Smart Growth America
Making Neighborhoods Great Together

THE FISCAL IMPLICATIONS OF DEVELOPMENT PATTERNS

West Des Moines, IA

May 2015

Analysis of West Des Moines, IA

Prepared by Smart Growth America for the City of West Des Moines, IA
May 2015

Background and objectives

The connection between land use development patterns and the costs of providing public infrastructure and services has long been a topic of study, particularly since *The Cost of Sprawl: A detailed analysis* was published in 1974. Since that time, dozens, if not hundreds of studies have been conducted relating to this topic. Most of these have concluded that "smart growth" (that is, more compact patterns of development) is associated with reduced local government spending on a per capita basis relative to sprawl (recognizing that the definition of each of those terms not entirely consistent). Smart Growth America's *Building Better Budgets* report, published in May 2013, summarizes the results of 17 of these studies.

Yet these findings are not often included in the typical fiscal impact analyses done in connection with new development proposals. There are many reasons for this, but the inconsistent methodologies used in the above-referenced studies, as well as the time-consuming data collection efforts they involve, have likely slowed the process of these academic findings filtering into the "practice." Instead, most, (though not all) fiscal impact analyses rely on a simple average cost approach, which implicitly assumes that each new resident or job will add the same amount of public costs, regardless of whether they live and work in a sprawling, low-density development, or a high-density walkable urban one.

With support from a grant from the Department of Housing and Urban Development, Smart Growth America ("SGA") has been working to develop a fiscal impact methodology that not only accounts for the increased cost efficiencies associated with denser development patterns, but can also be easily adapted and used by local practitioners across the country. The City of West Des Moines generously agreed to become a case study community in the development of this methodology.

Scenarios

To test the methodology, SGA developed and evaluated four scenarios. Each scenario assumes the development of 9,275 housing units and 2.69 million square feet of commercial space. These development quantities roughly approximate the amount of growth that West Des Moines could experience in the next 20 years, assuming historical trends persist.

The scenarios differ in their density. The "base density" scenario approximates the average density of development in West Des Moines today. The "low density" and "higher density" scenarios represent incrementally lower, and higher development densities, respectively, than the base scenario. The product mix in the lower, base, and higher density scenarios is held constant in order to isolate the impacts of changing density alone. As a result, the lower density scenario still includes multifamily and townhouse development.

The final scenario, called "walkable urban," has the highest density of all scenarios considered and represents a more dramatic departure from the typical development pattern in West Des Moines.[1] In it, the product mix is changed to include more townhouses and multifamily units in place of the single-family detached homes in the other scenarios. Table 1 summarizes the development by type in each scenario.

TABLE 1

Development mix by type, in four scenarios

	Low density scenario	Base density scenario	Higher density scenario	Walkable urban scenario
Large lot, single-family detached homes	150	150	150	0
Standard/small single-family detached homes	5,000	5,000	5,000	1,500
Townhouses	1,125	1,125	1,125	3,275
Multifamily units	3,000	3,000	3,000	4,500
Total units	**9,275**	**9,275**	**9,275**	**9,275**
Total gross acres	2,654	2,188	1,728	783
Net residential density	5.5	6.9	10.8	22.4
Sq. ft. of commercial space	2.69 million	2.69 million	2.69 million	2.69 million

Key findings

Net fiscal impact

The results show that the total net fiscal impact on the public sector, in this case defined as the City of West Des Moines and the West Des Moines School District, is higher under the walkable urban scenario than any other. On a combined basis, the walkable urban scenario is anticipated to generate a total annual net fiscal impact of $11.2 million, while the low density scenario is projected to generate a total annual net fiscal impact of $7.5 million.[2] More efficient use of infrastructure and services, as well as reduced student generation rates associated with denser development are the main drivers of this relationship.

These findings also highlight the enormous opportunity cost associated with low density development. Both the base and the low density scenarios would consume over 2,000 acres of land and lock in a relatively high-cost, low-revenue land use pattern for generations. The walkable

1 Note that this level of density does not require any high-rise construction.

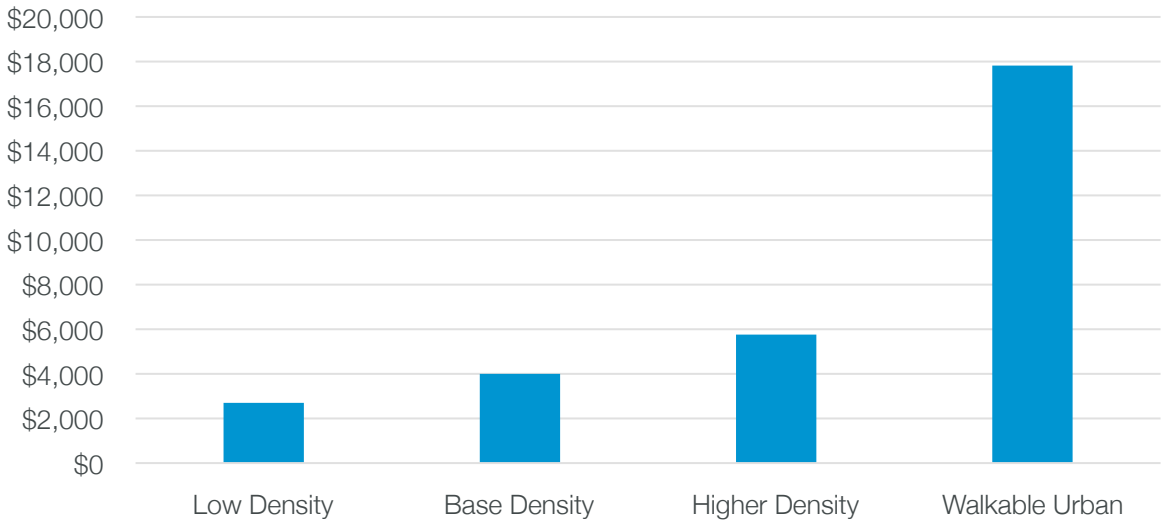
2 These numbers represent the total annual net fiscal impact (revenues minus expenditures) on the City of West Des Moines and the West Des Moines School District combined, in today's dollars, assuming full build-out of each scenario.

urban scenario could accommodate a similar amount of growth on less than 800 acres, meaning it could preserve over 1,200 acres of Iowa land. The remaining land, even if it remained vacant or agricultural would generate property tax revenues, but more importantly, it could accommodate future growth and development (or be retained for other public purposes, like parks), an opportunity that would be foreclosed under the low density scenario.[3] Because the value of the "saved" acreage is not reflected in the absolute totals, the net fiscal impact per acre is the more informative comparison between the programs. Table 2, below, illustrates the total net fiscal impact per acre for both the City of West Des Moines and the West Des Moines School District combined.

TABLE 2

Net fiscal impact per acre of by scenario

Combined impact on the City of West Des Moines and West Des Moines School District



The distinction between the absolute total net fiscal impact and the net fiscal impact per acre is important when interpreting these results. For the West Des Moines School District, the absolute total actually declines slightly as density increases if the development program is held constant, as in the low density, base density, and higher density scenarios. This occurs because SGA has conservatively assumed that the average single-family detached property value would decrease as lot size decreases.[4] Due to the fact that single-family detached homes constitute such a large portion of the development program, the decline in their value slightly outweighs the estimated cost savings associated with higher densities. Nonetheless, the change in absolute net fiscal impact is tiny compared to the change in acreage consumed among the scenarios. Therefore, the net fiscal impact per acre—the most relevant metric for reasons stated in the previous paragraph—is actually higher under the higher density scenario than either the low or base density scenario.

---

3 The retained land could of course be put to a public purpose, such as new parks. In such a case, it might come off the tax rolls; nonetheless, it clearly has economic value, which might be approximated by considering the cost that would be incurred to purchase it for that purpose.

4 As noted and discussed further below, this analysis maintains the very conservative assumption that reduced lot sizes result in reduced single-family property values. If, on the other hand, we allow for the possibility that the value of residential property may rise on a square-foot basis when homes are located in walkable environments, and in close proximity to services offered in a mixed-use community, there arises the potential for the "location premium" to offset the value of the diminished land area.

For the City of West Des Moines, however, the projected cost savings actually offset the estimated reduction in revenues associated with smaller single-family lot sizes. Both the absolute total net fiscal impact and the fiscal impact per acre increase as density increases when the development is held constant.

The walkable urban scenario assumes a different development program containing more multifamily units and fewer single-family detached units than the other scenarios. Although this results in a reduced absolute net fiscal impact for the City of West Des Moines compared to the other scenarios, the net fiscal impact per acre is still dramatically higher — more than double that of the base density scenario. For the West Des Moines School District, the walkable urban scenario generates a dramatic increase in both the absolute and per acre net fiscal impact because multifamily units tend to generate many fewer school children, and therefore costs, than single-family detached homes. Table 3, below, provides a breakdown of total revenues and costs by scenario.

TABLE 3

Total revenues and costs, by scenario

Residents and employees are both included in per capita costs.

Revenues

	City of West Des Moines			West Des Moines School District			Combined		
Scenario	**Total**	**Per capita**	**Per Acre**	**Total**	**Per Capita**	**Per Acre**	**Total**	**Per capita**	**Per Acre**
Low density	$29,085,000	$952	$10,400	$46,145,000	$1,510	$16,490	$75,230,000	$2,462	$26,890
Base density	$28,739,000	$941	$15,200	$45,764,000	$1,499	$24,200	$74,503,000	$2,440	$39,400
Higher density	$28,477,000	$933	$21,600	$45,477,000	$1,489	$34,550	$73,954,000	$2,422	$56,150
Walkable urban	$23,784,000	$884	$37,900	$29,689,000	$1,104	$47,360	$53,473,000	$1,988	$85,260

Expenditures

	City of West Des Moines			West Des Moines School District			Combined		
Scenario	**Total**	**Per capita**	**Per Acre**	**Total**	**Per Capita**	**Per Acre**	**Total**	**Per capita**	**Per Acre**
Low density	$22,169,000	$726	$7,900	$45,590,000	$1,493	$16,290	$67,759,000	$2,219	$24,190
Base density	$21,603,000	$707	$11,400	$45,399,000	$1,487	$24,000	$67,002,000	$2,194	$35,400
Higher density	$21,186,000	$694	$16,100	$45,142,000	$1,478	$34,290	$66,328,000	$2,172	$50,390
Walkable urban	$17,978,000	$668	$28,700	$24,284,000	$903	$38,740	$42,262,000	$1,571	$67,440

Net fiscal impact

	City of West Des Moines			West Des Moines School District			Combined		
Scenario	**Total**	**Per capita**	**Per Acre**	**Total**	**Per Capita**	**Per Acre**	**Total**	**Per capita**	**Per Acre**
Low density	$6,916,000	$227	$2,500	$555,000	$17	$200	$7,471,000	$243	$2,700
Base density	$7,135,000	$234	$3,800	$365,000	$12	$200	$7,500,000	$246	$4,000
Higher density	$7,291,000	$239	$5,500	$335,000	$11	$260	$7,626,000	$250	$5,760
Walkable urban	$5,806,000	$216	$9,200	$5,405,000	$201	$8,620	$11,211,000	$417	$17,820

Conservatism

SGA believes this model likely underestimates the improvement to net fiscal impact associated with higher densities. Most importantly, the model makes very conservative assumptions with regard to revenues. A wide body of research has confirmed that dense, walkable environments enjoy significant value premiums of 20% and higher over typical suburban product. This means that the assessed value per square foot of development could well be higher in the compact scenario than the base or low density scenarios. This factor alone, could easily have a greater impact on the net fiscal impact than the cost savings. Nonetheless, to be conservative SGA has not included this factor in the result and has in assumed that the average single-family home value would decrease with higher density due to smaller lot sizes.

In addition to the conservative revenue assumptions, SGA was not able to model certain other cost drivers that may be density-related due in part to a lack of sufficient data. Solid waste and recycling pickup, for example, is almost certainly less efficient in low density environments because of the greater distance, and therefore time and fuel between pickups. Police protection may also become less expensive in dense, walkable environments because of a need for fewer patrol cars and vehicle fuel and maintenance costs. The effective modeling of this relationship remains a task for future research.

Methodology

Revenues

Property tax

SGA reviewed assessment records in Polk County and Dallas County to develop average assessed value estimates for all of the residential and commercial product types evaluated in the study. These include single-family detached homes, townhouses, multifamily apartments, both for-sale and rental, as well as office, retail, and light industrial/flex space. The value of each product type was assumed to remain constant in each scenario except for the following two caveats:
First, a change in the size of a lot was assumed to have an impact on the assessed value of single-family homes. For example, in the low-density scenario, the standard single-family lot averages .25 acres in size. Under the higher density scenarios, the average lot size decreases. SGA estimated the reduction in assessed value associated with the smaller lot sizes based on a regression analysis of the relationship between assessed land value and lot size in West Des Moines. The only

factor that is assumed to vary among scenarios is the size of the lot; the square footage of the home is assumed to remain constant in all scenarios. No adjustments for lot sizes were applied to townhouses, multifamily units, or commercial properties.

In each scenario, the assumed assessed values were multiplied by the appropriate tax rates for the City of West Des Moines and the West Des Moines school district and taking account of the state "rollback" requirements.

Hotel tax
All of the scenarios assume the construction of 280 hotel rooms with an average daily rate of $150 and annual occupancy of 70%. The projected annual revenue is multiplied by the City's hotel tax. The hotel tax revenue is not assumed to vary between scenarios.

Miscellaneous revenues
Residents and employees of the development were assumed to generate revenues related to licenses, permits, fees, and certain other miscellaneous sources at the same rate as current residents and employees. These revenues do not vary by scenario.

Expenditures: Density-related

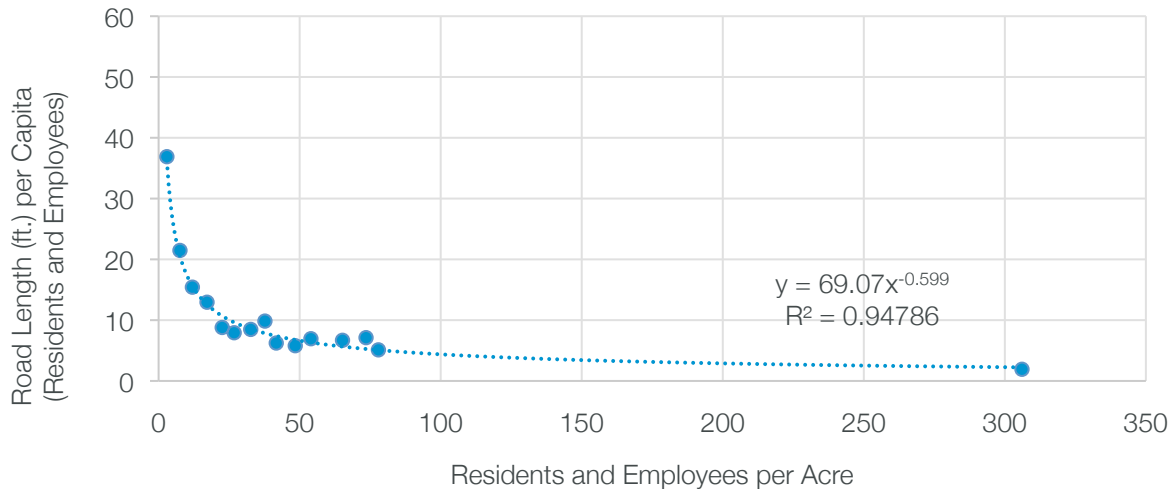
SGA divided the expenditures associated with new development into two basic categories. The first includes those that are likely to be affected by the density of the development while the second includes all other expenditures. For purposes of this analysis, SGA has treated expenditures on the maintenance of roads and pipes, including water, sewer, and storm sewer, as well as fire protection and school transportation as density-related. This represents approximately 32% of the total expenditures by the City of West Des Moines and 4% of the West Des Moines School District expenditures. Other expenditure categories, in particular solid waste pickup, and police protection are likely also affected by the density of development but the available information was not sufficient for SGA to credibly analyze the relationship for all categories.

Roads
SGA analysis shows that there is a strong inverse relationship between road length and area per capita, and the density of development in the Des Moines area. Using GIS, SGA drew a grid of equal-sized cells across the entire Des Moines Metropolitan area and determined the number of residents and employees, as well as the road length and area in each cell. From these data points, SGA derived a formula estimating both the road length and area needed per capita, at any reasonable density, assuming that the new development conforms to historical experience in the area.

There are significant improvements in efficiency when moving from typical suburban densities of 4 or 5 people and employees per acre to approximately 40 people and employees per acre. Figure 1, below, shows road length per capita on the y axis and the density (measured in terms of residents and employees per acre) on the x axis, along with a regression formula describing the relationship between the two factors. As this figure makes clear, the quantity of roads per capita decreases only slightly as density increases. While the chart below depicts road length only, SGA found a similarly strong relationship between road area and population/employment density.

FIGURE 1

Quantity of roads per capita



Capital costs for roads are paid by the developer; however, the City must maintain all roads. The City of West Des Moines estimated that roads cost $1.50 per square foot to resurface and must be resurfaced every 40 years. This model annualizes these costs by dividing the resurfacing cost by 40 years. In addition, the model assumes that the new roads would generate the same average costs per square foot in terms of pothole repair and snow removal as all other roads in the City of West Des Moines.

Water and sewer mains

The maintenance of water and sewer mains is performed by the City utility, which collects fees based on the quantity of water provided and wastewater processed. In a typical fiscal impact analysis, costs and revenues associated with public utilities are typically ignored because it is assumed that the utility revenues adjusts its rates to cover all costs, such that any expenses associated with a new development would be covered by the revenue it would generate. Nonetheless, the density of development does affect the costs to the utility. All else being equal, a development that requires an average of 100 feet of pipe between residences will cost more to maintain than a development with only 20 feet of pipe between residences. To account for this fact, SGA has developed a methodology that compares the ratio of pipe maintenance costs to the projected water and wastewater revenue generated by the development, to the same ratio for the City as a whole. If the ratio of maintenance costs to revenue generated is lower in the development than in the City as a whole, then the project is assumed to generate a positive cash flow to the City and vice versa.

Sewer and water mains typically follow the length of the street and SGA found that to be largely the case in the City of West Des Moines. Therefore, SGA employed the same methodology it used for road length to estimate the length of pipe needed in the development under each scenario. Water and wastewater use projections were made on a per resident and per employee basis using third party estimates.

Pipe maintenance costs were based on the annualized cost of reconstructing them, assuming a construction cost of $75 per linear foot and a lifetime of 60 years. The current analysis does not assume the reuse of any existing pipe.

Fire/EMS protection

To be effective, fire and emergency medical services (EMS) must respond to emergency calls in a short amount of time. The specific response time varies by community, but fire service budgets and capital requirements are typically based on an established standard. This necessarily means that, for any given response-time standard, the efficiency of fire service will be dependent on the density within the "fire service shed" (the geographic area served by a station). If it is developed at a very low density, then the cost of service, including the cost of the station, the ambulances, fire engine/ladders, and their staff will be spread over a few people and employees, and likely a low property tax base.

However, only the station costs are fixed. If density increases enough, the additional population will eventually require new fire engines and staff to serve them. SGA was unable to find any widely accepted standards, either in the City of West Des Moines, or nationally, on the quantity of fire engines and staff per population and employee. Therefore, SGA assumed that the City of West Des Moines would maintain its existing level of service, which is approximately one fully-staffed fire engine per 27,000 residents and employees and one fully staffed ambulance per 35,000 residents and employees.

The current City of West Des Moines response standard is 8 minutes. Assuming 1.5 minutes for dispatch, this equates to a 6.5 minute travel time for the fire engine. SGA estimated the distance that the fire engine could travel using a formula developed by the RAND institute and in use by ISO, a firm that analyzes the risk associated with public protection services for insurance companies. SGA translated the distance the engine could travel in 6.5 minutes into the acreage of the response shed from a hypothetical station at the center of the proposed development. Based on these assumptions, SGA found that the maximum service capacity for one fire engine and ambulance can be reached at even very low densities, of approximately 2 residents and employees per acre. Therefore, the incremental operating efficiencies associated with rising density are already more or less maximized, even at low densities.

The capital cost of the station, however, is more fixed. Though additional bays may need to be added as the population of the response shed increases, much of the station would remain the same. These costs can then be "spread out" over more people and a larger property tax base as density increases.

Based on information provided by the City of West Des Moines and additional sources, SGA estimated the cost of constructing a fire station, purchasing the necessary vehicles and equipment, and operating the vehicles on a per capita basis, assuming that the entire response shed is built-out at the density of the planned development. This per capita cost is then multiplied by the number of residents and employees in the development in each scenario.

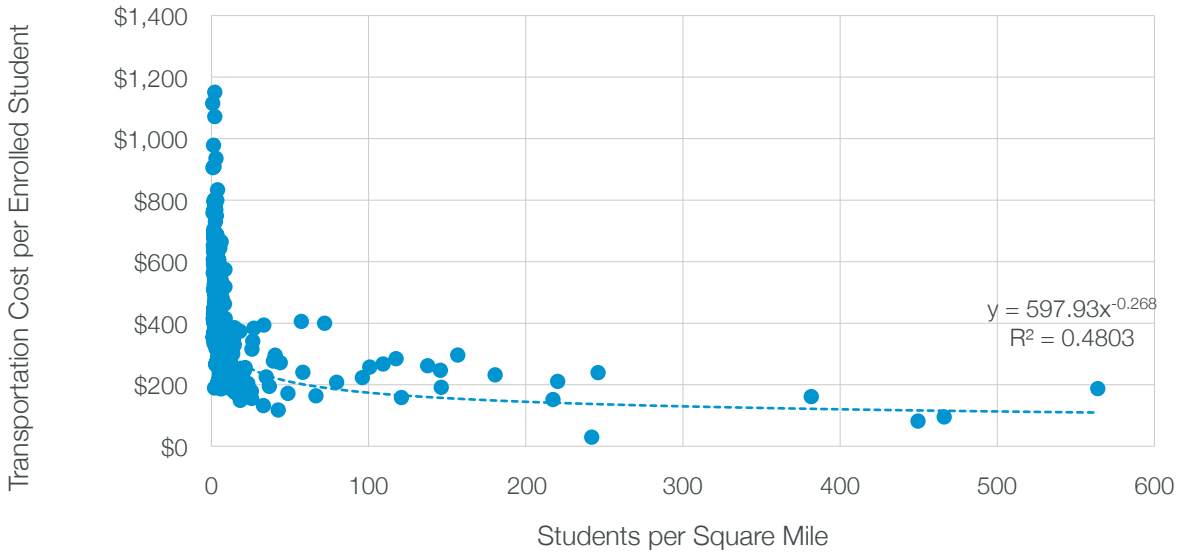
School transportation

All else being equal, school transportation costs should decline in areas of higher density, for two reasons: a) more students will live within the "walk zone" (close enough that they are expected to walk to school), and; b) for those who are bused, school buses should have smaller distances to

travel, saving on fuel costs and other operating costs. Data collected by the state of Iowa and other states on district transportation costs bears this out – transportation costs per student clearly decline as density increases. Figure 2 below, based on data from the Iowa Department of Education for the 2012-2013 school year, illustrates the relationship.

FIGURE 2

School district transportation costs and density



SGA's model estimates school transportation costs by estimating the number of students that are likely to be within the "walk zone" of any given school, assuming that the area around it as populated at the same gross density as the planned development in each scenario. Based on American Community Survey Public Use Microdata for the West Des Moines area, SGA estimated the number of students that would live in each development scenario and calculated the density of students per acre. The average student density was multiplied by the acreage of the walk zone for each school type (Elementary, Middle, and High). The number of likely students in the walk zone was then compared to the average school size by type for the West Des Moines School District. If the number of students likely to be in the walk zone met or exceeded the typical school capacity, then transportation costs were assumed to be zero. If the number of students within the walk zone was less than the capacity of the school, the remainder were assumed to use the school bus. Every bus student was assumed to generate annual costs equivalent to the current average expenditure per bussed student in the West Des Moines School District. This model does not account for bussing due to reasons other than the distance from the school, e.g. integration, magnet schools, etc.

Expenditures: Non-density related

For all expenditures not related to the density of development, SGA applied the conventional methodology of average costing, whereby expenditure categories are averaged across the number

of residents and employees in the jurisdiction. Each new resident and employee is assumed to generate these same costs. The distribution of costs between residents and employees is not an exact science, as municipalities typically do not and/or cannot track expenditures at this level of detail. SGA used its judgment in this regard, informed by the total proportion of residents to employees in the City of West Des Moines.

Notes on interpretation

This study is intended to provide an estimate of the different costs and revenues associated with developments of different densities. To that end, it compares annual revenues for each scenario at full build-out. It does not account for the time until build-out, which may well vary depending on the scenario. It also is a better calculator of the difference between scenarios, rather than the actual net fiscal impact in any given year of one scenario. This is mainly because major capital costs are annualized to provide an estimate of the overall long-term average costs. In reality, the City may need to spend very little money in the early years on maintaining infrastructure, for example, before eventually making a large balloon payment when infrastructure reaches the end of its lifetime. This model essentially assumes that the City saves up enough each year to make the large payment. The City's actual practice may differ, of course.

In addition, the model does not account for all capital costs that may be generated by new development. For example, the capital cost of new police stations, libraries, and recreation facilities are not currently included in the model. These cost items were assumed to be either independent of density or SGA did not have sufficient data to establish a relationship between density and their costs. Therefore, the inclusion of these costs might reduce the net fiscal impact of each scenario but the difference between scenarios, and the basic conclusions of this analysis, would remain unchanged.

The model also does not specifically account for the capacity of existing infrastructure. This is a deliberate choice for two reasons. First, the information on school, police, and fire capacity is difficult to obtain. Particularly, with respect to police, and fire, there are often no objective standards on when new staffing or equipment is required. Second, and perhaps more importantly, it is questionable to attribute the cost of a new station or school entirely to the new development that happens to push facilities beyond their "tipping point." Growth in prior years is equally responsible. For that reason, it is more important to understand the long-term average costs and apply them equally. The key point is that, while such a quantification may be important for a full fiscal impact analysis of prospective development, it would not affect the results here, because any such variation is likely to be the same regardless of the density of the development alternatives. In this analysis, our effort is simply to discern fiscal impacts that vary based on development pattern.

Smart Growth America
Making Neighborhoods Great Together

Smart Growth America is the only national organization dedicated to researching, advocating for, and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. Learn more at smartgrowthamerica.org.