type IV-A	Type IV-B	Type IV-C	Type IV-HT	Type V- A	Type V- B
E	S1	UL	UL	106,000	58,000	<u>306,000</u>	<u>204,000</u>	<u>127,500</u>	102,000	74,000	38,000
	SM	UL	UL	79,500	43,500	<u>229,500</u>	<u>153,000</u>	<u>95,625</u>	76,500	55,500	28,500
F-1	NS	UL	UL	25,000	15,500	<u>100,500</u>	<u>67,000</u>	<u>41,875</u>	33,500	14,000	8,500
	S1	UL	UL	100,000	62,000	<u>402,000</u>	<u>268,000</u>	<u>167,500</u>	134,000	56,000	34,000
	SM	UL	UL	75,000	46,500	<u>301,500</u>	<u>201,000</u>	<u>125,625</u>	100,500	42,000	25,500
F-2	NS	UL	UL	37,500	23,000	<u>151,500</u>	<u>101,000</u>	<u>63,125</u>	50,500	21,000	13,000
	S1	UL	UL	150,000	92,000	<u>606,000</u>	<u>404,000</u>	<u>252,500</u>	202,000	84,000	52,000
	SM	UL	UL	112,500	69,000	<u>454,500</u>	<u>303,000</u>	<u>189,375</u>	151,500	63,000	39,000
H-1	NS <sup>C</sup>	21,000	16,500	11,000	7,000	<u>10,500</u>	<u>10,500</u>	<u>10,500</u>	10,500	7,500	NP
	S1										
H-2	NS <sup>C</sup>	21,000	16,500	11,000	7,000	<u>10,500</u>	<u>10,500</u>	<u>10,500</u>	10,500	7,500	3,000
	S1										
	SM										
H-3	NS <sup>C</sup>	UL	60,000	26,500	14,000	<u>25,500</u>	<u>25,500</u>	<u>25,500</u>	25,500	10,000	5,000
	S1										
	SM										
H-4	NS	UL	UL	37,500	17,500	<u>72,000</u>	<u>54,000</u>	<u>40,500</u>	36,000	18,000	6,500
	S1	UL	UL	150,000	70,000	<u>288,000</u>	<u>216,000</u>	<u>162,000</u>	144,000	72,000	26,000
	SM	UL	UL	112,500	52,500	<u>216,000</u>	<u>162,000</u>	<u>121,500</u>	108,000	54,000	19,500
H-5	NS	UL	UL	37,500	23,000	<u>72,000</u>	<u>54,000</u>	<u>40,500</u>	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	<u>288,000</u>	<u>216,000</u>	<u>162,000</u>	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	<u>216,000</u>	<u>162,000</u>	<u>121,500</u>	108,000	54,000	27,000
I-1	NS	UL	55,000	19,000	10,000	<u>54,000</u>	<u>36,000</u>	<u>18,000</u>	18,000	10,500	4,500
	S1	UL	220,000	76,000	40,000	<u>216,000</u>	<u>144,000</u>	<u>72,000</u>	72,000	42,000	18,000
	SM	UL	165,000	57,000	30,000	<u>162,000</u>	<u>108,000</u>	<u>54,000</u>	54,000	31,500	13,500
I-2	NS	UL	UL	15,000	11,000	<u>36,000</u>	<u>24,000</u>	<u>12,000</u>	12,000	9,500	NP
	S1	UL	UL	60,000	44,000	<u>144,000</u>	<u>96,000</u>	<u>48,000</u>	48,000	38,000	NP
	SM	UL	UL	45,000	33,000	<u>108,000</u>	<u>72,000</u>	<u>36,000</u>	36,000	28,500	NP
I-3	NS	UL	UL	15,000	10,000	<u>36,000</u>	<u>24,000</u>	<u>12,000</u>	12,000	7,500	5,000
	S1	UL	UL	45,000	40,000	<u>144,000</u>	<u>96,000</u>	<u>48,000</u>	48,000	30,000	20,000
	SM	UL	UL	45,000	30,000	<u>108,000</u>	<u>72,000</u>	<u>36,000</u>	36,000	22,500	15,000
I-4	NS	UL	60,500	26,500	13,000	<u>76,500</u>	<u>51,000</u>	<u>25,500</u>	25,500	18,500	9,000
	S1	UL	121,000	106,000	52,000	<u>306,000</u>	<u>204,000</u>	<u>102,000</u>	102,000	74,000	36,000
	SM	UL	181,500	79,500	39,000	<u>229,500</u>	<u>153,000</u>	<u>76,500</u>	76,500	55,500	27,000
M	NS	UL	UL	21,500	12,500	<u>61,500</u>	<u>41,000</u>	<u>25,625</u>	20,500	14,000	9,000
	S1	UL	UL	86,000	50,000	<u>246,000</u>	<u>164,000</u>	<u>102,500</u>	82,000	56,000	36,000
	SM	UL	UL	64,500	37,500	<u>184,500</u>	<u>123,000</u>	<u>76,875</u>	61,500	42,000	27,000
R-1	NS	UL	UL	24,000	16,000	<u>61,500</u>	<u>41,000</u>	<u>25,625</u>	20,500	12,000	7,000
	S13R										
	S1										
		UL	UL	96,000	64,000	<u>246,000</u>	<u>164,000</u>	<u>102,500</u>	82,000	48,000	28,000

Use Group	NS - non sprklrd S1 -1 story sprnlkrd SM - >1 story sprklrd	Type I-A	Type I-B	Type II-A	Type II-B	Type IV-A	Type IV-B	Type IV-C	Type IV-HT	Type V- A	Type V- B
	SM	UL	UL	72,000	48,000	<u>184,500</u>	<u>123,000</u>	<u>76,875</u>	61,500	36,000	21,000
R-2	NS	UL	UL	24,000	16,000	<u>61,500</u>	<u>41,000</u>	<u>25,625</u>	20,500	12,000	7,000
	S13R										
	S1										
	SM										
R-3	NS	UL	UL	UL	UL	<u>UL</u>	<u>UL</u>	<u>UL</u>	UL	UL	UL
	S13D										
	S13R										
	S1										
	SM										
R-4	NS	UL	UL	24,000	16,000	<u>61,500</u>	<u>41,000</u>	<u>25,625</u>	20,500	12,000	7,000
	S13D										
	S13R										
	S1										
	SM										
S-1	NS	UL	48,000	26,000	17,500	<u>76,500</u>	<u>51,000</u>	<u>31,875</u>	25,500	14,000	9,000
	S1	UL	192,000	104,000	70,000	<u>306,000</u>	<u>204,000</u>	<u>127,500</u>	102,000	56,000	36,000
	SM	UL	144,000	78,000	52,500	<u>229,500</u>	<u>153,000</u>	<u>95,625</u>	76,500	42,000	27,000
S-2	NS	UL	79,000	39,000	26,000	<u>115,500</u>	<u>77,000</u>	<u>48,125</u>	38,500	21,000	13,500
	S1	UL	316,000	156,000	104,000	<u>462,000</u>	<u>308,000</u>	<u>192,500</u>	154,000	84,000	54,000
	SM	UL	237,000	117,000	78,000	<u>346,500</u>	<u>231,000</u>	<u>144,375</u>	115,500	63,000	40,500
U	NS <sup>i</sup>	UL	35,500	19,000	8,500	<u>54,000</u>	<u>36,000</u>	<u>22,500</u>	18,000	9,000	5,500
	S1	UL	142,000	76,000	34,000	<u>216,000</u>	<u>144,000</u>	<u>90,000</u>	72,000	36,000	22,000
	SM	UL	106,500	57,000	25,500	<u>162,000</u>	<u>108,000</u>	<u>67,500</u>	54,000	27,000	16,500

- a. See Chapters 4 and 5 for specific exceptions to the allowable height in this
- b. See Section 903.2 for the minimum thresholds for protection by an automatic
- c. New Group H occupancies are required to be protected by an automatic sprinkler
- d. The NS value is only for use in evaluation of existing building area in accordance with the International e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in
- f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the International Fire Code. g. New Group I-4 occupancies see Exceptions 2 and 3 of Section 903.2.6.
- h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
- i. The maximum allowable area for a single-story nonsprinklered Group U greenhouse is permitted to be 9,000 square feet, or the allowable area shall be permitted to comply with Table C102.1 of Appendix C

## **REASON**

The Tall Wood Building Ad Hoc Committee (TWB) has created several code change proposals with respect to the concept of tall buildings of mass timber and the background information is at the end of this Statement. Within the statement are important links to information, including documents and videos, used in the deliberations which resulted in these proposals.

In addressing this topic, it was necessary to develop height and area criteria to address each new type of construction being proposed. Relying upon each new type of construction proposed for tall wood buildings (IV-A, IV-B and IV-C), the committee examined each type of construction for its safety and efficacy with regard to each occupancy type. This proposal on allowable areas should be considered as a companion proposal to the height proposals (height in feet and height in stories). The three proposals were developed with regard to one another as well as with regard to the new types of construction.

The TWB decided that fire testing specific to this project would be necessary. TWB discussed the nature and intention of fire testing so as to ensure meaningful results for the TWB. They subsequently developed a test plan. The Fire WG then finalized a work plan, which included a series of five full scale, two story building fire tests at the Alcohol, Tobacco, Firearms, and Explosives (ATF) laboratories in Beltsville, MD. The results of those tests, as well as testing conducted by others, including NFPA Fire Protection Research Foundation, form the basis for the Codes and Standards WG developed this code change proposal.

Each proposed new Type of Construction was examined for its fire safety characteristics and then compared to the existing, long standing type of construction known as Heavy Timber (HT). The committee found that it was reasonable to develop a multiplier which could be applied to the traditional HT areas. This was done for each new Type of Construction. Thus, the proposed new Type IV-C was 1.25 times the HT allowable area, IV-B was 2.00 times the HT allowable area and IV-A was 3.00 times the HT allowable area.

These multipliers were examined in terms of relative performance compared to traditional HT. They were reexamined on a case-by-case basis based upon relative hazard and occupancy classification. Some hazards were perceived to be great and thus areas were adjusted downwardly to reflect the hazard. Other situations were similarly considered. For example, Hazardous and Institutional occupancies do not fully follow the multiplier method, as most areas for those occupancies are significantly reduced from what the multiplier method would suggest.

Also, the committee reconsidered this proposal with respect to the companion height proposal. This review was to be sure that allowable areas were commensurate with the risk posed by an occupancy being allowed at some height above grade plane or on some particular story.

Cost impact: None, this section provides information that was not previously set forth in the code, and does not change the requirements of current code, thus no cost impact is derived.