

RESIDENTIAL INFILL DEVELOPMENT

Handout

- FAR
- Building Volume
- Lot Coverage
- Open Space



Infill Task Force
January 17, 2008

Alexandria

Overview of Bulk Regulations

- FAR & Floor Area Definition
- FAR Modification Options
- Other Bulk Measures
 - Building Volume Ratio
 - Lot Coverage Ratio
 - Open Space Requirement

Single Family Residential Bulk Requirements

Standard Interior Lot

Zone	Lot Size	Lot Width	Lot Frontage	Front Yard	Side Yards			Rear Yard		Open Space	FAR	Height
					# Side Yards	Ratio	Min	Ratio	Min			
R-20	20000	100	75	40	2	1:2	12	1:1	12	N/A	0.25	35
R-12	12000	80	60	35	2	1:2	10	1:1	10	N/A	0.30	35
R-8	8000	65	40	30	2	1:2	8	1:1	8	N/A	0.35	35
R-5	5000	50	40	25	2	1:3	7	1:1	7	N/A	0.45	35
R-2.5	5000	50	40	25	2	1:3	7	1:1	7	N/A	0.45	35
RA	1980	50	50	20	2	1:3	7	1:1	8	800	0.75	45
RB	1980	50	50	20	2	1:3	8	1:1	8	800	0.75	45

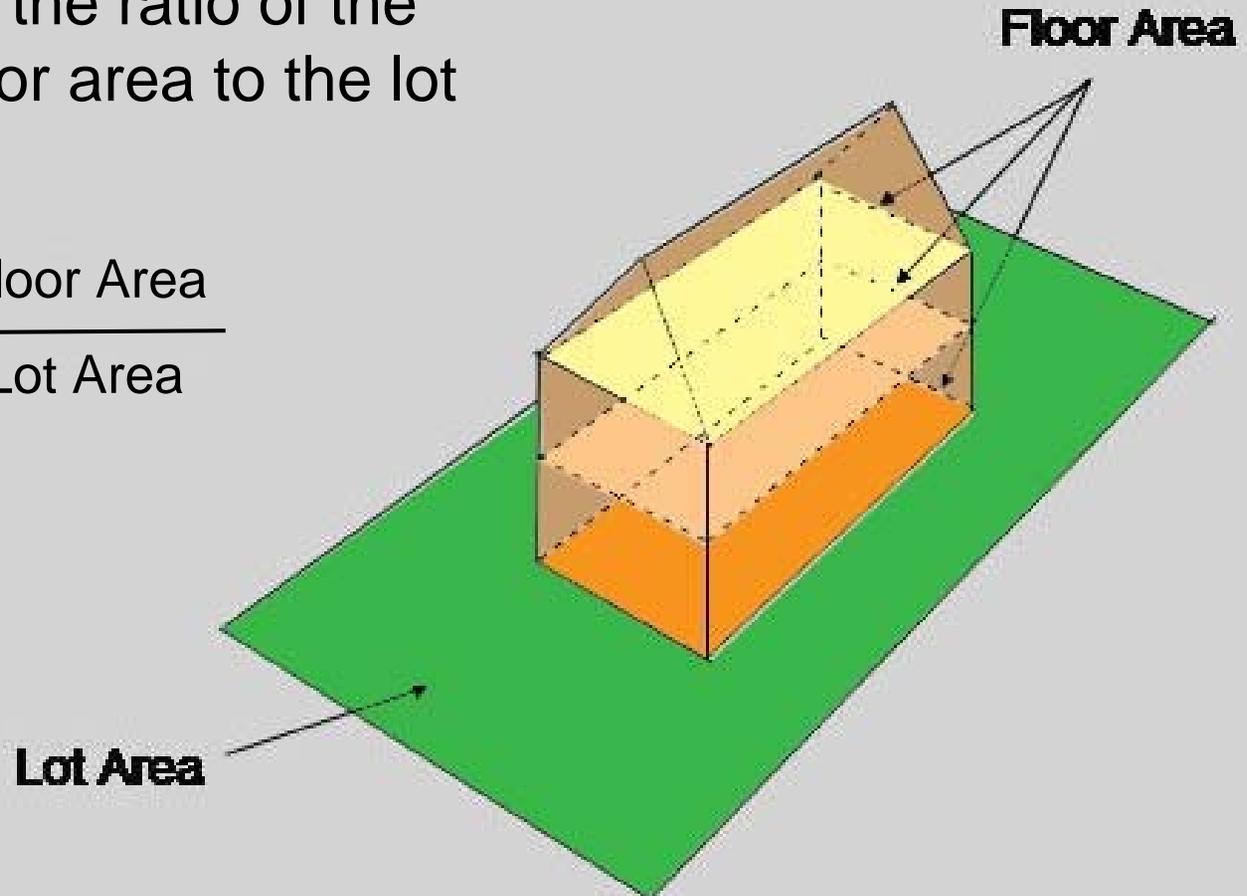
Standard Corner Lot

Zone	Lot Size	Lot Width	Lot Frontage	Front Yard	Side Yards			Rear Yard		Open Space	FAR	Height
					# Side Yards	Ratio	Min	Ratio	Min			
R-20	20000	120	75	40	2	1:2	12	1:1	12	N/A	0.25	35
R-12	12000	95	60	35	2	1:2	10	1:1	10	N/A	0.30	35
R-8	9500	80	40	30	2	1:2	8	1:1	8	N/A	0.35	35
R-5	6500	65	40	25	2	1:3	7	1:1	7	N/A	0.45	35
R-2.5	6500	65	40	25	2	1:3	7	1:1	7	N/A	0.45	35
RA	1980	50	50	20	2	1:3	7	1:1	8	800	0.75	45
RB	1980	50	50	20	2	1:3	8	1:1	8	800	0.75	45

FAR Defined

- Defined as the ratio of the building floor area to the lot area, or

$$\text{FAR} = \frac{\text{Floor Area}}{\text{Lot Area}}$$



FAR Examples

Example #1:

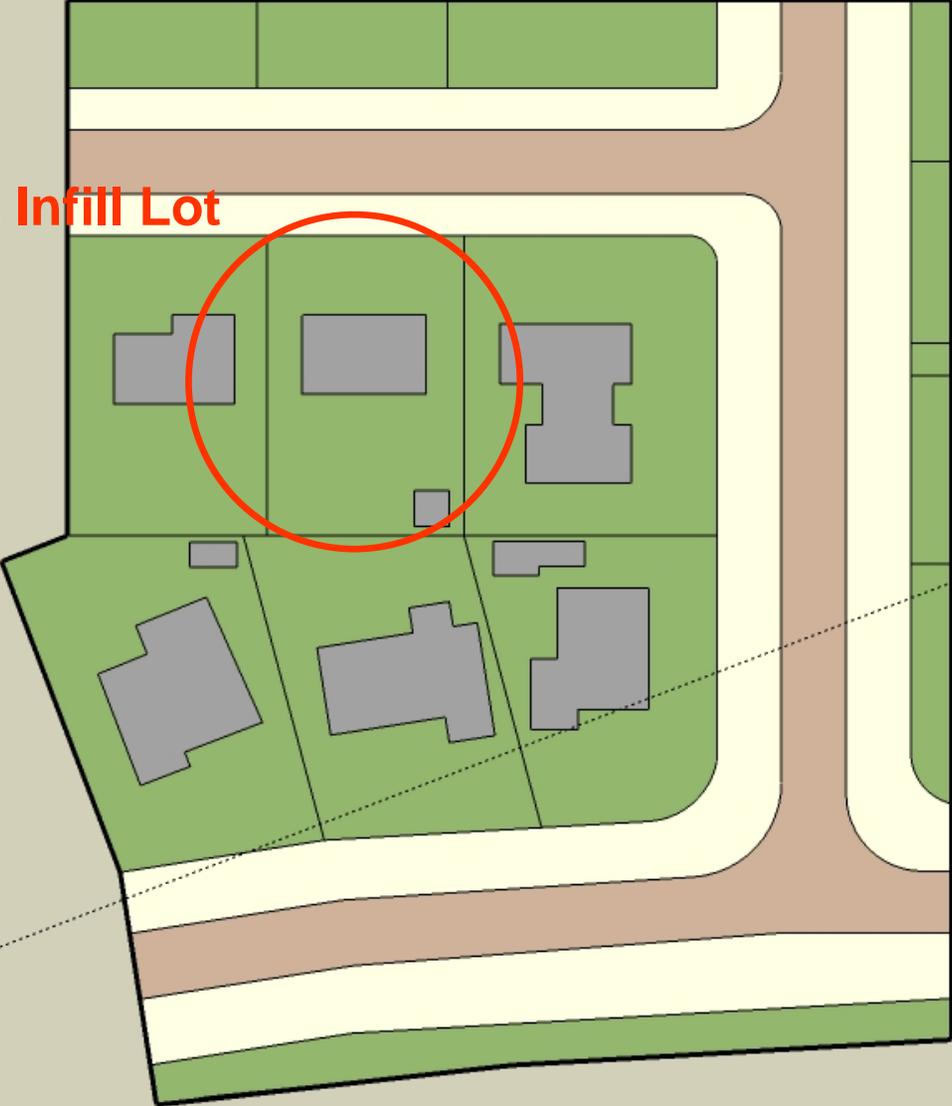
- An R-8 zoned property with 8,000 square feet of lot area
- The FAR of 0.35 would permit a house with 2,800 square feet of floor area ($8,000 \times 0.35 = 2,800$)

Example #2:

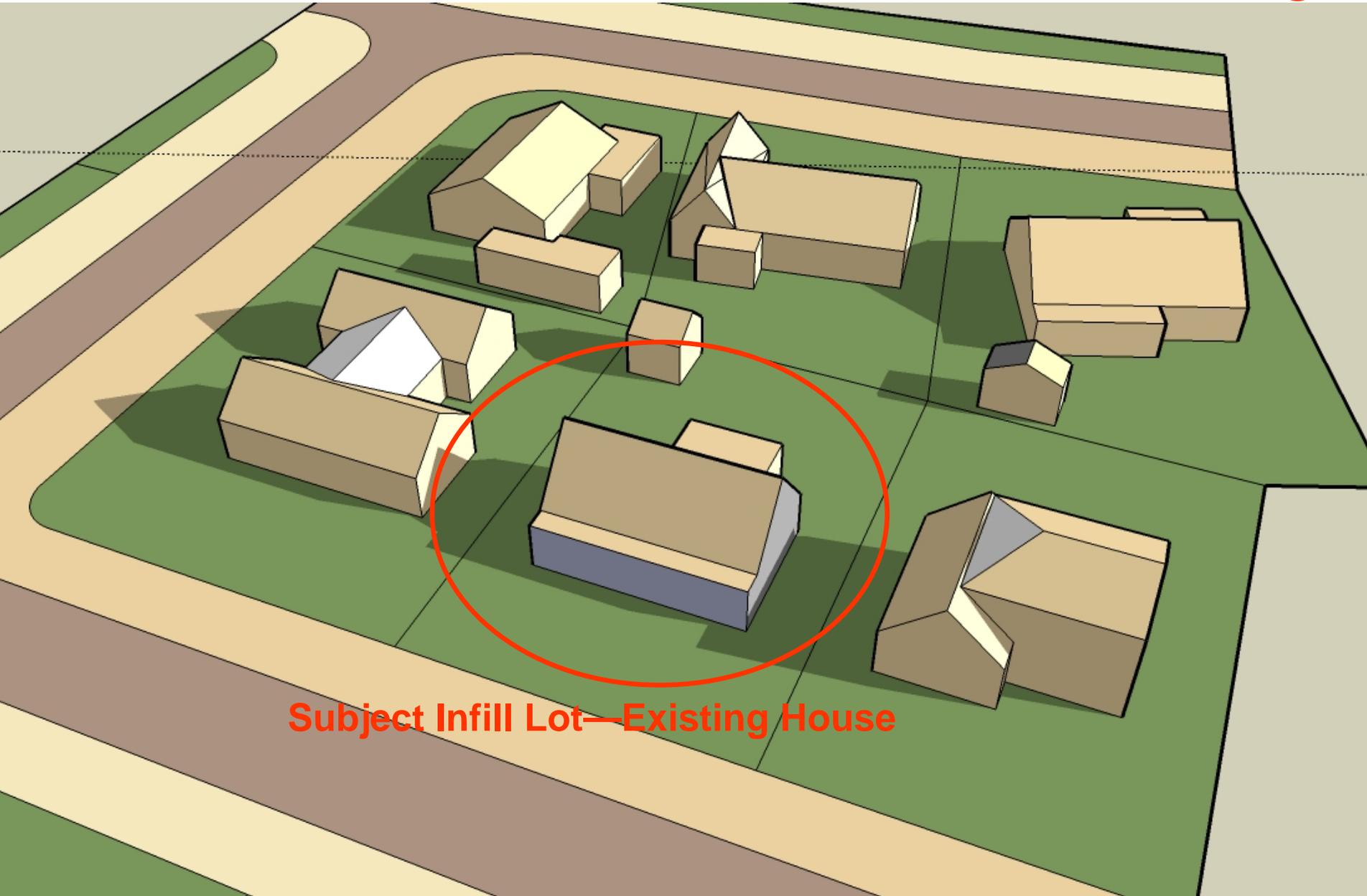
- An R-5 zoned property with 5,000 square feet of lot area
- The FAR of 0.45 would permit a house with 2,250 square feet of floor area ($5,000 \times 0.45 = 2,250$)

R-8 Zoning

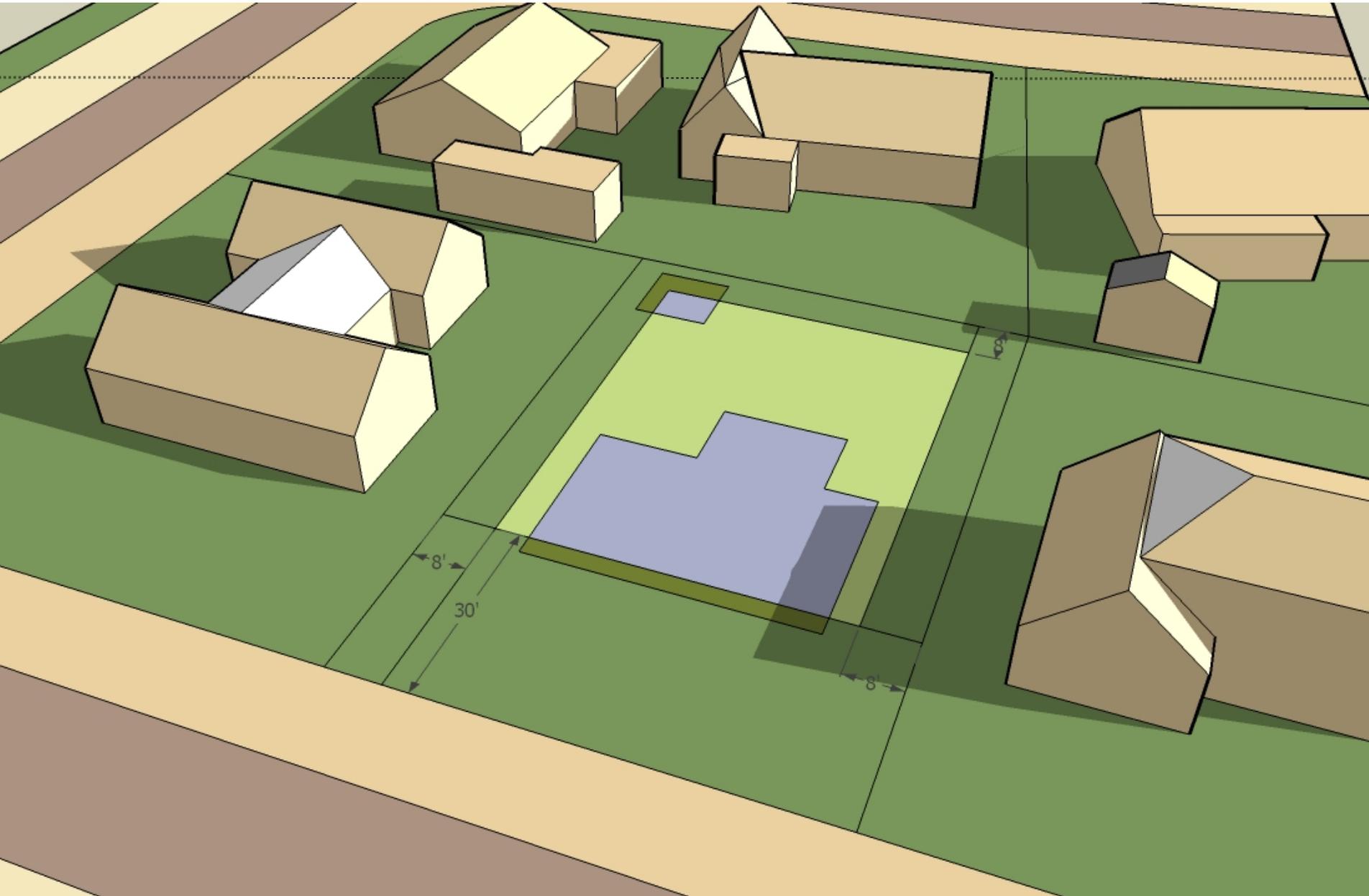
Subject Infill Lot



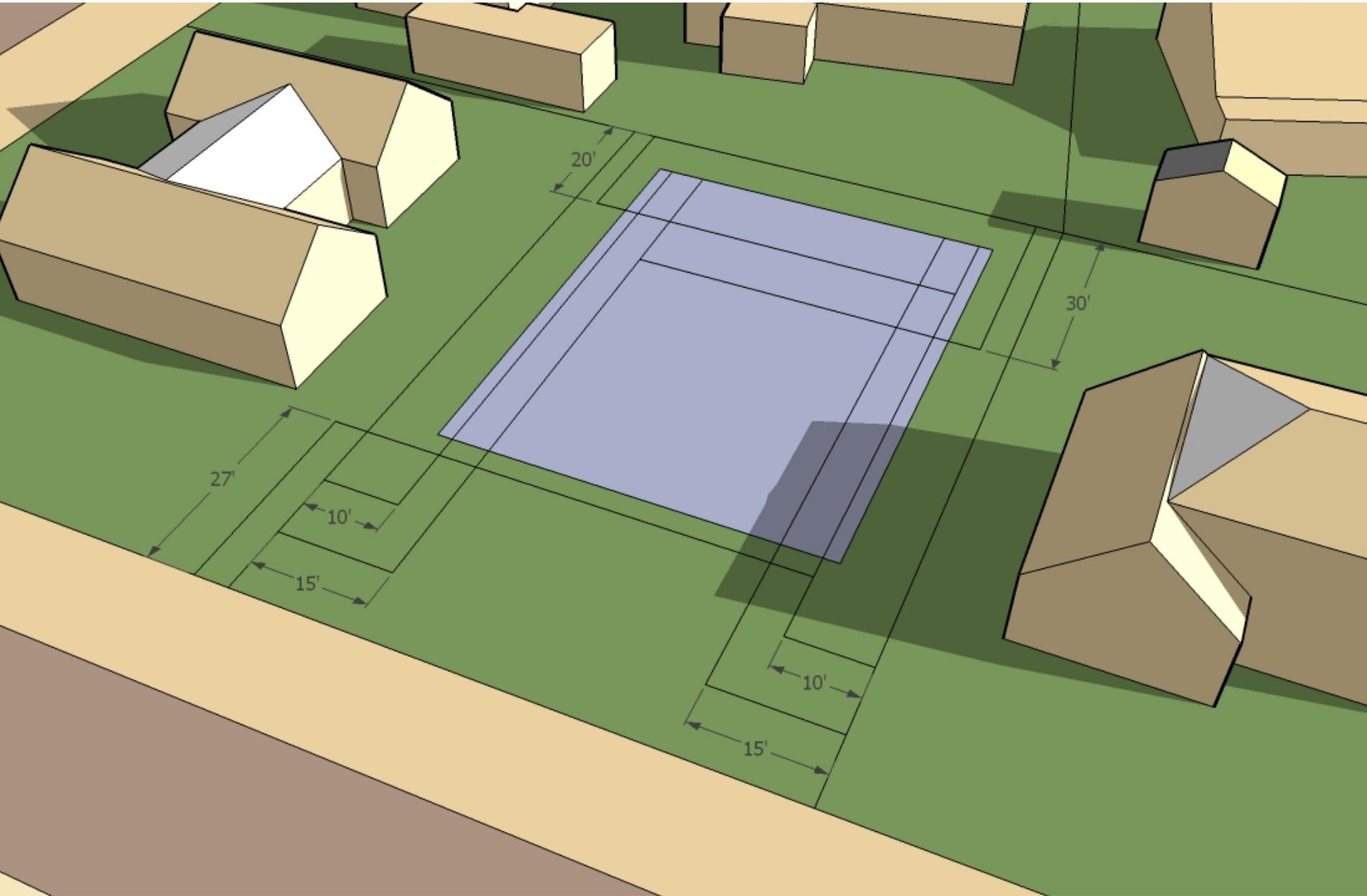
Base Map



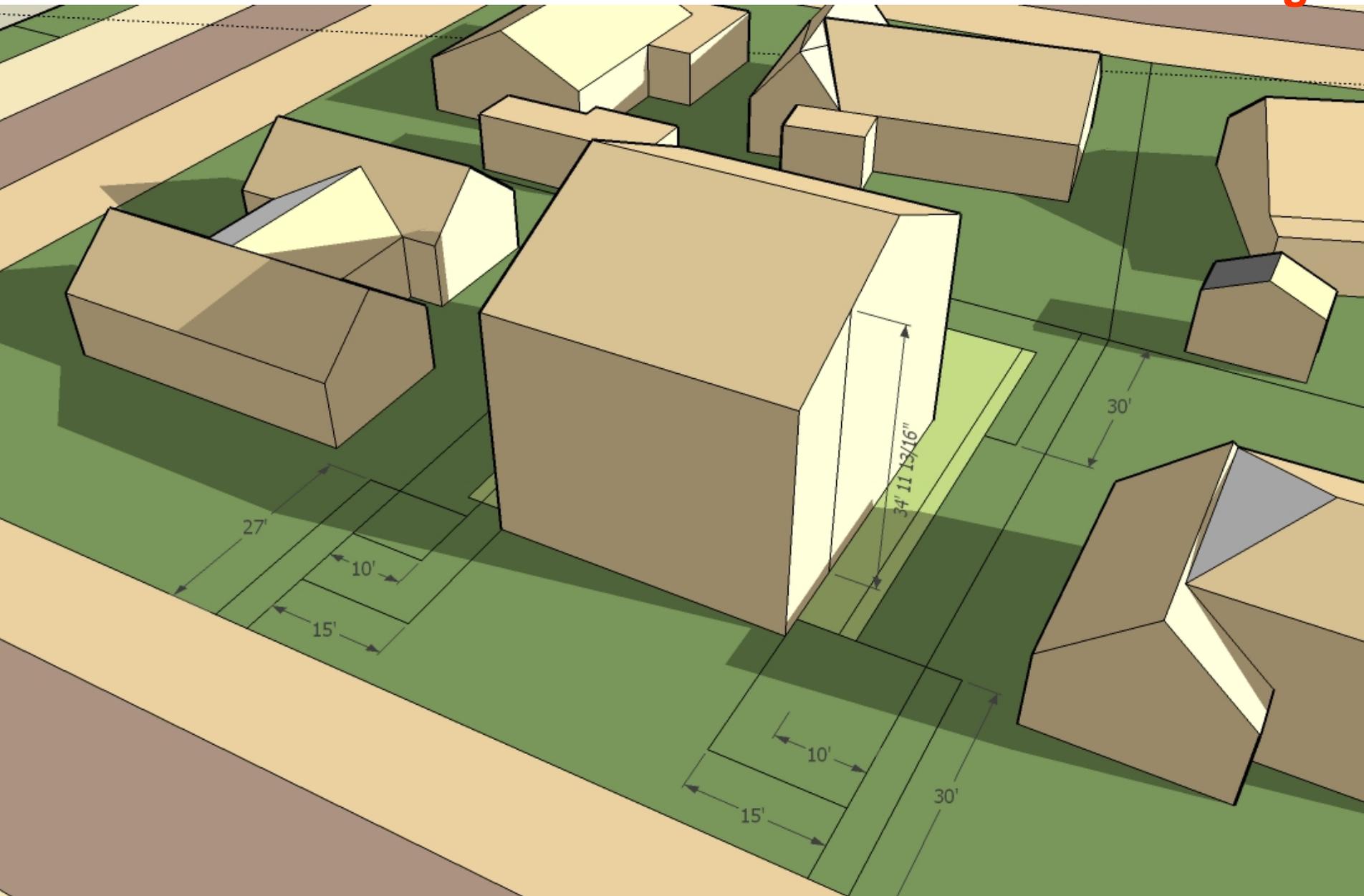
Subject Infill Lot—Existing House



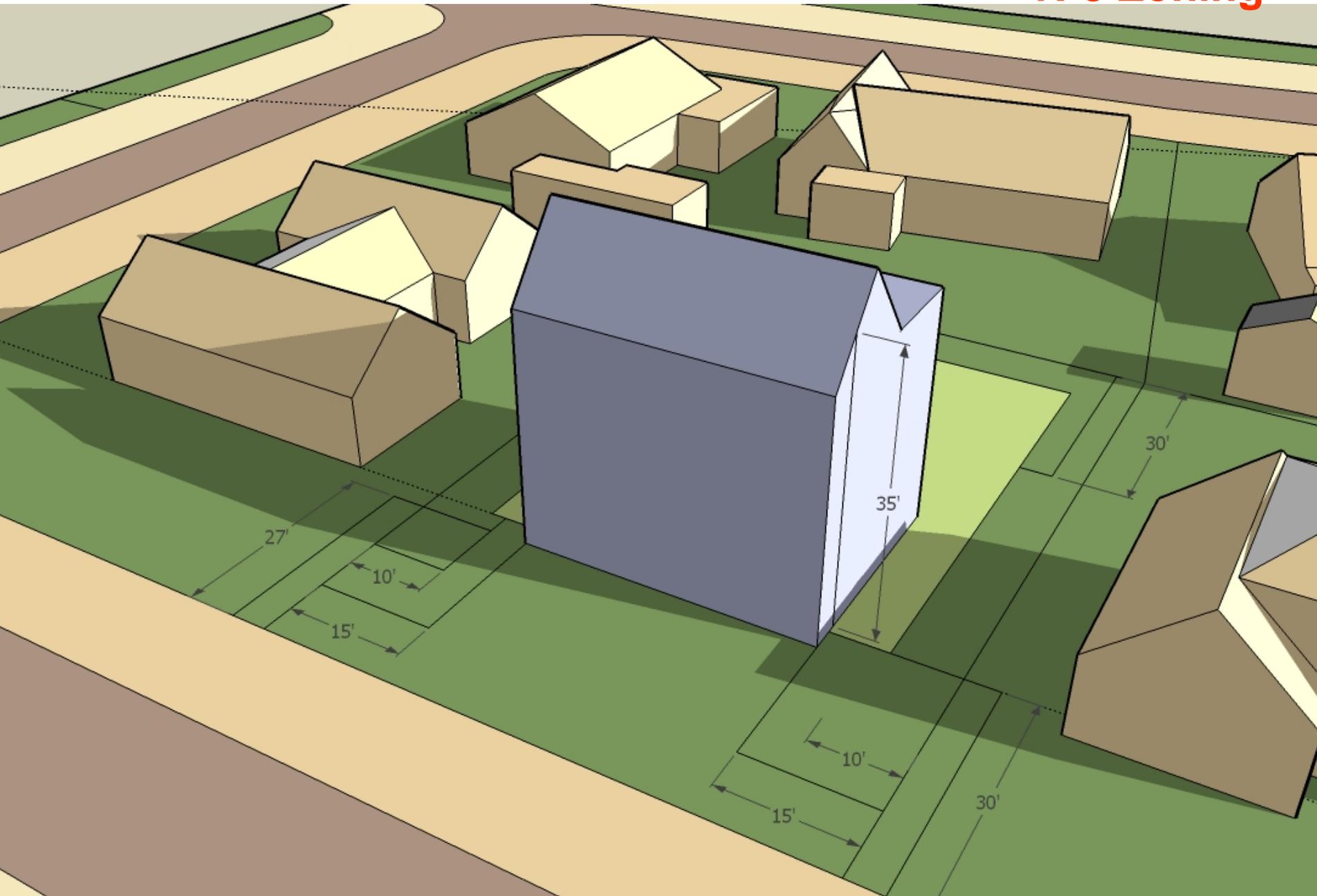
Minimum Setbacks for Infill Project



Setback Ratios for 2 or 3-story Infill Project



3-story Infill Project—Setbacks and Height ONLY



3-story Infill Project—Height, Setback and FAR Requirements

Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling. Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy. Basements and subbasements shall be excluded from the floor area ratio computations, but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling. Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy. Basements and subbasements shall be excluded from the floor area ratio computations, but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. **These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls** and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling. Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy. Basements and subbasements shall be excluded from the floor area ratio computations, but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls **and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling.** Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy. Basements and subbasements shall be excluded from the floor area ratio computations, but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling. **Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy.** Basements and subbasements shall be excluded from the floor area ratio computations, but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling. Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy. **Basements and subbasements shall be excluded from the floor area ratio computations,** but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

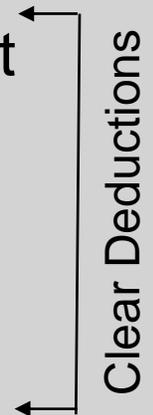
Floor Area Definition

The floor area of the building or buildings on a lot or tract or tract of land (whether "main" or "accessory") is the sum of all gross horizontal areas under a roof or roofs. These areas shall be measured from the exterior faces of walls and from the eaves of all roofs where they extend beyond the wall line or from the center line of party walls and shall include all space with a headroom of seven feet six inches or more, whether or not provided with a finished floor or ceiling. Excluded shall be elevator and stair bulkheads, accessory water tanks, cooling towers and similar construction not susceptible to storage or occupancy. Basements and subbasements shall be excluded from the floor area ratio computations, but for the purpose of computing off street parking requirements that portion of such areas as are occupied by permitted uses shall be subject to the provisions of Article VIII.

Floor Area Definition

In Summary, Floor Area as defined for FAR:

- Is the sum of all gross horizontal areas
- It is measured from exterior faces of walls
- **Includes space with a headroom of 7' 6" or more**
- Excluded are elevators, stairs, HVAC equipment areas, and other similar areas not susceptible to storage or occupancy
- Basements are excluded if no more than 4 feet above finished grade



What does FAR do?

FAR determines how intensively a lot may be built upon

There are two ways to view FAR standards:

- As a measure of habitable and useable space that is permitted on the property – interior viewpoint
- As a measure of the bulk or volume of a building allowed on the property – exterior viewpoint

FAR - Issues with Deductions

<u>Deduction</u>	<u>Interior Viewpoint</u>	<u>Exterior Viewpoint</u>
Basements, no more than 4 feet above grade	Provides more livable space, but does not count for FAR	Bulk is principally underground
Elevators, stairs, HVAC equipment	Not occupiable space	Space adds to exterior bulk
Height less than 7' 6"	Not considered occupiable space	Space adds to exterior bulk

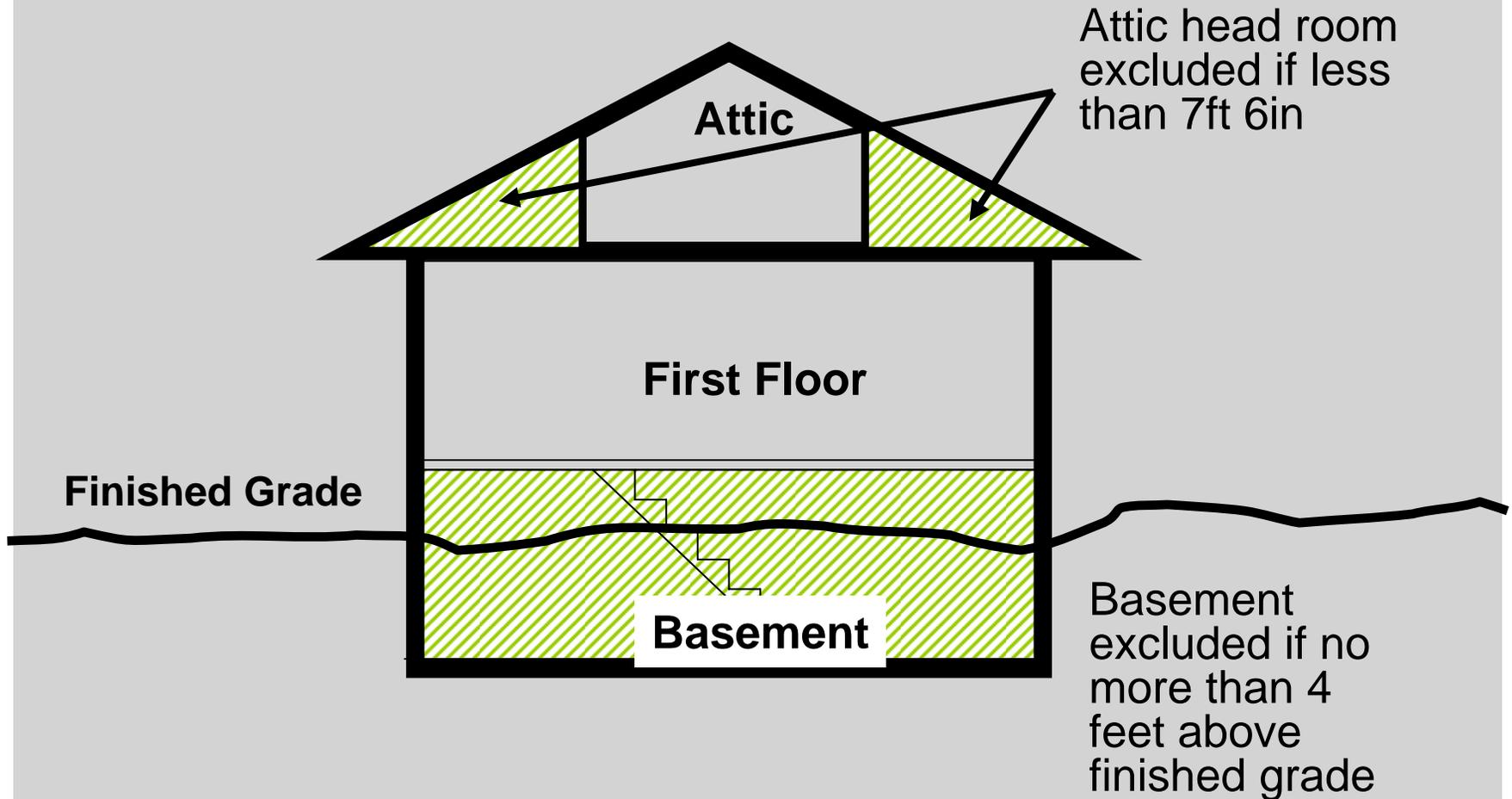
FAR – Other Issues

- Basement can be deducted, but can be a large percentage of total usable floor area, and can be exposed up to 4 feet above grade
- Whether floor space that has headroom less than 7' 6" can be deducted
 - Applied differently over time
 - Susceptible to varying interpretation by home owners, architects and neighbors
 - Time consuming for all—multiple submissions

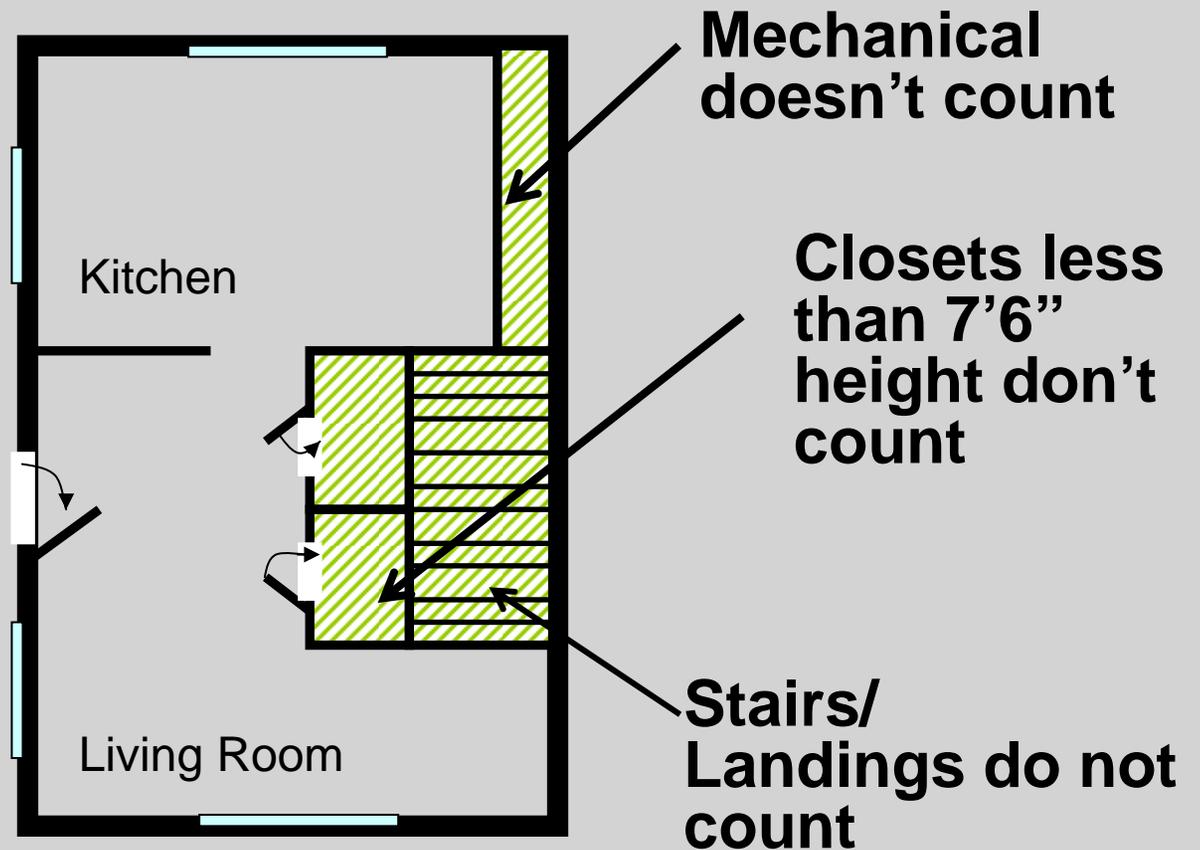
FAR – The History

- 1951 – FAR and Floor Area definition adopted
- 1992 – New Master Plan & Zoning Ordinance – attempt to change Floor Area definition – results: no change
- 1996 – Virginia Building Code – reduces height of habitable space from 7' 6" to 7'
- 1998 – Planning Director proposes text amendment to correct Floor Area definition – deferred by PC
- 2004 – More strict application of floor area definition and exclusions

FAR Calculation Methodology

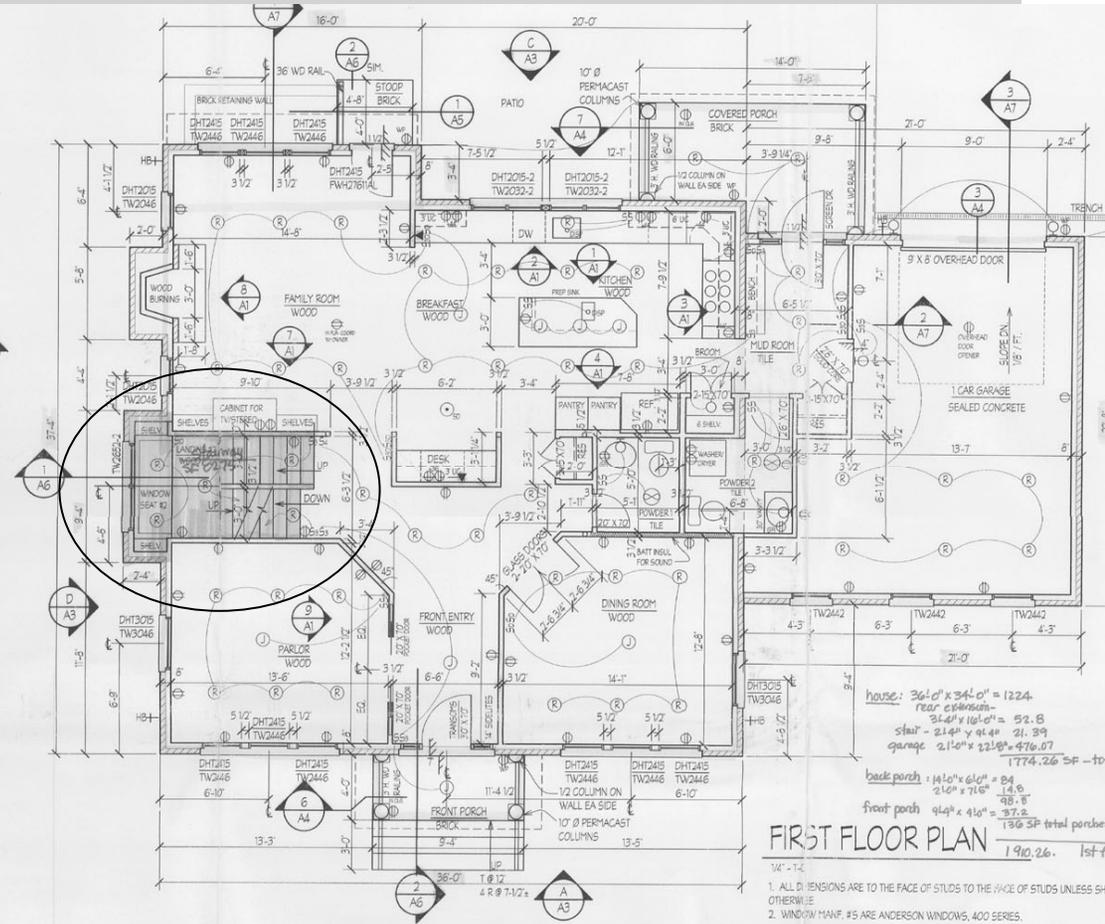
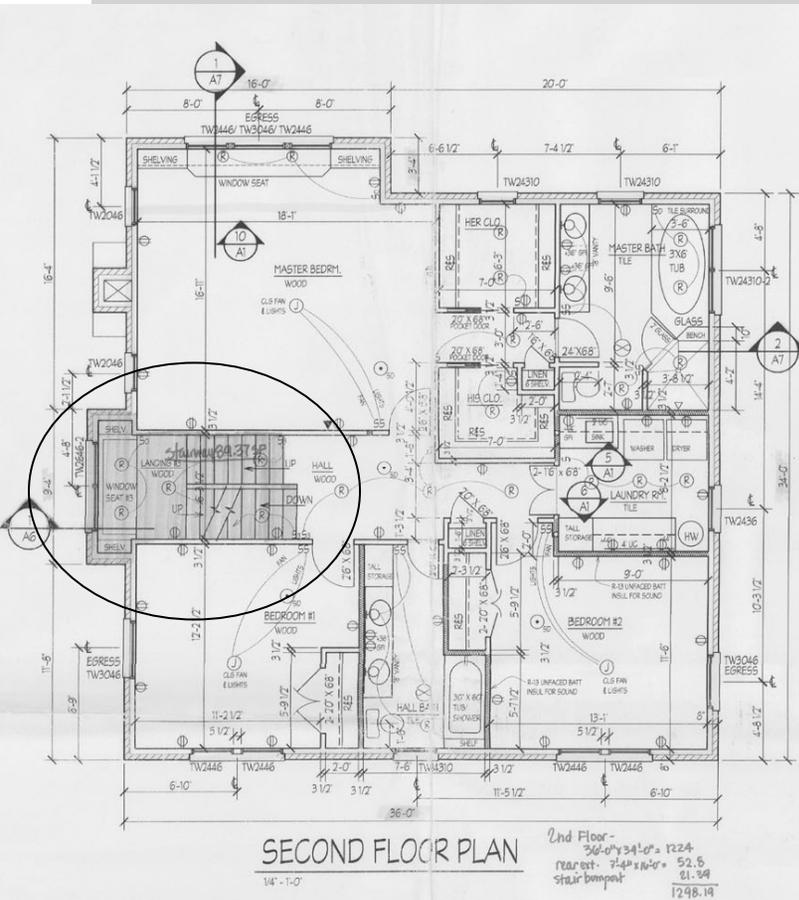


FAR Calculation Methodology



FAR Examples

Site A – Stairway Deductions

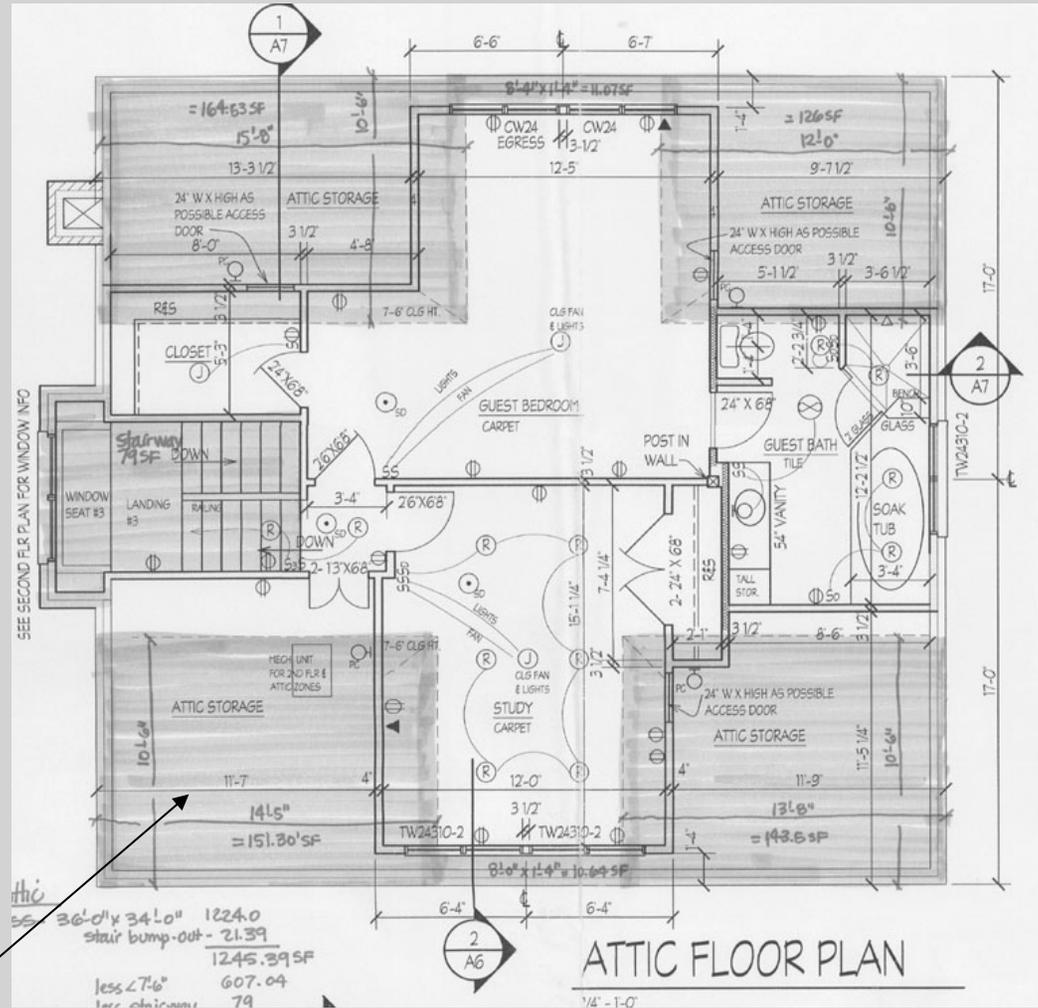
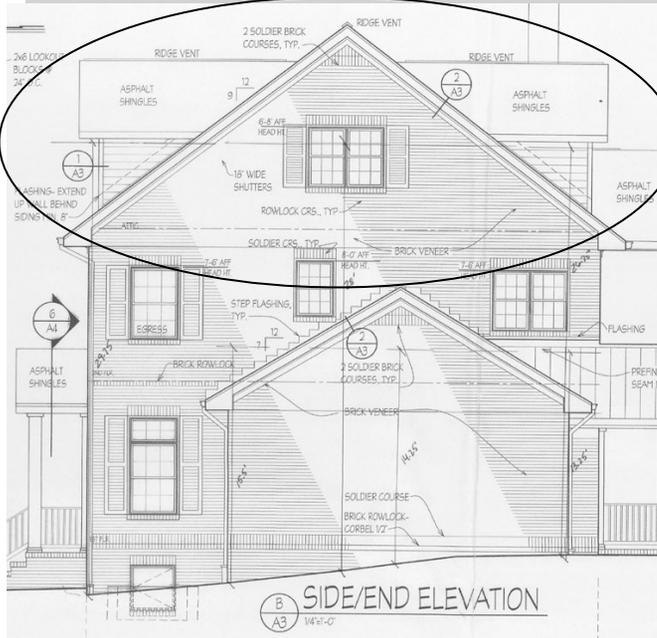


1. ALL DIMENSIONS ARE TO THE FACE OF STUDS TO THE FACE OF STUDS UNLESS SHOWN OTHERWISE
2. WINDOW MANUFACTURER: #5 ARE ANDERSON WINDOWS, 400 SERIES.

FAR Examples

Site A – Attic Deductions

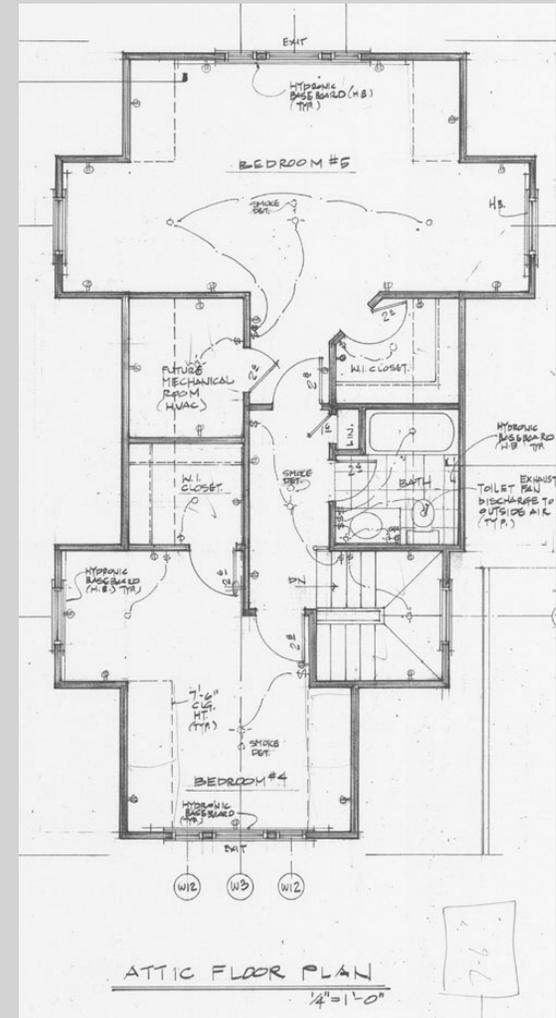
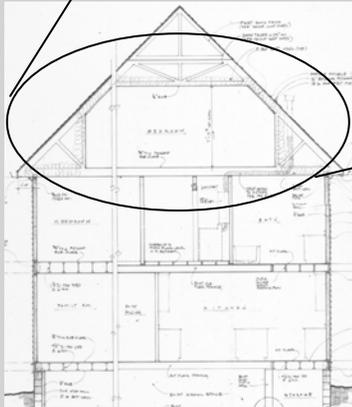
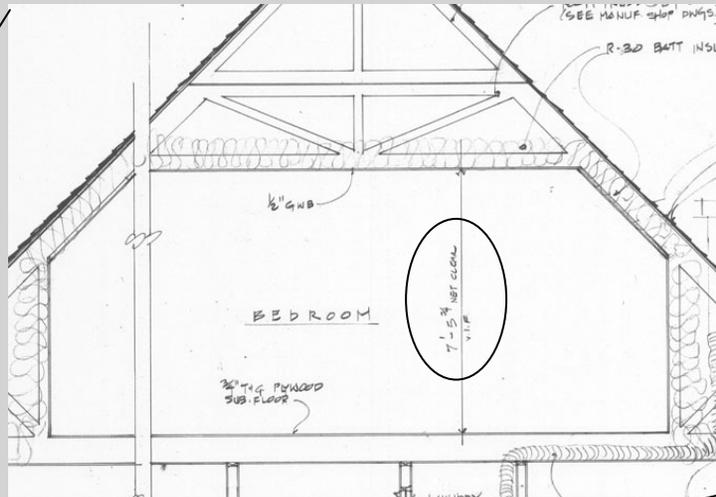
Attic Space



Deductions (shaded areas)

FAR Examples

Site B – Attic Floor Deduction



FAR – Analysis of Deductions

New Construction/Major Additions - 2007

Percent Deduction from Gross Floor Area (excluding Basement)

Zone	Number	Average	Median	Range
R-20	2	5%	5%	2% – 9%
R-12	1	4%	4%	4%
R-8	11	11%	4%	0% – 31%
R-2-5	4	12%	9%	4% - 24%
Totals	18	10%		

At least two plan submission typically needed to clarify allowable deducted areas

FAR – Analysis of Deductions

Medium & Small Additions - 2007

Percent Deduction from Gross Floor Area (excluding Basement)

Zone	Number	Average	Median	Range
R-20	9	6%	3%	0% -19%
R-12	3	5%	0%	0% -15%
R-8	33	6%	4%	0% -30%
R-5	17	8%	4%	0% -38%
R-2-5	22	4%	2%	0% -22%
RA	3	5%	7%	0% -9%
RB	10	6%	6%	0% -15%
Totals	97	6%		

More than one plan submission typically needed to clarify allowable deducted areas

FAR – Modification Options

1. Clarify allowable deductions:
 - A. NO DEDUCTIONS—*Count all floor space except basements (gross calculation)*
 - B. DEDUCT ONLY SPECIFIED UNOCCUPIABLE AREAS—*Count all floor space except basements and those areas specifically identified in definition (elevators, stairs, HVAC equipment areas, and basements); remove reference to 7'6" ceiling height*
 - C. DEDUCT ONLY SPECIFIED UNOCCUPIABLE AREAS AND AREAS BELOW CERTAIN HEIGHT IN ATTIC—*Count all floor space except those deductions specifically identified, and establish a ceiling height for deductible areas in attic*
2. Reduce exposure of deductible basements (incentive to lower first floor height)
3. Others?

1. Clarify allowable deductions

A. NO DEDUCTIONS—*Count all floor space except basements (gross calculation)*

Advantages:

- Property owners would likely maximize useable basement floor space
- From the community perspective, houses would be smaller because all floor space is counted
- Easy to calculate

Disadvantages:

- Houses might tend to have flat roofs because all attic floor space is counted
- For the homeowner, houses would be smaller because all floor space is counted
- Homeowners subject to more strict standards after the rules change

1. Clarify allowable deductions

Option: To address homeowner concerns about stricter standards, may consider adjusting FAR standards to compensate for loss of deductions

Assuming a 8% factor for deductions (not counting basement space):

Zone	Current FAR	Adjusted FAR
R-8	0.35	0.38
R-5	0.45	0.49

Note: 8% based on 2007 analysis of average deductions

1. Clarify allowable deductions

B. DEDUCT ONLY SPECIFIED UNOCCUPIABLE AREAS—*Count all floor space except basements and those areas specifically identified in definition (elevators, stairs, HVAC equipment areas, and basements); remove reference to 7'6" ceiling height*

Advantages:

- Property owners would likely maximize useable basement floor space
- From the community perspective, houses would be smaller because less floor area would be deducted
- Easy to calculate

Disadvantages:

- Houses might tend to have flat roofs because all attic floor space not used for stairs & HVAC would be counted
- For the homeowner, houses would be smaller because all floor space less than 7' 6" high is counted
- Homeowners subject to more strict standards after the rules change

1. Clarify allowable deductions

C. DEDUCT ONLY SPECIFIED UNOCCUPIABLE AREAS AND AREAS BELOW CERTAIN HEIGHT IN ATTIC—*Count all floor space except those deductions specifically identified, and establish a ceiling height for deductible areas in attic*

Advantages:

- Creates specific legislative guidance on how to count floor area for the space under the roof (whether third floor or attic)
- Reasonable way to encourage roofs that are not flat

Disadvantages:

- The 7' 6" provision allows for floor area over 7' 6" to be counted for FAR purposes (therefore, space with ceiling height less than 7' 6" would not be counted)

2. Reduce allowable exposure of deductible basements

This option would modify the basement deduction so that only 3 feet can be exposed and be deducted instead of 4 feet—creates incentive to lower first floor

Advantages:

- Less exposed basement and lower first floor
- There is potential for a lower overall height of the building
- Supplements or as an alternative to the threshold height regulation

Disadvantages:

- For the homeowner, loss of natural light in to basement
- May result in additional construction costs to address egress

FAR – Modification Options

1. Clarify allowable deductions:
 - A. NO DEDUCTIONS—*Count all floor space except basements (gross calculation)*
 - B. DEDUCT ONLY SPECIFIED UNOCCUPIABLE AREAS—*Count all floor space except basements and those areas specifically identified in definition (elevators, stairs, HVAC equipment areas, and basements); remove reference to 7'6" ceiling height*
 - C. DEDUCT ONLY SPECIFIED UNOCCUPIABLE AREAS AND AREAS BELOW CERTAIN HEIGHT IN ATTIC—*Count all floor space except those deductions specifically identified, and establish a ceiling height for deductible areas in attic*
2. Reduce exposure of deductible basements (incentive to lower first floor height)
3. Others?

Floor Area Ratio

Advantages:

- Uses floor area to regulate bulk/volume
- Floor area is commonly used to measure space in dwellings

Disadvantages:

- With exclusions, not a true measure of residential bulk
- Problems with addressing attic space
- Problems with addressing basement area
- With current definition, not easy to calculate
- Does not address high floor to ceiling heights