



&

ORB University Presents:

IBC Chapter 5, Section 508
Mixed-Use & Occupancy

Presented by: Kevin Kiley

Lesson Plan

What is Mixed-Use?

What are Accessory, Non-Separated & Separated occupancies?

Requirements of each type.

Advantages and limitations of each type.

Other optional code sections.

Multifamily project examples.

Chapter 5, Revit Area Charts.

What is a Mixed-Use Occupancy?

A mixed-use occupancy is simply a building that has multiple occupancies within it.

An example of a common mixed-use building is a multifamily residential complex where the primary occupancy & use is Residential Group R-2 with other occupancies such as;

Assembly Group A: Lobbies, Pool areas, Lounges & Restaurants.

Business Group B: Offices, Mail rooms & Public toilets.

Mercantile Group M: Retail spaces.

Storage Group S: Bike storage, Mechanical, Electrical & IT rooms.

(Most buildings have more than a single occupancy within them).

Mixed-Use Buildings

Buildings that contain more than one occupancy are required to abide by the requirements of IBC section 508, where three design options are provided.

Accessory occupancies: IBC Section 508.2.

Non-separated occupancies: IBC Section 508.3.

Separated occupancies: IBC Section 508.4.

IBC Section 508 allows for the use of any one of the above design approaches or, a combination of all three.

(It should be noted that the requirements of IBC Section 508 for Mixed-Use & Occupancies are only to determine a buildings Height, Area, Number of Stories & Construction type based on the occupancies within it).

What is an Accessory occupancy?

IBC Section 508.2: Accessory Occupancies.

Buildings often have rooms or spaces with an occupancy classification that is different from, but Accessory to, the principal occupancy classification of the building. Where such accessory areas are limited in size, they will not ordinarily represent a significantly different life safety hazard. The accessory occupancy must be ancillary to the principal purpose for which the structure is occupied. A few examples of Accessory occupancies within a multifamily building are;

Storage rooms.

Lounges.

Fitness rooms.

Offices.

What are the Requirements of an Accessory occupancy?

IBC Section 508.2.2: Allowable Building Height

The allowable height and number of stories of the building containing accessory occupancies shall be in accordance with Section 504 for the main occupancy of the building.

Example: A multifamily residential building would use Group R-2 to determine the buildings Height & Number of Stories.

What are the Requirements of an Accessory occupancy?

IBC Section 508.2.3: Allowable Building Area.

The aggregate area within a story devoted to the accessory occupancies must not be greater than 10-percent of the area of that story.

The area of the building containing an accessory occupancy is limited in size based on the area of the main occupancy. The code imposes those limits on the assumption that with limited size, the accessory occupancies pose a limited increase in the degree of hazard over the primary occupancy.

Example: A Group R-2 multifamily building has a ground floor level area of 20,000 square feet. The aggregate area of all Accessory spaces on that floor level cannot exceed 2,000 square feet. Each floor level is calculated separately.

What are the Requirements of an Accessory occupancy?

IBC Section 508.2.3: Allowable Building Area.

In addition, Accessory occupancies cannot exceed their allowable non-sprinklered (NS) tabular area, based on the type of construction.

Example: A Group R-2 Multifamily building is designed using Type IIA construction. A Group A-3 accessory occupancy for Type IIA construction based on NS allows for a maximum of 15,500 square feet.

(This limitation is typically not a factor in multifamily buildings).

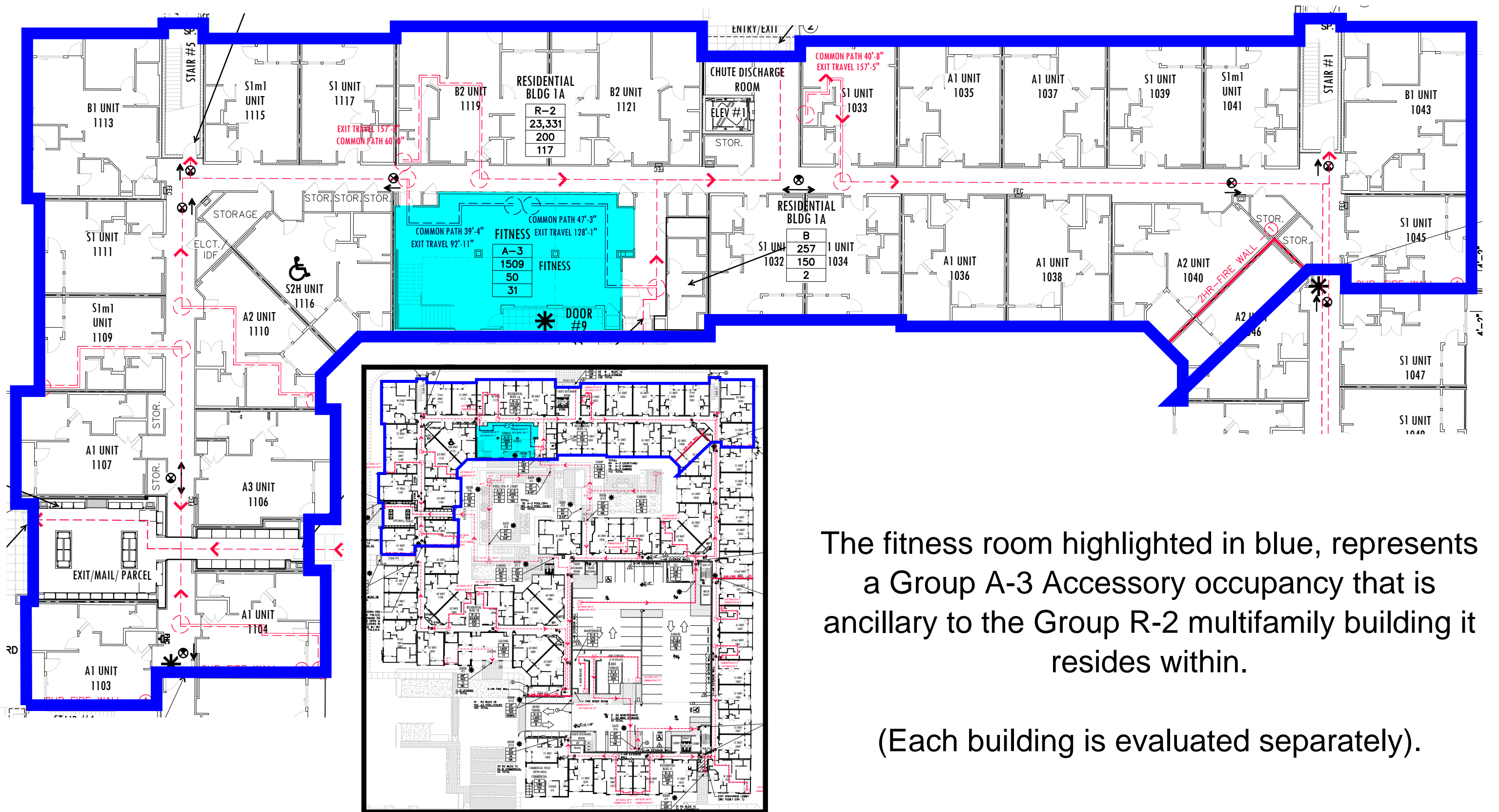
What are the Requirements of an Accessory occupancy?

IBC Section 508.2.4: Separation of Occupancies.

Accessory occupancies are not required to be separated from the main occupancy via an occupancy separation per IBC Table 508.4.

(Separations may be required by other applicable codes such as accessory spaces adjacent to a dwelling unit and incidental use spaces.).

Example of an Accessory occupancy at Aura Apache



The fitness room highlighted in blue, represents a Group A-3 Accessory occupancy that is ancillary to the Group R-2 multifamily building it resides within.

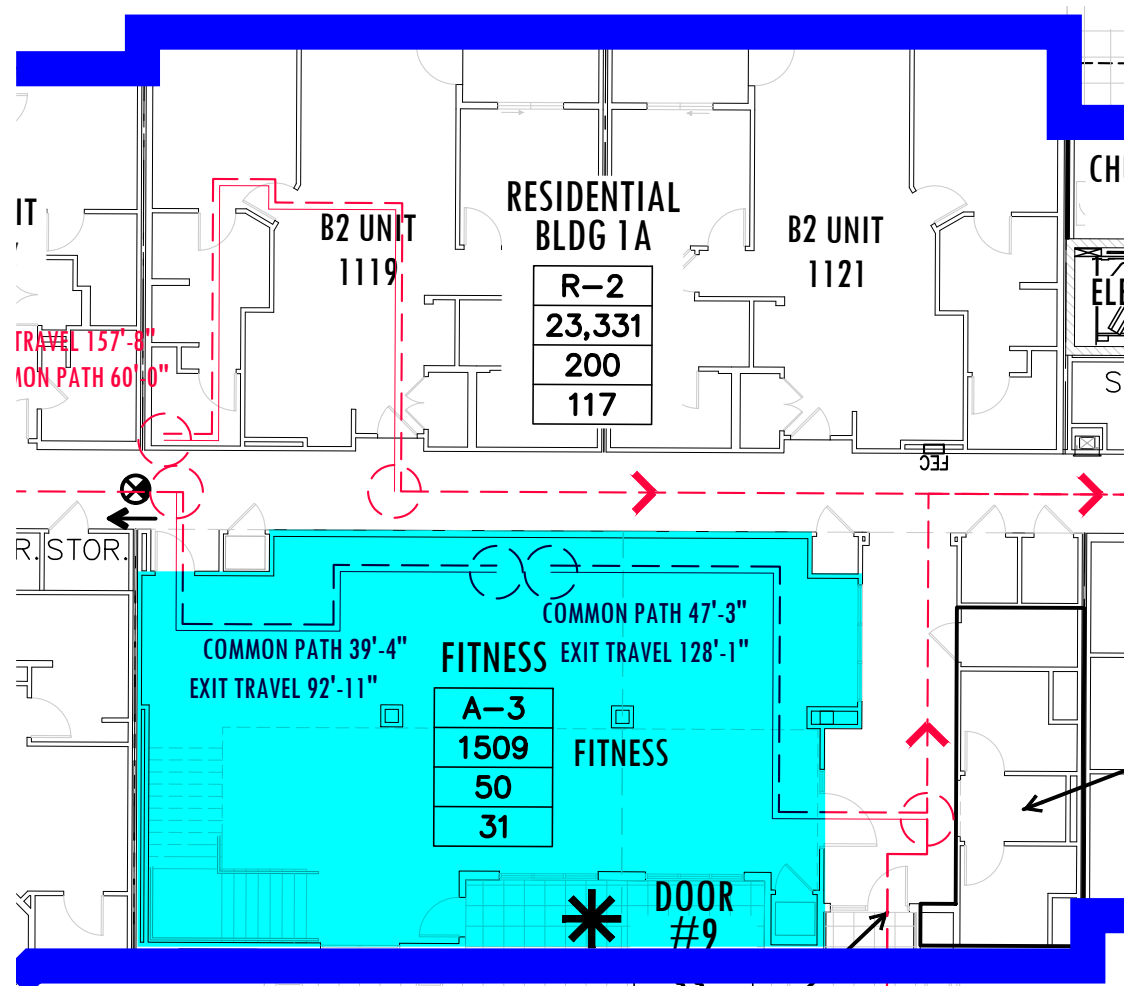
(Each building is evaluated separately).

Aura Apache building 1, level 1 footprint.

Example of an Accessory occupancy at Aura Apache

BUILDING 1 AREA ANALYSIS

BUILDING	LEVEL	CONST. TYPE (SECT. 602)	SPRINKLER SYSTEM	OCCUPANCY	ALLOWABLE HEIGHT (TABLE 504.3)	ACTUAL HEIGHT (202)	ALLOWABLE No. OF STORIES (504.4)	ACTUAL No. OF STORIES	ALLOWABLE AREA (SF) /STORY (506.2)	PROVIDED AREA (SF)	RATIO ACTUAL/ALLOWED (508.4.2)	RATIO TOTAL/STORY	
1A (Mixed Use, Non-Separated per IBC 508.3)	L1	V-A	NFPA 13	A-3	ACCESSORY TO R-2 PER IBC 508.2 (= 5.6% OF TOTAL FLOOR AREA; <11,500 SF TABLE 506.2)							1,509	N/A
				R-2	70	66'-3"	4	4	36,000	23,331			
				B	NON-SEPARATED PER IBC 508.3							1,193	
	TOTAL LEVEL 1									26,033			
	L2	V-A	NFPA 13	A-3	ACCESSORY TO R-2 PER IBC 508.2 (= 5.4% OF TOTAL FLOOR AREA; <11,500 SF TABLE 506.2)							1,375	N/A
				R-2	70	66'-3"	4	4	36,000	23,977			
	TOTAL LEVEL 2									25,352			
	L3	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	26,200	N/A		
	TOTAL LEVEL 3									26,200			
	L4	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	26,200	N/A		
TOTAL LEVEL 4									26,200				
TOTAL BUILDING 1A									103,785				



Building 1A has a floor area of 26,033 square feet, which allows for a maximum of 2,603 square feet to be used as Accessory spaces, per IBC 508.2.3.

The fitness room has an area of 1,509 square feet, which represents 5.8% of the 1st floor area, and is the only accessory space within this floor level.

The fitness room is not required to be separated from other spaces via occupancy separations.

Accessory Code Options

I have too many accessory spaces that exceed the 10% limitation of IBC section 508.2.3. Are there any other code options that I can use without separating the spaces?

IBC Sections 303.1.2 & 311.1.1 are two options that can be used for Group A, Assembly & Group S, Storage spaces, in addition to the Accessory use per IBC Section 508.2.

(Both code sections can be used in the same building and the use of these two code sections does not add to the 10% aggregate area limitation of IBC Section 508.2).

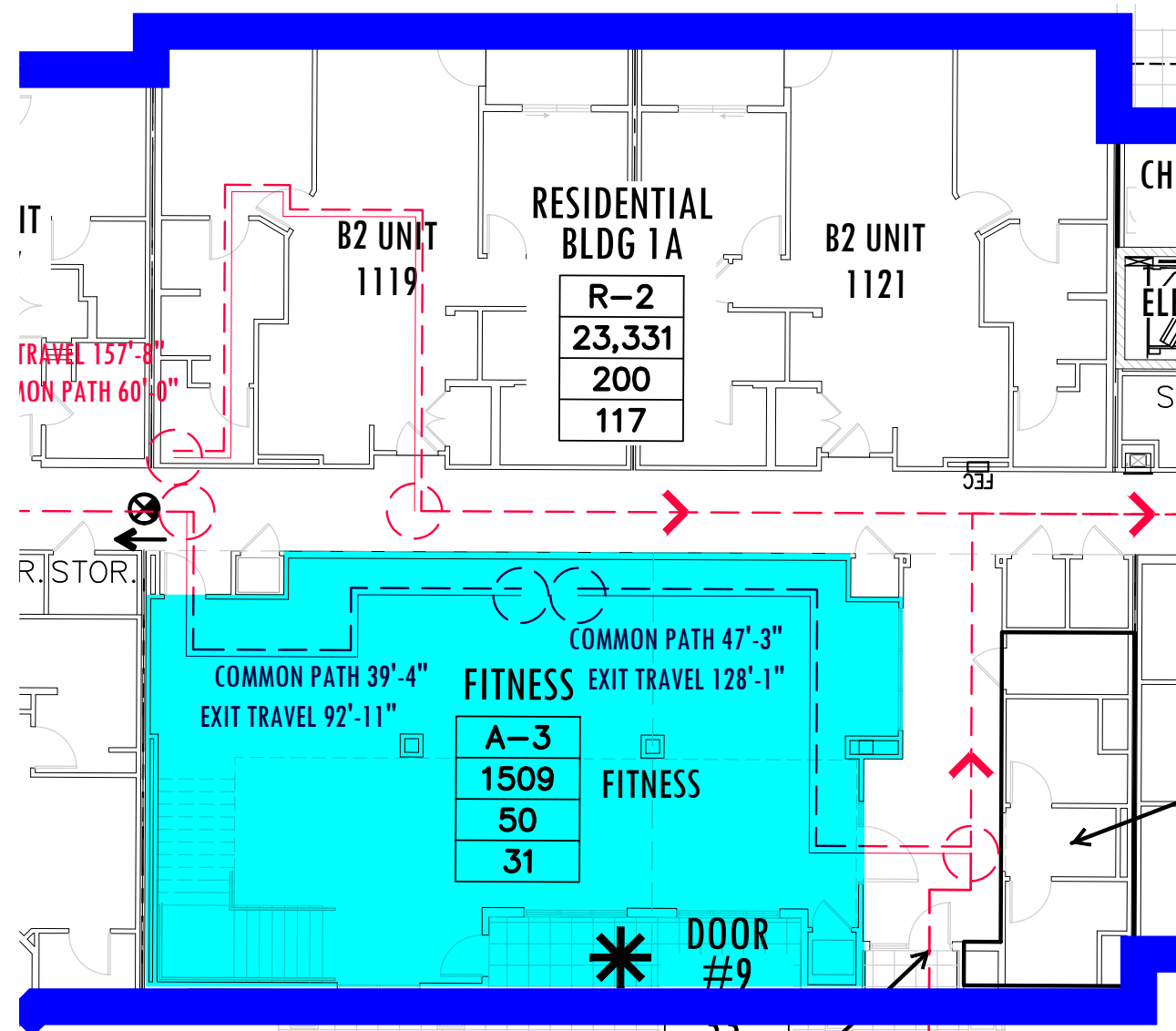
Accessory Code Options

IBC Section 303.1.2: Small Assembly Spaces.

1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

(If you are going to use this code option, you are required to identify this within your code sheets and/or area tables).

Example of Small Assembly Spaces at Aura Apache



The Group A-3 fitness room within building 1A could have used the small assembly space option per IBC Section 303.1.2, Item 1, as the occupant load of the space is less than 50.

Using this option in this building design achieves the same outcome however, if the building had more assembly spaces that would have exceeded the 10% aggregate area limitation of IBC Section 508.2.3, this fitness room could use the "small assembly space" provisions, be classified as either Groups B or R-2 and would not be part of the 10% aggregate area limitation.

(FYI: The maximum area of an exercise room is 2,450 SF.
 $2,450 \text{ SF} / \text{OLF of } 50 = 49 \text{ occupants}$).

Accessory Code Options

IBC Section 311.1.1: Accessory Storage Spaces.

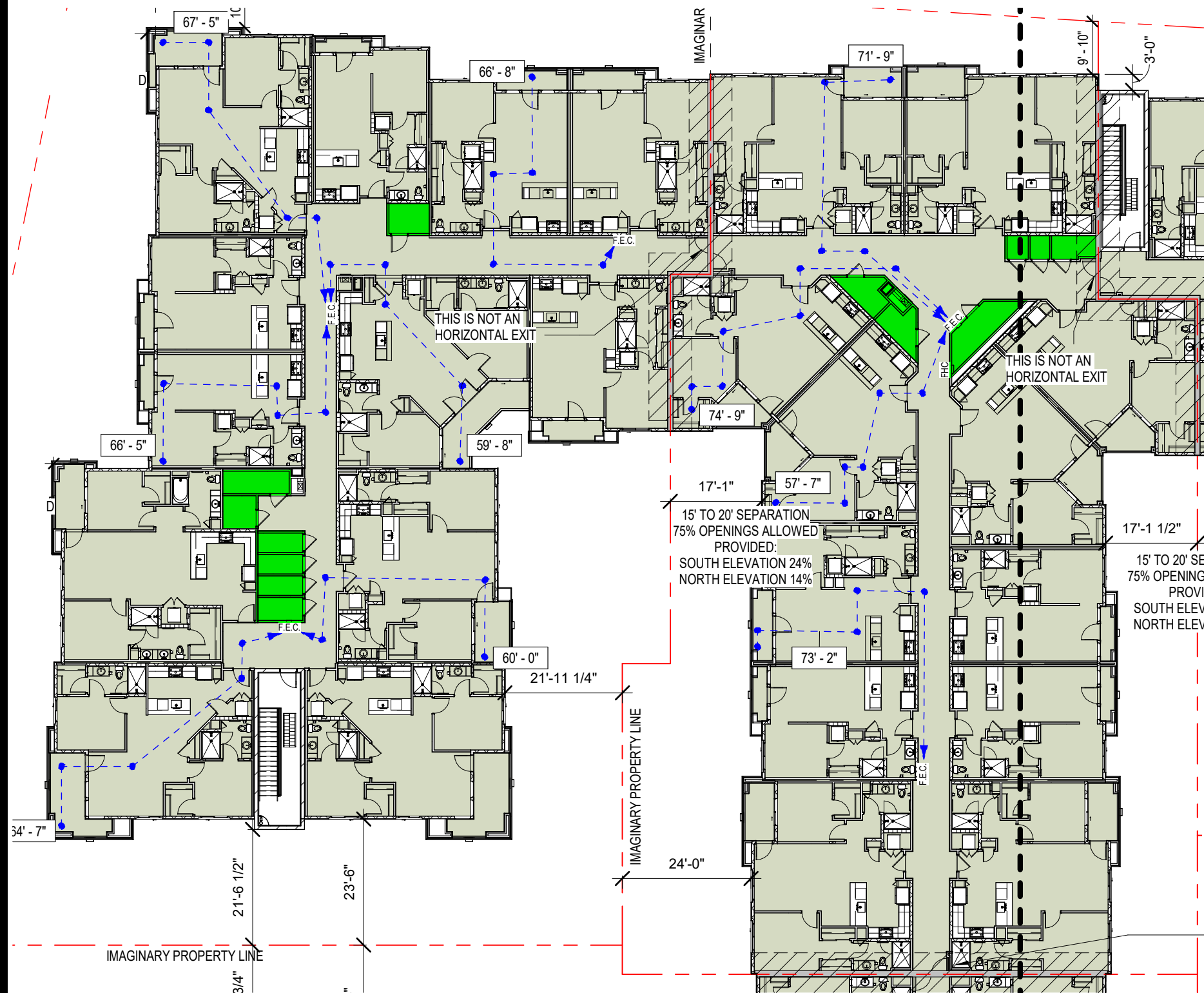
A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.

This provision allows accessory storage areas to be classified in the same occupancy group as the primary occupancy of a space. There are no longer limits on the size of such spaces, nor how much of the floor area such accessory storage can occupy.

This is a permanent occupancy change.

(If you are going to use this code option, you are required to identify this within your code sheets and/or area tables).

Example of Accessory Storage Spaces at Broadstone



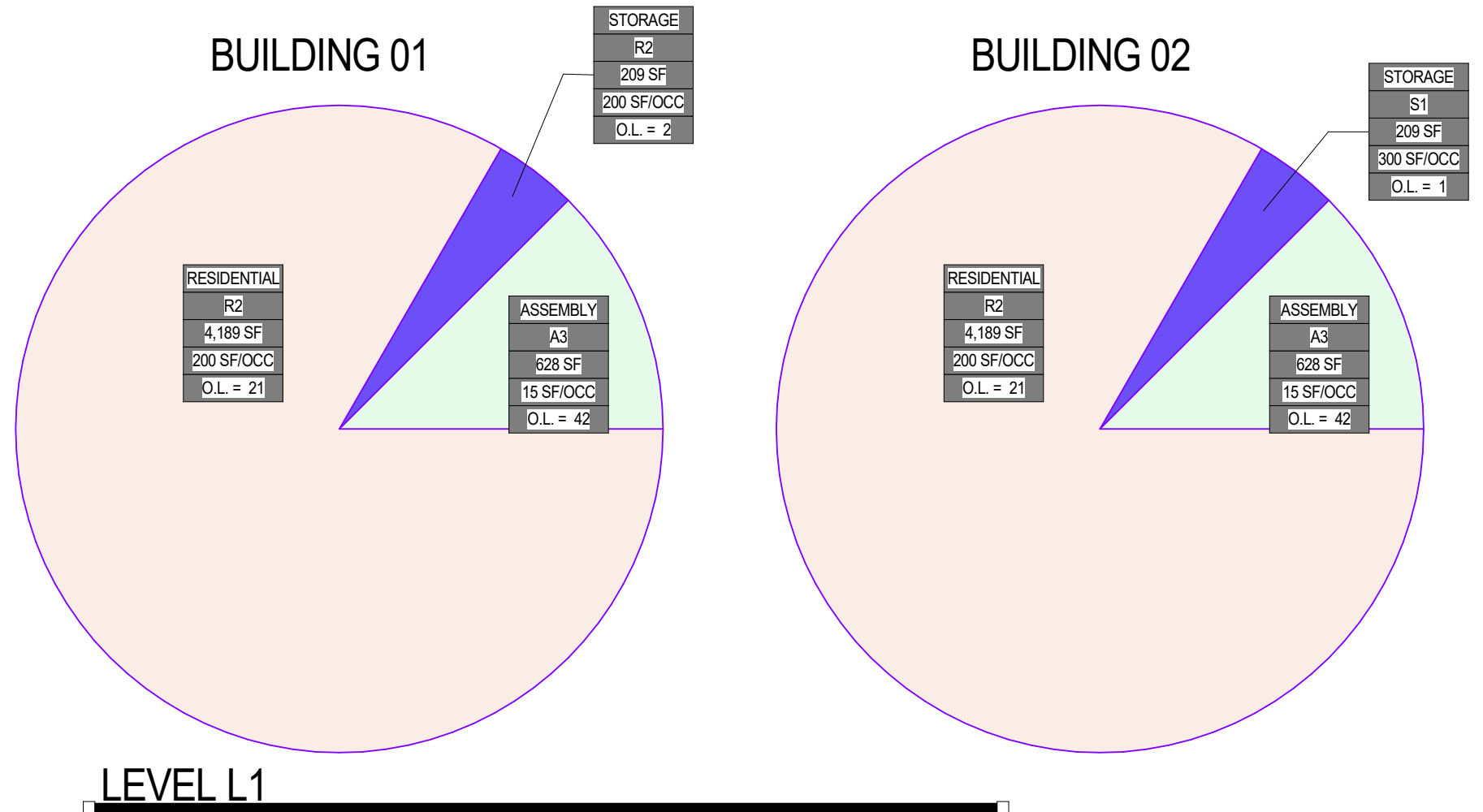
The green highlighted storage rooms within this Group R-2 multifamily building can be classified as "Accessory Storage Spaces" & utilize the provisions of IBC Section 311.1.1.

Since they are accessory to Group R-2, they are to be classified as Group R-2.

These accessory storage spaces do not contribute to the 10% aggregate area limitations of IBC Section 508.2.3, do not have a size limitation nor are they required to be separated from other occupancies.

Chapter 5 Revit Schedule

Bldg Area Analysis (Chapter 5 - Building Areas) REV								
Level	Construction Type	Occupancy Type	Accessory Use %		Allowable Area	Area	Area Ratio	Accessory Override
BLDG 1								
LEVEL L1	VA	A3			34,500 SF	628 SF	0.018212	No
LEVEL L1	VA	R2			36,000 SF	4,398 SF	0.122173	<varies>
						5,027 SF	0.140385	
LEVEL L2	VA	A3			34,500 SF	419 SF	0.012141	No
LEVEL L2	VA	R2			36,000 SF	4,608 SF	0.127991	
						5,027 SF	0.140132	
LEVEL L3	VA	A3			34,500 SF	419 SF	0.012141	
LEVEL L3	VA	R2			36,000 SF	4,608 SF	0.127991	
						5,027 SF	0.140132	
						15,080 SF	0.42065	
BLDG 2								
LEVEL L1	VA	A3	13%		34,500 SF	628 SF	0.018212	Yes
LEVEL L1	VA	R2			36,000 SF	4,189 SF	0.116355	
LEVEL L1	VA	S1	4%		42,000 SF	209 SF	0.004987	Yes
						5,027 SF	0.139554	
LEVEL L2	VA	A3	8%		34,500 SF	419 SF	0.012141	Yes
LEVEL L2	VA	R2			36,000 SF	4,608 SF	0.127991	
						5,027 SF	0.140132	
LEVEL L3	VA	A3	8%		34,500 SF	419 SF	0.012141	Yes
LEVEL L3	VA	R2			36,000 SF	4,608 SF	0.127991	
						5,027 SF	0.140132	
						15,080 SF	0.419819	



What is a Non-Separated occupancy?

IBC Section 508.3: Non-Separated Occupancies.

Non-Separated occupancies are simply multiple occupancies within the same building that are not required to be separated from each other.

The principle behind Non-Separated occupancies is that different occupancies within the same building do not have to be separated by fire-resistance-rated assemblies if the building complies throughout with the most restrictive code requirements for minimum construction type and fire protection systems (Chapter 9) applicable to the occupancies within the building.

What are the requirements of a Non-Separated occupancy?

IBC Section 508.3.2: Allowable Building Area, Height & Number of Stories.

The allowable building area, height and number of stories 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.

The fundamental concept underlying the Non Separated occupancies option is that the allowable building height, number of stories and building areas are based on the most restrictive requirements of Tables 504.3, 504.4 and 506.2 applicable to each of the occupancy groups in the mixed occupancy building.

What are the requirements of a Non-Separated occupancy?

Example: A sprinklered (S), multistory (SM), residential building of Type VA construction, with occupancy Groups A, B, R-2 & S, Group A-3 would be the most restrictive occupancy, based on the allowable number of stories and tabular area limitations per IBC Tables

504.3, 504.4 and 506.2.

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE^a

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS ^b	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
R ^b	NS ^d	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE^{a, b}

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
R-2 ^b	NS ^d	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4	4	4	4	4	4	3
	S	UL	12	5	5	5	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	2
	S	UL	12	6	4	5	4	5	5	3

TABLE 506.2
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET^{a, b}

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
R-2 ^b	NS ^d	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
S-1	NS	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000
	S1	UL	UL	48,000	26,000	17,500	26,000	17,500	14,000	9,000
	SM	UL	UL	192,000	104,000	70,000	104,000	70,000	102,000	56,000
S-2	NS	UL	UL	144,000	78,000	52,500	78,000	52,500	76,500	42,000
	S1	UL	UL	79,000	39,000	26,000	39,000	26,000	38,500	13,500
	SM	UL	UL	316,000	156,000	104,000	156,000	104,000	154,000	84,000
S-2	NS	UL	UL	237,000	117,000	78,000	117,000	78,000	115,500	63,000
	SM	UL	UL	237,000	117,000	78,000	117,000	78,000	115,500	63,000

What are the requirements of a Non-Separated occupancy?

IBC Section 508.3.3: Separation.

A fire-resistance rated separation is not required between non-separated 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 508.4.
2. Groups I-1, R-1, R-2 and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from other occupancies contiguous to them in accordance with the requirements of Section 420.

Non-Separated Code Options?

A Group A-3 Assembly occupancy is too restrictive for my multifamily residential building. How can I change the most restrictive occupancy?

Utilize the small assembly option per IBC Section 303.1.2.

Reduce the area of the Group A-3 space(s).

Separate the Group A-3 occupancies per IBC Section 508.4.

Consider utilizing A podium per IBC Section 510.

What is a Separated Occupancy?

IBC Section 508.4: Separated Occupancies.

A separated occupancy is simply an occupancy or multiple occupancies that are separated from each other via fire-resistance rated assemblies.

Occupancies that are to be evaluated as separated occupancies must be separated in accordance with Table 508.4. Where the table requires a separation, the occupancies must be separated completely, both horizontally and vertically, by the provision of fire-resistance-rated fire barriers and horizontal assemblies.

It should be noted that where Table 508.4 indicates “N” at the intersection of some occupancies. The “N” indicates that no rated separation is required. This is allowed where the adjacent occupancies pose similar levels of risk. Separations, where provided, do not necessarily create separate fire areas.

What are the requirements of Separated Occupancies?

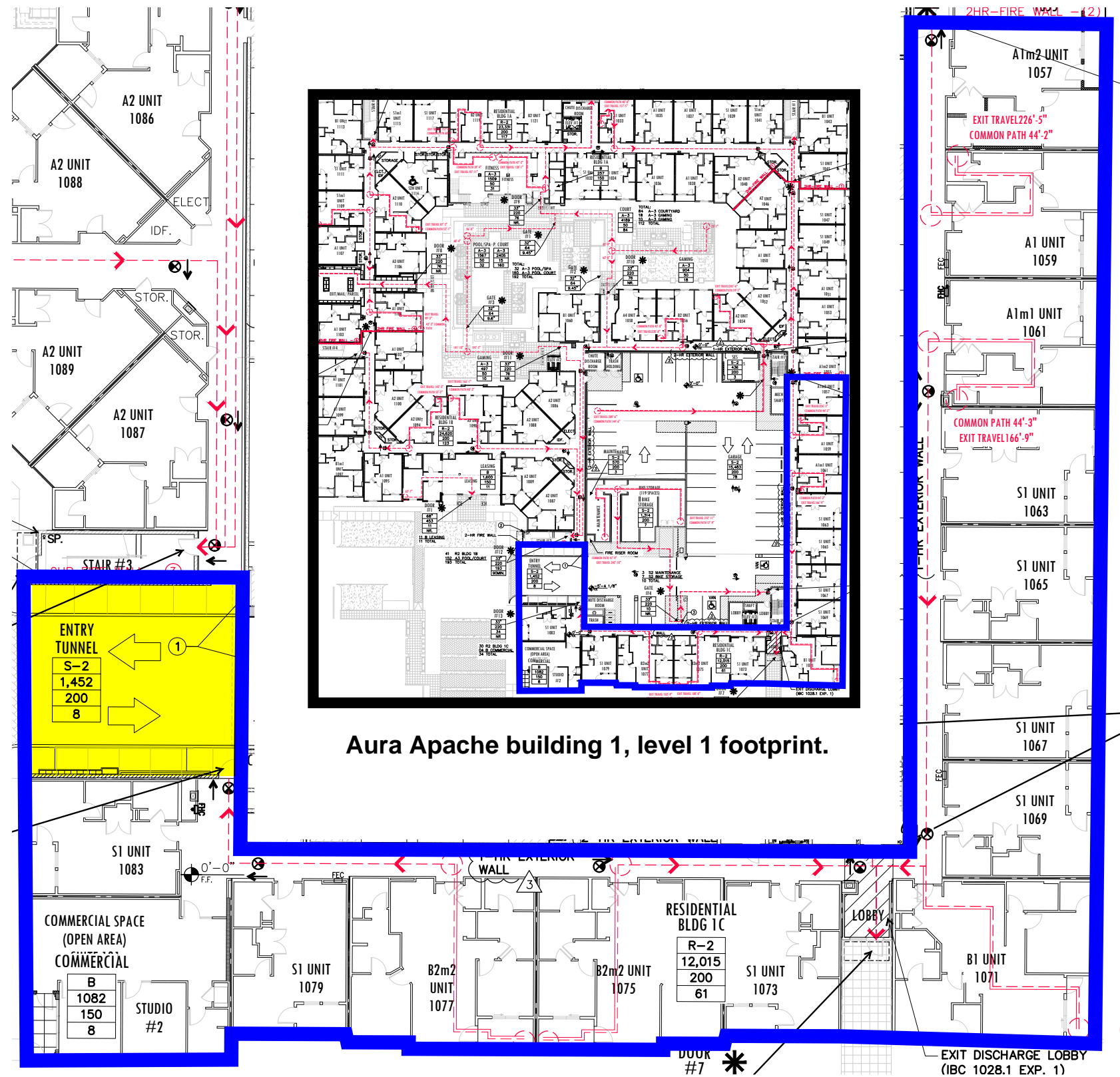
IBC Section 508.4.2: Allowable building area.

In each story, the building area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable building area of each separated occupancy shall not exceed 1.

(It should be noted that the Separated method of design allows for the use of the frontage increase, per IBC Section 506.3, for each separated occupancy).

Example of Separated Occupancies at Aura Apache

Building 1C at Aura Apache is an example of where a Separated occupancy was utilized and the yellow highlighted area represents the separated space.



Aura Apache building 1, level 1 footprint.

Example of Separated Occupancies at Aura Apache

The Separated Occupancy design option requires the sum of the ratios calculation to be performed, to confirm the building area limitations have been met, per the type of construction being used.

Building parameters:

4-story Multifamily Residential complex of Type VA construction.

An NFPA 13 sprinkler system with occupancy Groups B, R-2 & S-2.

Occupancy Group S-2 is separated per IBC Table 508.9

BUILDING	LEVEL	CONST. TYPE (SECT. 602)	SPRINKLER SYSTEM	OCCUPANCY	ALLOWABLE HEIGHT (TABLE 504.3)	ACTUAL HEIGHT (202)	ALLOWABLE No. OF STORIES (504.4)	ACTUAL No. OF STORIES	ALLOWABLE AREA (SF) /STORY (506.2)	PROVIDED AREA (SF)	RATIO ACTUAL/ALLOWED (508.4.2)	RATIO TOTAL/STORY	
1C (Mixed Use, Separated per IBC 508.4)	L1	V-A	NFPA 13	B	ACCESSORY TO R-2 PER IBC 508.2 (= 7.4% OF TOTAL FLOOR AREA; <18,000 SF TABLE 506.2)					1,082	12,015 + 1,082 = 13,097	0.36	0.38
				R-2	70	66'-3"	4	4	36,000				
				S-2	70	66'-3"	5	1	84,000	1,452			
	TOTAL LEVEL 1									14,549			
	L2	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	14,710	0.41	0.41	
	TOTAL LEVEL 2									14,710			
	L3	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	14,710	0.41	0.41	
	TOTAL LEVEL 3									14,710			
	L4	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	14,707	0.41	0.41	
	TOTAL LEVEL 4									14,707			
TOTAL BUILDING 1C									58,676	(DOES NOT EXCEED 3) 1.61			

What are the requirements of Separated Occupancies?

IBC Section 508.4.3: Allowable building Height & Number of Stories.

Each separated occupancy shall comply with the building height limitations and story limitations based on the type of construction of the building in accordance with IBC Section 503.1.

Exception: Special provisions of Section 510 (Podium buildings) shall permit occupancies at building heights and number of stories other than provided in Section 503.1.

The allowable building Height and Number of Stories is occupancy dependent and as long as the individual occupancies within the building meet the height limitations based on a measurement from grade plane, then the building complies.

Example of Separated Occupancies at Aura Apache

IBC Section 508.4.3: Allowable building Height & Number of Stories.

BUILDING	LEVEL	CONST. TYPE (SECT. 602)	SPRINKLER SYSTEM	OCCUPANCY	ALLOWABLE HEIGHT (TABLE 504.3)	ACTUAL HEIGHT (202)	ALLOWABLE No. OF STORIES (504.4)	ACTUAL No. OF STORIES	ALLOWABLE AREA (SF) /STORY (506.2)	PROVIDED AREA (SF)	RATIO ACTUAL/ALLOWED (508.4.2)	RATIO TOTAL/STORY
1C (Mixed Use, Separated per IBC 508.4)	L1	V-A	NFPA 13	B	ACCESSORY TO R-2 PER IBC 508.2 (= 7.4% OF TOTAL FLOOR AREA; <18,000 SF TABLE 506.2)				1,082	12,015 + 1,082 = 13,097	0.36	0.38
				R-2	70	66'-3"	4	4	36,000			
				S-2	70	66'-3"	5	1	84,000			
				TOTAL LEVEL 1			14,549					
	L2	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	14,710	0.41	0.41
	TOTAL LEVEL 2			14,710								
	L3	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	14,710	0.41	0.41
	TOTAL LEVEL 3			14,710								
	L4	V-A	NFPA 13	R-2	70	66'-3"	4	4	36,000	14,707	0.41	0.41
	TOTAL LEVEL 4			14,707								
TOTAL BUILDING 1C									58,676	(DOES NOT EXCEED 3) 1.61		

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE^a

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION									
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS ^b	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
R ^b	NS ^d	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE^{a, b}

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION									
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
R-2 ^b	NS ^d	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4	4	4	4	4	4	3
	S	UL	12	5	5	5	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	2
	S	UL	12	6	4	5	4	5	5	3

IBC Tables 504.3 & 504.4 provide the limitations for building Height & Number of Stories for each occupancy based on the type of construction used. Type VA construction with an NFPA 13 sprinkler system allows for the following.

- Group B: 70-feet, 4-stories.**
- Group R-2: 70-feet, 4-stories.**
- Group S-2: 70-feet, 5-stories.**

Example of Separated Occupancies at Aura Apache

IBC Section 508.4.3: Allowable building Height & Number of Stories.

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE^a

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS ^b	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
R ^b	NS ^d	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE^{a, b}

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
R-2 ^b	NS ^d	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4	4	4	4	4	4	3
	S	UL	12	5	5	5	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	2
	S	UL	12	6	4	5	4	5	5	3

Type VA construction limits my Group A-3 Assembly space to the 3rd story of this building.

What can I do to locate it on the 4th floor for a better view?

As an Accessory Group A-3 space, it is considered as part of the Group R-2 occupancy for determination of story location, which allows it to be located on the 4th story.

(Reminder: The accessory assembly space cannot exceed the 10% floor area limitation).

Utilize the Frontage Increase for Separated Occupancies

**Frontage Increase example for Group A-3:

$$A_a = [34,500 + (11,500 \times .75)]$$

$$A_a = 34,500 + 8,625$$

$$A_a = 43,125 \text{ SF allowed.}$$

$$A_a = [A_t + (NS \times I_f)] \quad \text{(Equation 5-3)}$$

where:

A_a = Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S13R, S13D or SM value, as applicable) in accordance with Table 506.2.

NS = Tabular allowable area factor in accordance with Table 506.2 for a nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage (percent) as calculated in accordance with Section 506.3.

TABLE 506.2
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET^{a, b}

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
R-2 ^b	NS ^d	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000
S-1	NS	UL	48,000	26,000	17,500	26,000	17,500	25,500	14,000	9,000
	S1	UL	192,000	104,000	70,000	104,000	70,000	102,000	56,000	36,000
	SM	UL	144,000	78,000	52,500	78,000	52,500	76,500	42,000	27,000
S-2	NS	UL	79,000	39,000	26,000	39,000	26,000	38,500	21,000	13,500
	S1	UL	316,000	156,000	104,000	156,000	104,000	154,000	84,000	54,000
	SM	UL	237,000	117,000	78,000	117,000	78,000	115,500	63,000	40,500

What are the requirements of Separated Occupancies?

IBC Section 508.4.4: Separation.

Individual occupancies shall be separated from adjacent occupancies in accordance with IBC Table 508.4 and Separations shall be fire barriers constructed in accordance with IBC Section 707 or horizontal assemblies constructed in accordance with IBC Section 711, or both, so as to completely separate adjacent occupancies.

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)^f

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

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. See Section 420.

b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but not to less than 1 hour.

c. See Section 406.3.2.

d. Separation is not required between occupancies of the same classification.

e. See Section 422.2 for ambulatory care facilities.

f. Occupancy separations that serve to define fire area limits established in Chapter 9 for requiring fire protection systems shall also comply with Section 707.3.10 and Table 707.3.10 in accordance with Section 901.7.

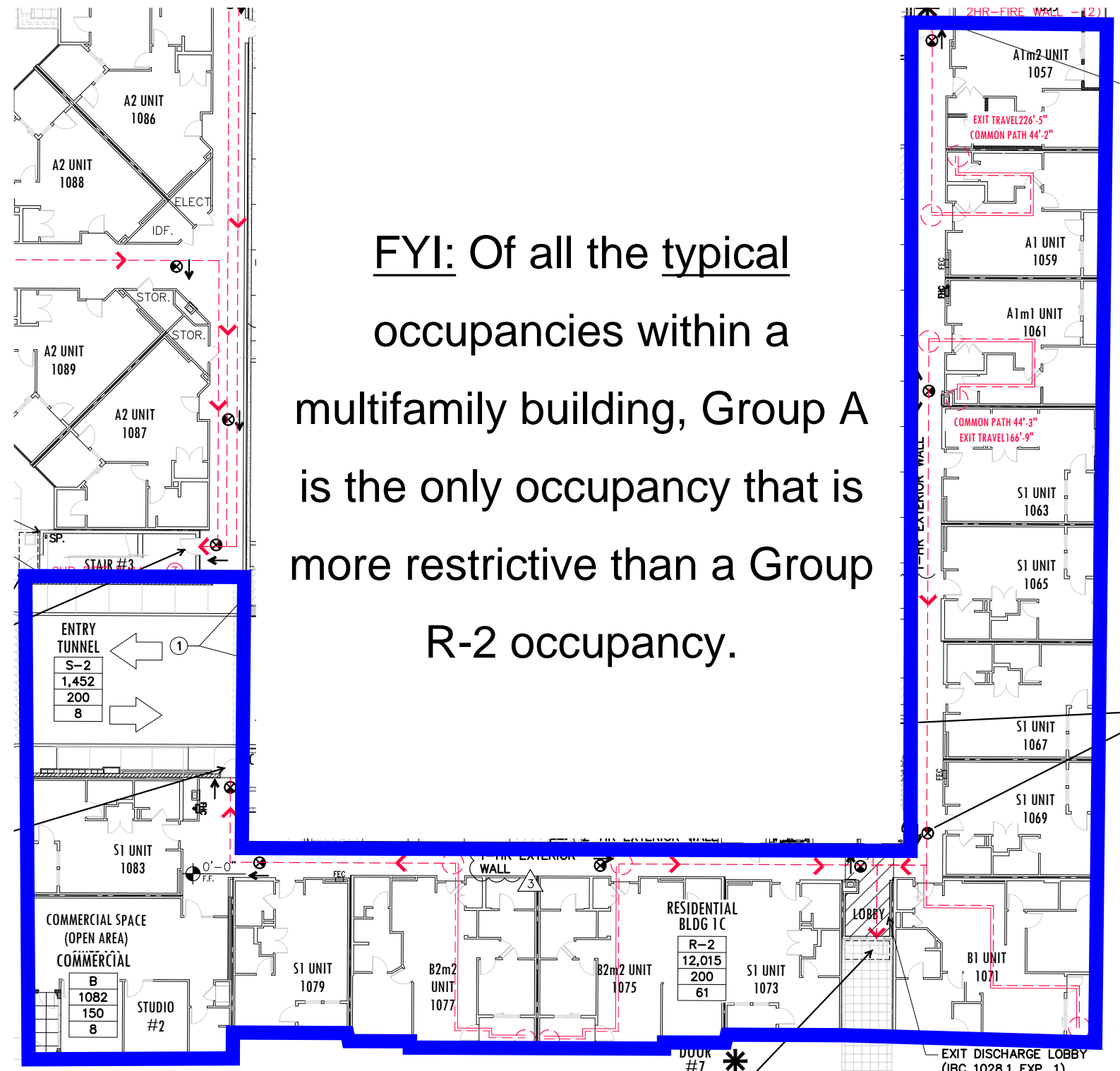
Design Options to avoid Separated Occupancies

I don't want to use fire barriers to separate my occupancies, What can I do differently?

Building 1C at Aura Apache could have used other mixed-use design options to eliminate the fire barrier separation.

Option 1: The Group S-2 space could have utilized the Accessory Storage space provisions of IBC Section 311.1.1.

Option 2: The mixed-use, non-separated method of design could have been used throughout building 1C, as Groups B & S-2 are less restrictive than Group R-2.



FYI: Of all the typical occupancies within a multifamily building, Group A is the only occupancy that is more restrictive than a Group R-2 occupancy.

Mixed-Use occupancy design considerations.

It is the designer's prerogative to use the Accessory occupancies option, Non-Separated occupancies option or the Separated occupancies option when establishing a mixed occupancy building. It is also possible to apply both or all three options within different portions or different stories of a building.

My recommendations are as follows.

Start with the mixed-use, Non-Separated option per IBC 508.3.

Utilize the Small Assembly & Accessory Storage provisions per IBC 303.1.2 & 311.1.1.

Utilize the Accessory option per IBC 508.2.

Use the Separated option per IBC 508.4 as a last resort.