

# SIZE BASED RESIDENTIAL IMPACT FEES

## PREPARED FOR QUEEN ANNE'S COUNTY

Prepared for Queen Anne's County by

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## ASSESSMENT OF RESIDENTIAL IMPACT FEES

The objective of impact fees is to reasonably distribute costs of accommodating development over units of new development. For non-residential development this is accomplished by identifying certain distinguishing characteristics among non-residential developments, primarily the nature of the business, and then applying the cost on the basis of the size of the building. The bigger the building, the bigger the impact and thus the larger the impact fee. Residential developments have tended to be treated differently.

A common practice has been to assess residential impact fees based on the type of residential structure; commonly single family detached, multifamily and mobile home. Thus a 750 square foot detached dwelling is presumed to have the same impact as a 9,000 square foot dwelling and thus charged the same impact fee. Many have challenged this simplistic notion.<sup>1</sup> Generally dwellings don't have impact; it is the people within the dwellings that cause the impact. The more people the more need for parks and the more school children. An exception is fire protection. Here it is not the number of people within a building that causes the need for fire protection but simply the size of the building. For rescue or EMS, it is back to the number of people associated with the building as the determinant of demand for service. When fire and rescue/EMS are combined, it is both the size of the building and the number of people that are deterministic. The empirical question is, what is the best way to determine the number of people that may be resident within a residential structure? There are three alternatives:

- **Type of Dwelling Unit.** This is the most commonly used means of assessing impact. It is the one presently used by Queen Anne's County.

### RESIDENTIAL OCCUPANCIES - PEAK QUEEN ANNE'S COUNTY 2000

Single Family	
Average Occupants	2.710
Average School Attendees	0.445
Other	
Average Occupants	2.233
Average School Attendees	0.352
ALL DWELLINGS	
Average Occupants	2.631
Average School Attendees	0.429

<sup>1</sup> See J. Nicholas, "On the Progression of Impact Fees," *Journal of the American Planning Association*, 1992.

Other includes attached single family, mobile homes and multifamily (apartments). These data are from the 2000 Census of the Population, Public Use Micro Sample (PUMS) for Queen Anne's County. Here it is clear that single family dwellings have greater occupancy both in total and by public school attendees.

- **Number of Bedrooms within a Unit.** The numbers of bedrooms within a dwelling are available from the PUMS, so it is possible to measure impact on the basis of the number of bedrooms. The data for Queen Anne's County show total and public school occupancy by type of unit and number of bedrooms. The following graphic makes the data easier to

**RESIDENTIAL OCCUPANCIES - AVERAGE  
QUEEN ANNE'S COUNTY  
2000**

	<b>Occupants</b>	<b>Public School Attendees</b>
Single Family - Detached	2.283	0.393
< 2 Bedrooms	1.738	0.199
2 Bedrooms	1.679	0.152
3 Bedrooms	2.303	0.397
4 or More	2.834	0.614
5 or More	2.798	0.627
Other	1.846	0.311
< 2 Bedrooms	1.331	0.079
2 Bedrooms	1.721	0.201
3 Bedrooms	2.222	0.546
4 or More	3.314	1.161
5 or More	3.255	1.325

follow. While single family has greater occupancy for fewer bedrooms, it has less occupancy for more bedrooms. This simply points to the fact that



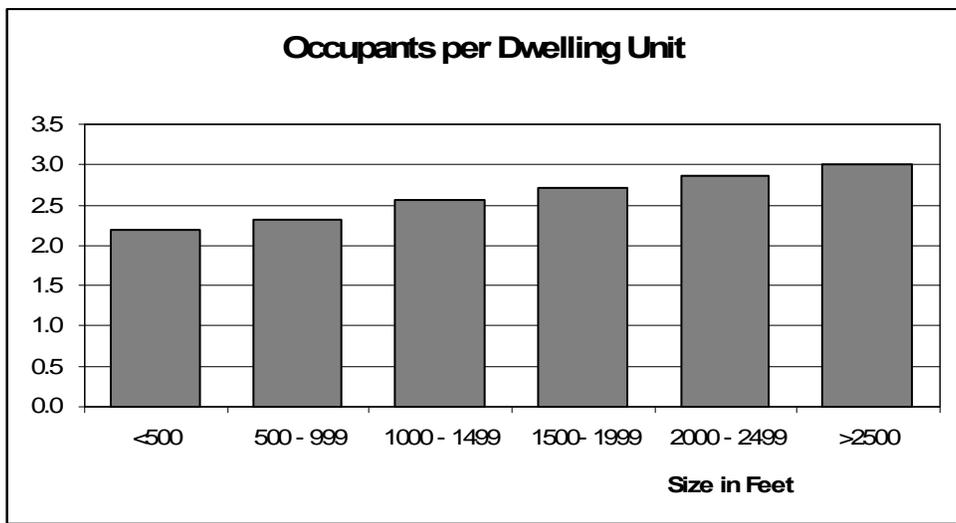
bedrooms are, at best, an imperfect means of assessing impact. There is an additional problem with the use of bedrooms. Just when is a bedroom a bedroom? In the Census what is a bedroom is self reported, meaning that when the householder fills out the census form and is asked how many bedrooms are in the house, the householder will respond based upon that individual's concept of what is or what is not a bedroom. The difference between a bedroom and a den or family room can sometimes be difficult to define. When money is involved in this differentiation, it can become complicated. Nevertheless, we can see a tendency for there to be more people within dwellings that are larger. This tendency is better respected when the type of dwelling is retained, rather than lumping several or all types together.

- **Size of Unit in Floor Area.** The third method of assessing impact is on the basis of the size of the dwelling, measured in gross floor area.<sup>2</sup> This method begins with the simple concept that larger homes will, on balance, have more occupants and greater impact than smaller homes. There are several bases for this contention. The *American Housing Survey of the United States, 2003*, provided data with respect to dwelling unit occupancy and the size of the dwelling. These data show increasing occupancy as the size of the dwelling increases.

<sup>2</sup> Some jurisdictions use gross floor area while others use heated area.

Area In FT <sup>2</sup>	Average Occupants
<500	2.185
500 - 999	2.321
1,000 - 1,499	2.553
1,500- 1,999	2.710
2,000 - 2,499	2.857
>2,500 FT <sup>2</sup>	3.012

SOURCE: American Housing Survey, 2003 Table 2-18,  
<http://www.census.gov/hhes/www/housing/ahs/ahs03/tab218.htm>



Many jurisdictions have been shifting to residential dwelling unit size as the preferred basis to measure impact and assess impact fees. The reasons for their interest are the fact that size based fees are seen as more equitable in that the heavier burden is lifted from smaller and presumably more affordable dwellings while still employing an empirically meaningful impact methodology. Queen Anne's County is also considering shifting to size based residential impact fees. Their non-residential impact fees are already size based.

## RESIDENTIAL OCCUPANCIES BY SIZE IN QUEEN ANNE'S COUNTY

Residential occupancies for Queen Anne's County derived from the census are shown above. These data can be used to project residential unit occupancies by size of unit in Queen Anne's County.

Residential building permit records for Queen Anne's County were gathered and analyzed to calculate statistics on the sizes of the units. A total of 743 residential permits issued, within unincorporated Queen Anne's County, between January 2003 and December 2006 were gathered. The summary statistics for this universe are summarized in Table 1.<sup>3</sup>

**TABLE 1  
SUMMARY STATISTICS FOR RESIDENTIAL UNITS PERMITTED  
QUEEN ANNE'S COUNTY  
2003 - 2006**

Units	Number	Bedrooms	Unit Size
All Units	743	2,630	2,051,829
Average		3.540	2,762
SFD	716	2,557	2,015,093
Average		3.571	2,814
Mobile Home	20	62	28,627
Average		3.100	1,431
Apartment	7	11	8,109
Average		1.571	1,158
Non-SFD	27	73	36,736
Average		2.704	1,361

As might be expected, single family homes have more bedrooms and are larger than apartments and mobile homes and also have more bedrooms than either.

The American Housing Survey found increasing occupancy with unit size. Table 2 shows occupancy by size data for Queen Anne's County. Table 3 contrasts Queen Anne's County data with that from the American Housing Survey. The same pattern prevails except that Queen Anne's absolute values are lower than for the nation as a whole.

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<sup>3</sup> The sample includes a de minimis number of apartment units.

**TABLE 2  
OCCUPANCY BY UNIT SIZE**

	No. of Units	No. of Persons	Persons per Unit
< 500 FT <sup>2</sup>	1	2	1.74
500 - 999	12	22	1.80
1,000 - 1,499	73	159	2.18
1,500 - 1,999	94	219	2.33
2,000 - 2,499	166	429	2.58
2,500 - 2,999	153	410	2.68
3,000 - 3,499	116	309	2.67
3,500 - 3,999	55	152	2.76
4,000 - 4,499	20	52	2.62
4,500 - 5,000	19	52	2.72
> 5,000 FT <sup>2</sup>	33	90	2.74
>2,500 FT <sup>2</sup>	396	2.69	

**TABLE 3  
UNIT OCCUPANCY BY SIZE OF UNIT  
UNITED STATES AND QUEEN ANNE'S COUNTY**

Area In FT <sup>2</sup>	AHS	QAC
<500	2.185	1.738
500 - 999	2.321	1.801
1,000 - 1,499	2.553	2.180
1,500- 1,999	2.71	2.328
2,000 - 2,499	2.857	2.584
>2,500 FT <sup>2</sup>	3.012	2.691

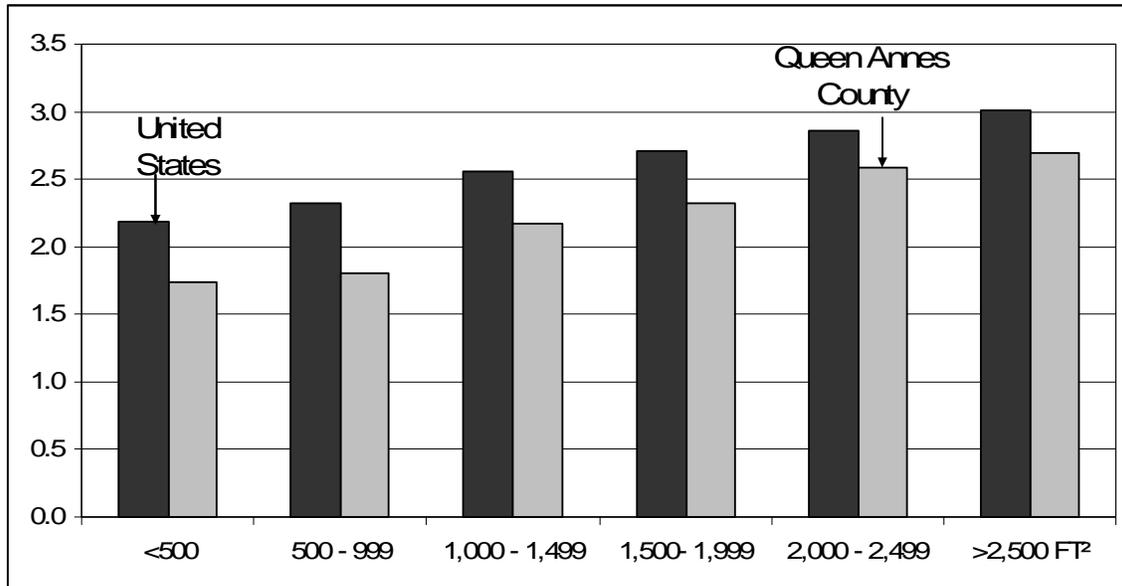
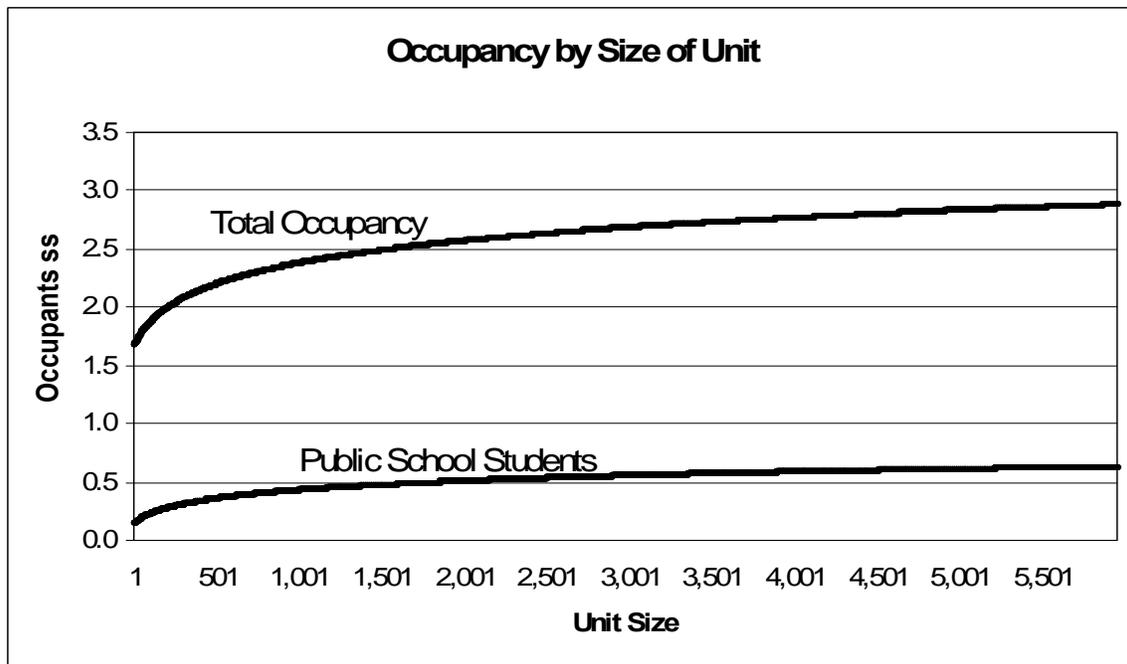


Table 4 shows student occupancy by size of the dwelling unit. Here too occupancy is increasing as units get larger.

**TABLE 4  
STUDENT OCCUPANCY BY UNIT SIZE  
QUEEN ANNE'S COUNTY**

	No. Units	No. Students	Students per Unit
< 500 FT <sup>2</sup>	1	0	0.199
500 - 999	12	3	0.260
1,000 - 1,499	73	27	0.368
1,500 - 1,999	94	39	0.417
2,000 - 2,499	166	86	0.521
2,500 - 2,999	153	85	0.554
3,000 - 3,499	116	64	0.550
3,500 - 3,999	55	32	0.587
4,000 - 4,499	20	11	0.528
4,500 - 5,000	19	11	0.570
> 5,000 FT <sup>2</sup>	33	20	0.607
>2,500 FT <sup>2</sup>	396	222	0.561

In both instances occupancy increases with unit size but the increase is at a decreasing rate. This trend is graphically shown below.



This is a semi-logarithmic relationship. Alternatively, occupancy grows at a decreasing rate as unit size grows. This follows from a regression equation that using either student or total occupancy as the dependent variable and unit size, expressed in natural logarithms<sup>4</sup> as the independent variable. The resulting equation and statistics are:

$$\text{Occupants} = .3185 + [.295^{1.76} * \text{Ln}(\text{Size})] - (.52^{18.7} * \text{SFD})$$

$$r_{Adj}^2 = .5024$$

The t-Ratios are shown in parentheses above the coefficients. These statistics indicate that there is a statistically significant relationship between occupancy and unit size in Queen Anne's County. However, there will be an upper limit to the accuracy of this equation and of the relationship. The relevant data are:

Average Size	2,762
Median Size	2,585
Standard Deviation	1,265
Upper Limit	5,242

Based on these data, the size based occupancies would be accurate only to dwellings with 5,000 square feet of heated floor area. For dwellings greater than 5,000 square feet, the rates of the 5,000 square foot dwelling should be used.

The average residence in Queen Anne's County has 2,762 square feet of heated living area. It also has 2.61 people and .429 public school students. This works out to .925 individuals per 1,000 feet of area and 0.184 school students per 1,000 feet of area.

Average Unit Size	2,762
Occupants	2.631
Students	0.429
Per 1,000 FT <sup>2</sup>	
Occupants	0.925
Students	0.184

These data can be used to reassess all of Queen Anne's County's impact fees from unit type based to size based.

Impact fees assessed on the basis of unit size should be revenue neutral to Queen Anne's County, that is, the same amount of money should be raised on the basis of unit size as on the basis of unit type. The only difference is smaller

<sup>4</sup> Natural logarithms have a base 2.718 as contrasted with the base 10 for common logarithms.

dwellings would pay smaller amounts and larger dwellings would be larger amounts. It would no longer matter what type of dwelling is being constructed.

**SIZE BASED IMPACT FEES  
QUEEN ANNE'S COUNTY**

Average Unit Size	2,762
Occupants	2.631
Students	0.429
<b>Per 1,000 FT<sup>2</sup></b>	
Occupants	0.925
Students	0.184
<b>Schools</b>	
Net School Cost per Student	\$20,755
Bond Credit per 1,000 FT <sup>2</sup>	\$618
Students per 1,000 FT <sup>2</sup>	0.184
Cost per FT <sup>2</sup>	\$3.21
<b>Parks</b>	
Park Cost per Capita	\$381.25
Persons per 1,000 FT <sup>2</sup>	0.925
Cost per FT <sup>2</sup>	\$0.35
<b>Fire/EMS Protection</b>	
Fire/EMS Cost per Capita	\$401.29
Persons per 1,000 FT <sup>2</sup>	0.925
Cost per FT <sup>2</sup>	\$0.37
<b>Total Impact Fee per FT<sup>2</sup></b>	<b>\$3.93</b>

A comparison of typical impact fees by method of assessment follows.

**Comparison of Size Based and Unit Type Based Impact Fees**

	Average	
	Square Feet	Occupants
All	2,762	2.631
Single Family	2,814	2.710
Other	1,361	2.233
Mobile Home	1,431	2.326
Apartment	1,158	1.709
<b>SCHOOLS</b>	<b>Size Based</b>	<b>Unit Type</b>
Avg SF	\$9,026	\$7,529
Avg Other	\$4,363	\$5,603
Avg Mobile Home	\$4,590	\$5,603
Avg Apartment	\$3,715	\$5,603
<b>PARKS</b>	<b>Size Based</b>	<b>Unit Type</b>
Avg SF	\$993	\$1,033
Avg Other	\$480	\$851
Avg Mobile Home	\$505	\$851
Avg Apartment	\$409	\$851
<b>FIRE</b>	<b>Size Based</b>	<b>Unit Type</b>
Avg SF	\$1,045	\$1,166
Avg Other	\$505	\$952
Avg Mobile Home	\$532	\$952
Avg Apartment	\$430	\$952
<b>TOTAL</b>	<b>Size Based</b>	<b>Unit Type</b>
Avg SF	\$11,064	\$9,728
Avg Other	\$5,349	\$7,406
Avg Mobile Home	\$5,627	\$7,406
Avg Apartment	\$4,554	\$7,406

Impact fee assessment at present in Queen Anne's County is on the basis of unit type and the types of units are Single Family Detached (SFD) and all others. All others would include mobile homes and apartments. The above comparison shows the unit type fee as contrasted with what the size based fee would yield. Single family homes tend to be larger than mobile homes and apartments and would thus most single family homes would have a higher fee with the sized based fee than with the unit type fee. By contrast, non-single family units tend to be smaller and thus would have a higher fee with unit type than with a size based fee. All dwellings, regardless of type, would pay the same fee per foot of livable area with a size based fee program. Smaller dwellings would have lower fees no matter what type of structure and larger dwellings would have higher fees, again regardless of type of structure.