



**NAHB**

**THE METRO AREA  
IMPACT OF HOME  
BUILDING IN BRYAN &  
COLLEGE STATION, TX**

**COMPARING COSTS  
TO REVENUE FOR  
LOCAL GOVERNMENTS**

Prepared by the Housing Policy Department

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## ***Introduction***

Home building generates local economic impacts such as income and jobs for local residents, and revenue to local governments. It also typically imposes costs on local governments—such as the costs of providing primary and secondary education, police and fire protection, and water and sewer service. Not only do these services require annual expenditures for items such as teacher salaries, they typically also require capital investment in buildings, other structures, and equipment that local governments own and maintain.

This report presents estimates of the metro area impacts of home building in the City of Bryan and the City of College Station, Texas. The report presents estimates of the impacts of building 952 single family homes, based on the level of construction in the City of Bryan and the City of College Station in 2007.

The local economic benefits generated by this level of home construction activity are reported in a separate NAHB document.<sup>1</sup> This report presents estimates of the costs—including current and capital expenses—that new homes impose on jurisdictions in the area and compares those costs to the revenue generated. The results are intended to answer the question of whether or not, from the standpoint of local governments in the area, residential development pays for itself.

Figure 1. College Station-Bryan, Texas MSA



<sup>1</sup> "The Metro Area Impact of Home Building in Bryan & College Station, TX: Income, Jobs and Taxes Generated," completed by NAHB in March 2008.

The comprehensive nature of the NAHB model requires a local area large enough to include the labor and housing market in which the homes are built. Local benefits in the model, including revenue generated for local governments, include the ripple impacts of spending and taxes paid by construction workers and new residents, which occur in an economic market area. For a valid comparison, costs should be calculated for the same area. A local labor and housing market generally corresponds to a Metropolitan Statistical Area (MSA) as defined by the U.S. Office of Management and Budget (OMB).

Based on local commuting patterns, OMB has identified the College Station-Bryan MSA as a metro area consisting of three counties (Brazos, Burleson, and Robertson) in Texas (see Figure 1). In this report, wherever the term local is used, it refers to the entire, three-county metro area.

### ***Costs Compared to Revenue***

This section summarizes the results on costs and revenue for local governments. The relevant assumptions about the single family homes built (including their average price, property tax payments, and construction-related fees incurred) are contained in the NAHB report, *The Metro Area Impact of Home Building in the City of Bryan & the City of College Station, TX: Income, Jobs and Taxes Generated*.

- ◆ In the first year, the 952 single family homes built in the City of Bryan and the City of College Station result in an estimated
  - **\$24.0 million** in tax and other revenue for local governments<sup>2</sup>
  - **\$2.7 million** in current expenditures by local government to provide public services to the net new households at current levels
  - **\$26.6 million** in capital investment for new structures and equipment undertaken by local governments

The analysis assumes that local governments finance the capital investment by borrowing at the current municipal bond rate of 4.40 percent.<sup>3</sup>

- ◆ In a typical year after the first, the 952 single family homes result in
  - **\$11.1 million** in tax and other revenue for local governments
  - **\$5.4 million** in local government expenditures needed to continue providing services at current levels.

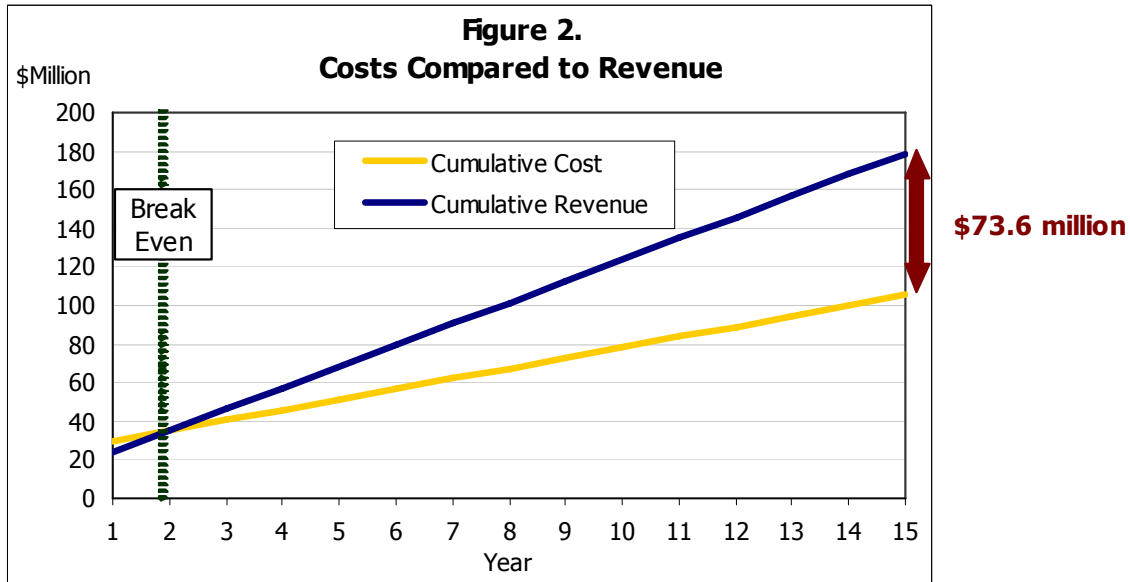
- ◆ The difference between government revenue and current expenditures is defined as an “operating surplus.” If it is assumed that the operating surplus is used first to service and then to pay down the debt, all debt incurred by investing in structures and equipment at the beginning of the first year can be entirely

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<sup>2</sup> This assumes that homes are occupied at a constant rate during the year, so that the year captures one-half of the ongoing, annual revenue generated as the result of increased property taxes and the new residents participating in the local economy.

<sup>3</sup> The analysis assumes that there is currently no excess capacity, that local governments invest in capital before the homes are built, and that no fees or other revenue generated by construction activity are available to finance the investment, so that all capital investment at the beginning of the first year is financed by debt. This is a conservative assumption that results in an upper bound estimate on the costs incurred by local governments. For information about the particular interest rate on municipal bonds used, see page 2 of the technical appendix.

paid off by the end of the second year. After that, the operating surpluses will be available to finance other projects or reduce taxes. After 15 years, the homes will generate a cumulative **\$178.9 million in revenue** compared to only **\$105.3 million in costs**, including annual current expenses, capital investment, and interest on debt (Figure 3).



**Method Used to Estimate Costs**

The method for estimating local government revenue generated by home building is explained in the NAHB documents, *The Metro Area Impact of Home Building in the City of Bryan and the City of College Station, TX: Income, Jobs and Taxes Generated* and *NAHB’s Local Impact of Home Building Model: Technical Documentation*. This section describes how costs are estimated.

The general approach is to assume local jurisdictions supply residents of new homes with the same services that they currently provide, on average, to occupants of existing structures. The amount that any jurisdiction spends is available from the Census of Governments, where all units of government in the U.S. report line item expenses, revenues, and intergovernmental transfers once every five years to the Governments Division of the U.S. Census Bureau. Census of Governments accounts can be aggregated for every local government in the College Station-Bryan metro area and then used to produce total annual expenses per housing unit.

Not surprisingly, cost per housing unit varies substantially across the major service categories. Education, publicly owned electric utilities, and miscellaneous general government account for the largest shares (Table 1):

Table 1.  
Total Annual Local Government Expenses per  
Single Family Housing Unit  
(in 2007 Dollars)

Education	\$1,710
Police Protection	\$375
Fire Protection	\$187
Corrections	\$191
Streets and Highways	\$170
Water Supply	\$162
Sewerage	\$90
Health Services	\$92
Recreation and Culture	\$190
Other General Government	\$832
Electric Utilities	\$1,658
<b>Total</b>	<b>\$5,656</b>

In deriving the above estimates, water supply and sewerage expenses are allocated based on gallons of water consumed per day by single family and multifamily households. Streets and highway expenses are allocated based on average number of vehicle trips generated on weekdays. Education is allocated based on average number of children age 5 through 18. The other government services listed in Table 1 are assumed to be proportional to population, so costs associated with those services are allocated based on household size.<sup>4</sup>

There are several factors present in most parts of the country that tend to reduce education expenses per housing unit. The first is the average number of school-aged children present in the units. According to the American Housing Survey, there is, on average, only a little over one school-aged child for every two households in the U.S. The number is about 0.6 per household for single family and under 0.4 per household for multifamily. So education costs per housing unit are lower than costs per pupil, simply because there is less than one pupil per household.

Beyond that, a share of households typically send their children to private schools. According to the National Center for Education Statistics (NCES), the share is 12.6 percent of all school-aged children nationally. As public monies are very rarely used to pay for private instruction, this tends to further reduce K-12 public school expenses, although the extent to which that occurs varies from place to place. Moreover, according to the NCES another 1.7 percent of students

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<sup>4</sup> Information about vehicle trips comes from *Trip Generation*, published by the Institute of Transportation Engineers. Information about water consumption comes from *Analysis of Summer Peak Water Demands*, a study undertaken by the City of Westminster, Colorado Department of Water Resources and Aquacraft, Inc. Water Engineering and Management. Information about household size and number of children comes from the American Housing Survey, conducted by the U.S. Census Bureau for the Department of Housing and Urban Development.

nationwide, ages 5 to 17, with a grade equivalent of kindergarten through grade 12, are homeschooled, which further acts to reduce the cost of public education.

Finally, state governments in the form of intergovernmental transfers pay for some public school expenses. In the latest Census of Governments, local governments in aggregate across the College Station-Bryan metro area spent about \$181 million in current expenses on education. However, 51 percent of this was offset by \$92 million in state-to-local intergovernmental transfers for education.

In addition to current expenses, providing services to residents requires that local governments make capital expenditures for items such as schools and other buildings, equipment, roads, and other structures.

Estimating capital costs is in general a more difficult and complicated problem than estimating current expenses. The approach used here is to estimate a conventional economic model, where costs are expressed as a function of labor and capital, with state level data. (Information about state and local government capital in each state can be estimated through a procedure that has been established over several decades in the technical literature on public finance; see the technical appendix for details.) The results are then applied to a local area, where information is available for every variable except capital. The local capital stock then emerges as a residual in the calculation. Consistent with the approach used to estimate current expenses, the amount of capital in each category is expressed as the amount necessary to accommodate an average housing unit (Table 2):

Table 2.  
Local Government Capital per  
Single Family Housing Unit  
(in 2007 Dollars)

Schools	\$12,158
Hospitals	\$542
Other Buildings	\$3,621
Highways and streets	\$3,882
Conservation & development	\$226
Sewer systems	\$2,290
Water supply	\$1,175
Other structures	\$2,733
Equipment	\$290
<b>Total</b>	<b>\$26,917</b>

To implement these numbers, several conservative assumptions are made to avoid understating costs. In contrast to the way current expenses were handled, intergovernmental transfers are generally not taken into account here—it is assumed that local governments undertake all capital investment without any help from the states. The exception is highways and streets, for which the amount of current expenditures per dollar of capital is typically quite low. It is further assumed that none of this demand for capital can be met through current excess

capacity. Instead, local governments invest in new structures and equipment at the start of the first year, before any homes are built. To the extent that this is not true—that, for instance, some revenue from impact or other fees is available to fund part of the capital expenditures—interest costs would be somewhat lower than reported here.

To compare the streams of costs and revenues over time, we assume that half of the current expenses and half of the ongoing, annual revenues are realized in the first year. This would be the case if construction and occupancy took place at an even rate throughout the year. Revenues in the first year also include all of the one-time construction impacts such as impact and permit fees.

The difference between revenues and current expenses in a given year is an operating surplus. At the start of the first year, capital investment is financed through debt by borrowing at the current municipal bond interest rate, and the interest accrues throughout the year. Each year after that, the operating surplus is used first to pay the interest on the debt, if any exists, then to pay off the debt at the end of the year. The results are shown for the 952 single family homes in Table 3:

Table 3. Results for 952 Single Family Homes

Year	Current Expenses	Revenue	Operating Surplus	Capital Investment Start of Year	Debt Outstanding End of Year	Interest on the Debt	Revenue Net of Costs and Interest
1	2,692,500	24,007,151	21,314,651	25,625,000	5,438,062	1,127,713	-5,438,062
2	5,385,000	11,065,775	5,680,775	0	0	239,320	5,441,455
3	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
4	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
5	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
6	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
7	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
8	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
9	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
10	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
11	5,385,000	11,065,775	5,680,775	276,000	0	0	5,404,775
12	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
13	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
14	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775
15	5,385,000	11,065,775	5,680,775	0	0	0	5,680,775

The difference between revenues (the third column) and all costs, including interest on the debt, is shown in the last column. Again, the assumption is that any operating surplus is being used to service the debt, and then to retire as much debt as possible at the end of the year. Revenue net of costs and interest is negative in the first year, but turns positive beginning in year two, and is sufficient to pay off all debt by the end of two. After that, revenue net of costs generated by the 952 single family homes is roughly \$5.7 million per year.

Net revenue falls due to a slight cost increase that occurs in year 11, because capital equipment purchased at the start of the first year becomes fully depreciated and needs to be replaced at that time. All other capital investment consists of structures of various types, for which the service lives are typically much longer than a single decade.