

TRENDS IN DELAWARE'S GROWTH AND SPENDING

TECHNICAL REPORT

Prepared for the Delaware Department of Agriculture

by American Farmland Trust

May 2006



Acknowledgments

The Delaware Agricultural Lands Preservation Foundation funded this study. American Farmland Trust would like to thank Linda Hollis for her careful and thorough research and writing for this report. We would also like to thank the following people for their very valuable contributions to this study: Candace Casto, Office of the State Auditor; Bruce Haase and his staff in the reading room of the Delaware Public Archives; Jim Frazier, Delaware Public Archives; Walter Konek, Division of Accounting; John Laznik, Center for Applied Demography & Survey Research, University of Delaware; Michael Mahaffie, Office of State Planning Coordination; Michael McGrath, Delaware Department of Agriculture; Bryan Sullivan, Executive Office of the Budget.

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American Farmland Trust (AFT) is a private, nonprofit conservation organization founded in 1980 to protect our nation's strategic agricultural resources. AFT works to stop the loss of productive farmland and to promote farming practices that lead to a healthy environment. AFT provides a variety of services to landowners, land trusts, public officials, planners, agricultural agencies and others. Services include Cost of Community Services studies, workshops on farmland protection and estate planning, farmland protection program development and agricultural economic analysis.

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INTRODUCTION

Delaware lost 384,000 acres of farmland between 1950 and 2005¹ — much of it to scattered, low-density development, commonly referred to as sprawl. Today, only 9 percent of the state’s population lives in the city of Wilmington, as compared to 35 percent in 1950. Indeed, between 1984 and 2002, new housing units in Delaware consumed more than twice the land as the state’s historical average.

Sprawl separates essential uses such as home, work and shopping and results in fragmented open space and an automobile-dependent lifestyle.² It also is expensive, requiring significant capital spending, annual expenditures and bonded debt. For example, per capita the state’s capital budget increased by almost 250 percent over the last 20 years – eight times more than the state’s population increase and six times more than the increase in total housing units over the same time period.

The impact of sprawl on the loss of farmland, coupled with Delaware’s recent growth in population and land consumption, prompted the Delaware Department of Agriculture to ask American Farmland Trust (AFT) to research historic and recent trends in the state’s growth and capital spending.

AFT compared Delaware’s development patterns and capital spending every 10 years from 1900 to 1970, and for selected years between 1974 and 2002 to identify connections between increasing growth, state spending and land consumption, particularly in the years following World War II. Delaware agencies, such as the Executive Budget Office, the Division of Accounting, the State Archives and the Office of State Planning Coordination provided data for the study.

AFT’s analysis focused on population; total housing units; land use and land cover; acres of land consumed per housing unit; state capital spending, including cash expenditures and bonded debt; and spending for school bus transportation. A separate Summary Report describes those trends and major findings from the research. This Technical Report provides the background data for the research.

¹ U.S. Department of Agriculture, National Agricultural Statistics Service. “Delaware Data – Farm Numbers.” Available online at http://www.nass.usda.gov:8080/QuickStats/PullData_US.

² Fulton, William, et al. *Who Sprawls Most? How Growth Patterns Differ Across the U.S.* Washington, D.C.: Brookings Institution, 2001.

TRENDS FROM 1900 TO 1970

AFT examined changes in population, housing and total bonded indebtedness for the first seven decades of the twentieth century. For the historical period, data on population and total housing units were obtained from the Statistical Abstract of the United States, based on data gathered by the U.S. Bureau of the Census. *Total housing units* includes vacant and seasonal units, and is therefore higher than the number of occupied households in the state of Delaware.

Historic Growth in Population and Housing Units

Between 1900 and 1970, the population of the State of Delaware almost tripled in size, from less than 200,000 to almost 550,000. The number of total housing units increased almost five-fold, from 38,191 to 180,233. These increases are shown in Chart 1 and Table 1.

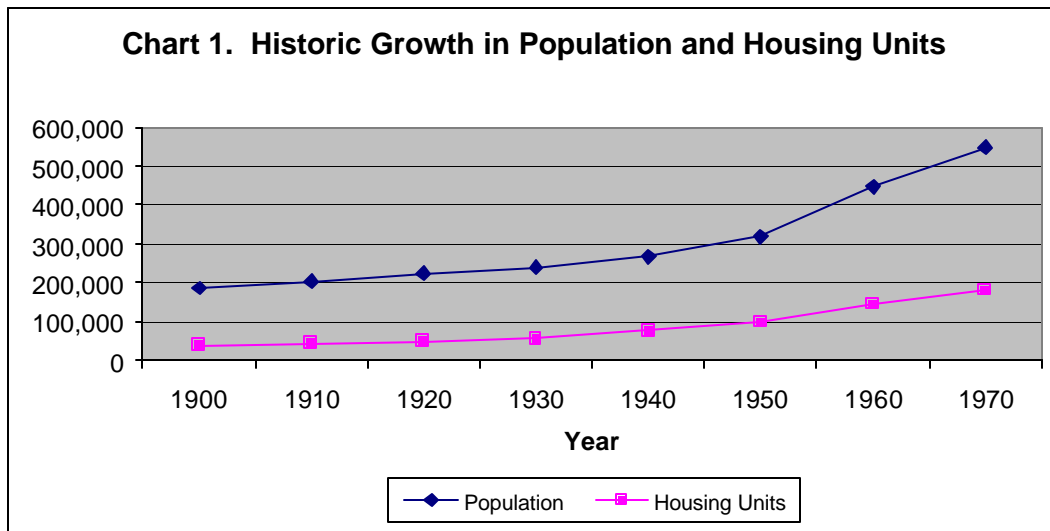


Table 1. Growth in Delaware, 1900–1970

Year	Population	Increase	% Increase	Housing Units	Increase	% Increase
1900	184,735			38,191		
1910	202,322	17,587	9.5%	43,183	4,992	13.1%
1920	223,003	20,681	10.2%	47,868	4,685	10.8%
1930	238,380	15,377	6.9%	54,940	7,072	14.8%
1940	266,505	28,125	11.8%	75,567	20,627	37.5%
1950	318,085	51,580	19.4%	97,013	21,446	28.4%
1960	446,292	128,207	40.3%	143,725	46,712	48.2%
1970	548,104	101,812	22.8%	180,233	36,508	25.4%

Source: U.S. Census Bureau, *Statistical Abstract of the United States*.

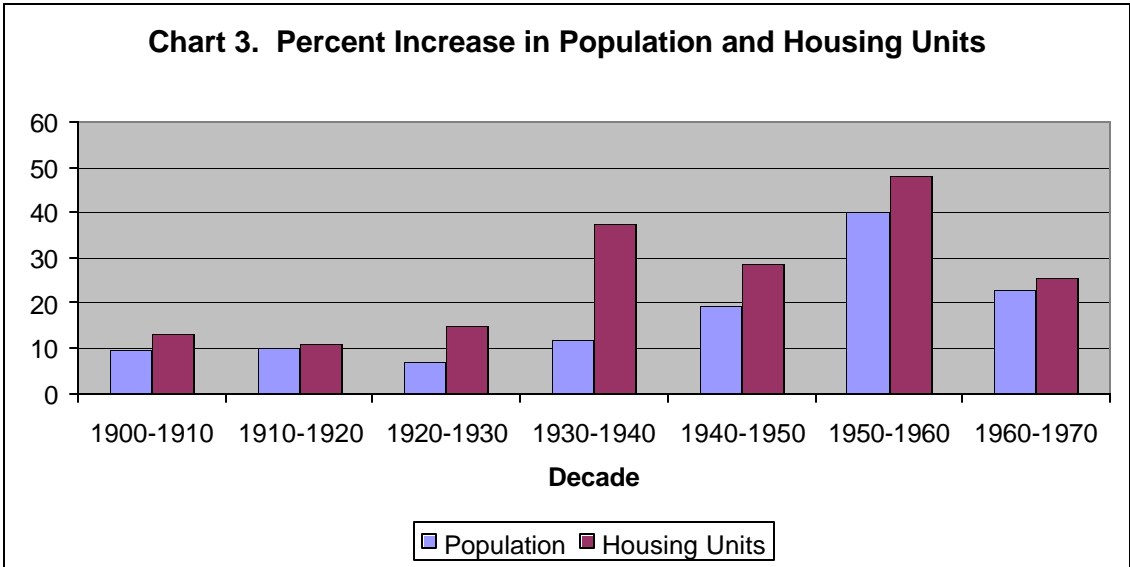
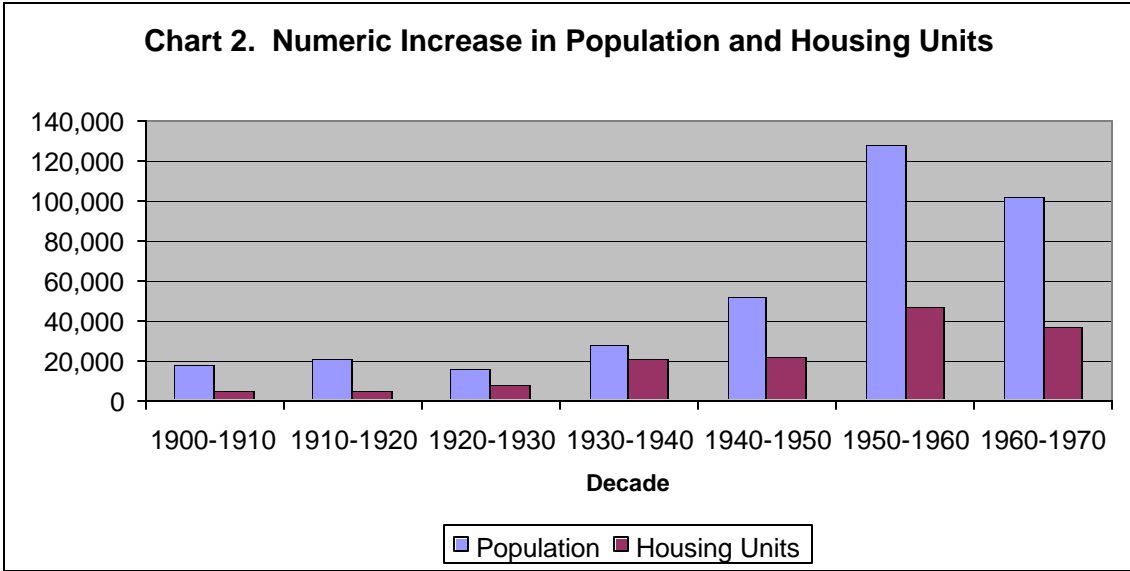
Table 1 shows that the percentage increase in housing units, ranging from 11 percent to 48 percent, was greater than the percentage increase in the state's population for each of the seven decades. Between 1920 and 1930 population increased only by about 7 percent, while housing increased by almost 15 percent. During the same time period, the number of manufacturing jobs in Delaware roughly doubled, from around 17,000 to almost 34,000.

The DuPont Highway was completed in 1924. This and the widespread adoption of automobiles may have encouraged more dispersed housing in the decade between 1930 and 1940, when the percentage increase in total housing units was more than three times greater than the percentage increase in population.

The largest increases in Delaware's population and housing came during the economic boom of the 1950s. The Delaware Memorial Bridge opened in 1951, linking the Delaware and New Jersey Turnpikes. The state gained major employers including Chrysler, General Foods and General Motors; a modern oil refinery opened near Delaware City; Dover Air Force Base was developed; and new chemical research centers were opened.³ Between 1950 and 1960, population increased 40 percent, total housing units increased 48 percent, and total employment increased 70 percent.

During the 1960s the increase in Delaware's population slowed to 23 percent but still included over 100,000 new residents and over 35,000 new housing units. Charts 2 and 3 illustrate the numeric and percentage increases by decade for housing and population.

³ Carol E. Hoffecker and Charles A. Stansfield, "Delaware," *Microsoft Encarta Online Encyclopedia 2005*.



Historic Growth in State Bonded Indebtedness

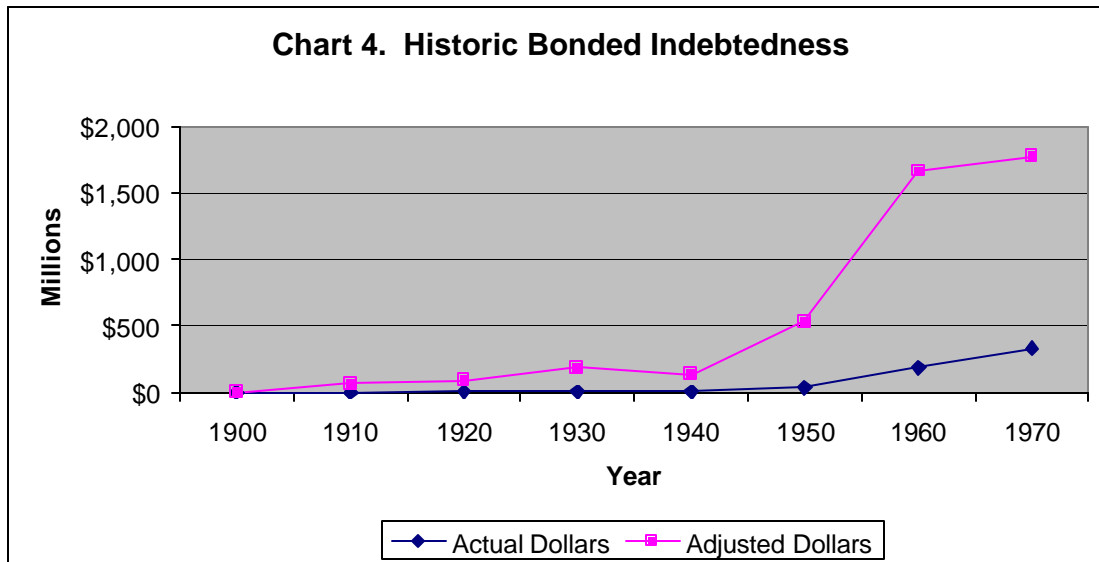
Data on total state indebtedness were obtained from the State Auditor of Accounts annual reports, which were retrieved with the help of the staff at the Delaware State Archives. State debt was inflated to 2005 dollars using the Engineering News-Record *Construction Cost Index History for 1908 to 2005*.⁴ In the tables and text below, figures that have been inflated to 2005 dollars are also referred to as “adjusted dollars.”

⁴ Mc-Graw Hill Construction, Engineering News-Record (ENR), *Construction Cost Index History, 1908-2005*.

Along with the growth of population and housing units, the amount of debt incurred by state government increased substantially between 1900 and 1970. Table 2 and Chart 4 below show that total bonded indebtedness increased from less than \$1 million in 1900 to over \$300 million in 1970. When those figures are inflated to 2005 dollars, the 1970 total is almost \$1.8 billion.

Year	Actual Dollars	2005 Dollars
1900	\$844,750	N/A
1910	\$826,785	\$63,627,996
1920	\$3,056,785	\$89,974,213
1930	\$5,056,785	\$184,037,082
1940	\$4,386,000	\$133,899,868
1950	\$36,750,000	\$532,370,588
1960	\$184,657,000	\$1,655,638,248
1970	\$331,645,000	\$1,774,216,698

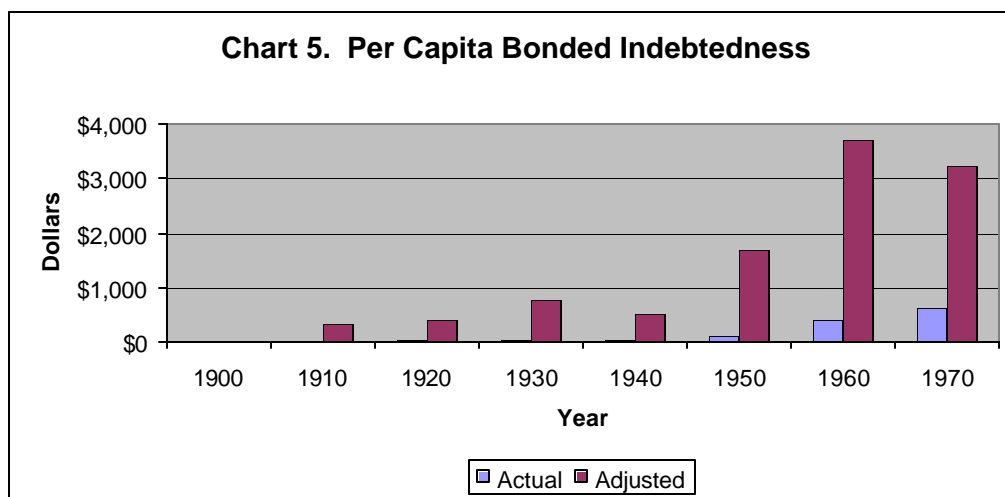
Source: State of Delaware Auditor of Accounts Annual Reports.



One way to compare total state bonded indebtedness across the years is to look at the level of spending per resident. Table 3 and Chart 5 show the results of dividing state debt by population.

Table 3. Per-Capita Bonded Debt		
Year	Actual Dollars	Adjusted Dollars
1900	\$4.57	N/A
1910	\$4.09	\$314.49
1920	\$13.71	\$403.47
1930	\$21.21	\$772.03
1940	\$16.46	\$502.43
1950	\$115.54	\$1,673.67
1960	\$413.76	\$3,709.76
1970	\$605.08	\$3,237.01

Sources: State of Delaware Auditor of Accounts Annual Reports and U.S. Census Bureau, *Statistical Abstract of the United States*.



The low levels of state debt in 1900 and 1910 are due to several factors. Almost half of Delaware’s population lived in Wilmington, where streets and other infrastructure already had been built. This decade preceded widespread automobile use, so the state had not incurred debt to build roads. And until the 1917 to 1921 administration of Governor John Townsend, the state had not invested much to build public schools.⁵

⁵ Hoffecker and Stansfield.

By 1920, Delaware began to incur debt for transportation and schools. Bonded debt per capita tripled from \$4 in 1900 to almost \$14. By the end of the “Roaring Twenties,” state debt per capita had increased another 150 percent to over \$21 in 1930. Then the Great Depression dampened economic conditions including state spending, and per-capita debt decreased to \$16 by 1940.

During World War II (1939–1945), Delaware’s employers were busy producing ships, airplanes, motor vehicles, iron, steel, chemicals and foodstuffs. The DuPont Company used its 1938 invention of nylon to produce parachutes for the war effort.⁶ The last half of the decade saw continued economic growth along with the beginning of the Baby Boom. As a result, state debt per capita increased by a factor of seven to almost \$116 in 1950. State investments to support the rapid growth in population, housing units and employment during the 1950s raised per capita debt to over \$400 in 1960, an increase of over 350 percent. Delaware’s rate of growth slowed during the 1960s, with the increase in state debt per capita dropping to 150 percent or \$605 by 1970.

Summary of Historic Trends

Although detailed land use/land cover data is not available prior to 1974, there are other indicators of sprawling development patterns beginning in 1950. That was the year that the population of the city of Wilmington as a percentage of the state total began to significantly decline, as shown in Table 4.

Year	Wilmington	Delaware	% of State
1900	76,508	184,735	41%
1910	87,411	202,322	43%
1920	110,168	223,003	49%
1930	106,597	238,380	45%
1940	112,504	266,505	42%
1950	110,356	318,085	35%
1960	95,827	446,292	21%
1970	80,391	548,104	15%
1980	70,197	594,338	12%
1990	71,531	666,168	11%
2000	72,664	783,600	9%

Source: U.S. Census Bureau, Statistical Abstract of the United States.

⁶ Hoffecker and Stansfield.

Also during this period the number of farms in Delaware decreased significantly. Table 5 shows that almost 200,000 acres of farmland were lost between 1950 and 1970.

Table 5. Historical Data on Delaware Agriculture				
Year	No. Farms	% Decrease	Farm Acres	% Decrease
1910	10,800		N/A	
1920	10,300	5%	N/A	
1930	10,000	3%	N/A	
1940	9,500	5%	N/A	
1950	8,300	13%	904,000	
1960	5,600	33%	800,000	12%
1970	3,900	30%	715,000	11%
1980	3,500	10%	650,000	9%
1990	2,900	17%	600,000	8%
2000	2,600	10%	560,000	7%

Source: U.S. Department of Agriculture, National Agricultural Statistics Service.

Table 6 compares the percentage increases in population, housing units and debt per capita (in adjusted dollars) for each decade in the historic period. While bonded debt per capita increased at a higher rate than population or housing units through the 1920s, it declined during the 1930s due to the economic depression. In the 1940s per capita debt took a great leap, increasing at over 12 times the rate of population and over 8 times the rate of housing units. During the 1950s bonded debt per capita increased at over three times the rate of both population and housing units.

Table 6. Comparison of Percentage Increases, 1900 to 1970			
Year	Population	Housing Units	Adjusted Debt per Capita
1900			
1910	9.5%	13.1%	
1920	10.2%	10.8%	28.3%
1930	6.9%	14.8%	91.3%
1940	11.8%	37.5%	-34.9%
1950	19.4%	28.4%	233.1%
1960	40.3%	48.2%	121.7%
1970	22.8%	25.4%	-12.7%

It is likely that the significant increases in bonded debt during the 1940s and 1950s reflect the impact of postwar suburban sprawl — lower density development spreading out into the countryside on former farm and forest land. This land use pattern generated public demand

for more miles of roads, more dispersed schools and other capital facilities, which resulted in the issuance of more bonded debt during this period.

Conclusions Regarding Historic Trends

- Between 1900 and 1940, Delaware's population increased an average of 10 percent per decade. Between 1940 and 1950, that rate of increase almost doubled, from less than 12 percent to more than 19 percent.
- Between 1950 and 1960, the population increase doubled again, from 19 percent to over 40 percent. During the 1960s, while the relative population increase was only 23 percent, the absolute increase (101,812) was almost as high as that of the 1950s.
- Between 1940 and 1960 there were over 68,000 housing units built in the state, almost equaling the entire inventory in the state in 1940 (75,567).
- Suburbanization accelerated after World War II, as people moved out of Wilmington and into new subdivisions on former farm and forest land. This low density, sprawling development pattern was accompanied by demand for more state-financed infrastructure, such as roads, schools and other capital facilities.
- Bonded debt shows the impact of this postwar suburban sprawl. In adjusted dollars, this measure tripled between 1940 and 1950, increasing from \$502 to \$1,674 per capita.
- Bonded debt per capita doubled again between 1950 and 1960, increasing from \$1,674 to \$3,710 in adjusted dollars.

TRENDS FROM 1970 TO THE PRESENT

For the period from 1970 to the present, data on population and housing units were obtained from the U.S. Bureau of the Census. Census data were used to be consistent with the historical data from 1900 to 1970. The Census also provides the total number of housing units, including vacant and seasonal units.

Because Delaware is located on the east coast within easy driving distance of the Washington, D.C., Baltimore, Philadelphia and New York metropolitan areas, it is attracting second homes. These seasonally occupied units are counted as vacant in the Census data. Vacant units in Delaware increased from around 20,000 in 1980 to over 40,000 in 1990 and remained at over 10 percent of the state's total housing stock in 2000.

The Delaware Office of State Planning Coordination provided data on changes in acres of developed land and land use/land cover data.

Recent Growth in Population and Housing Units

Between 1970 and 2000, the population of Delaware grew over 40 percent, to over 780,000. Over the same three decades, the number of housing units almost doubled, from 180,233 to 343,072. These increases are shown in Chart 6.

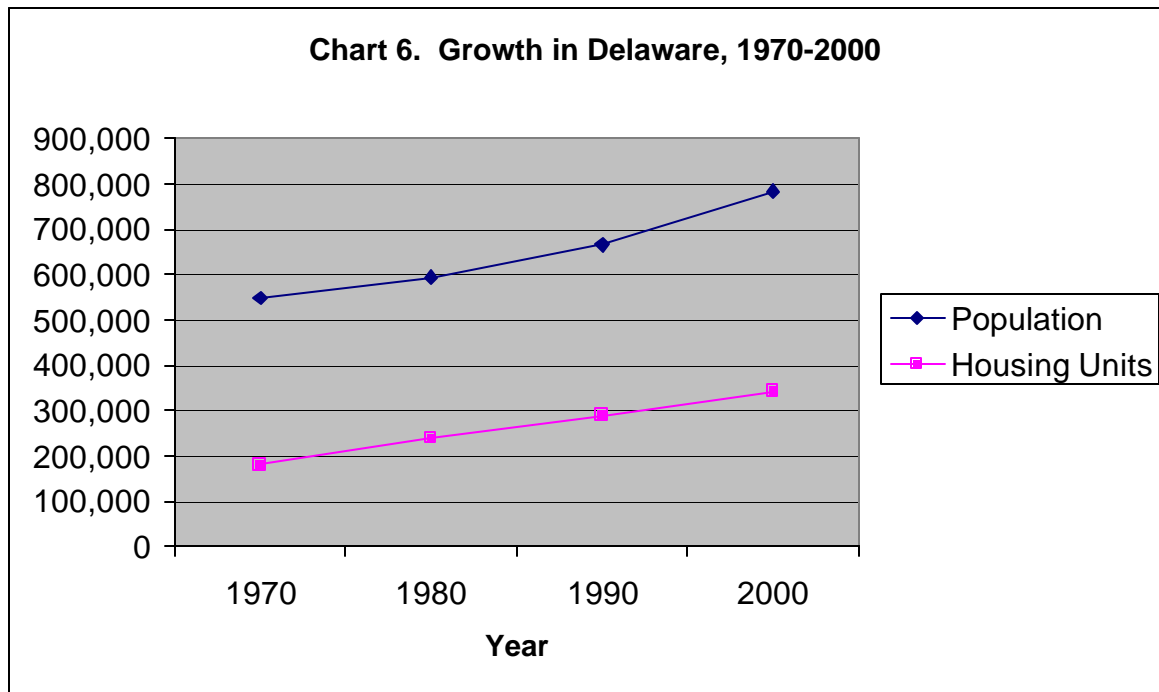


Table 7 shows that the percentage increase in housing units was greater than the percentage increase in the state’s population for the three most recent decades. This continued the pattern found between 1900 and 1970. In fact, during the 20th century as a whole, Delaware’s population increased 324 percent, while its number of total housing units increased almost 800 percent.

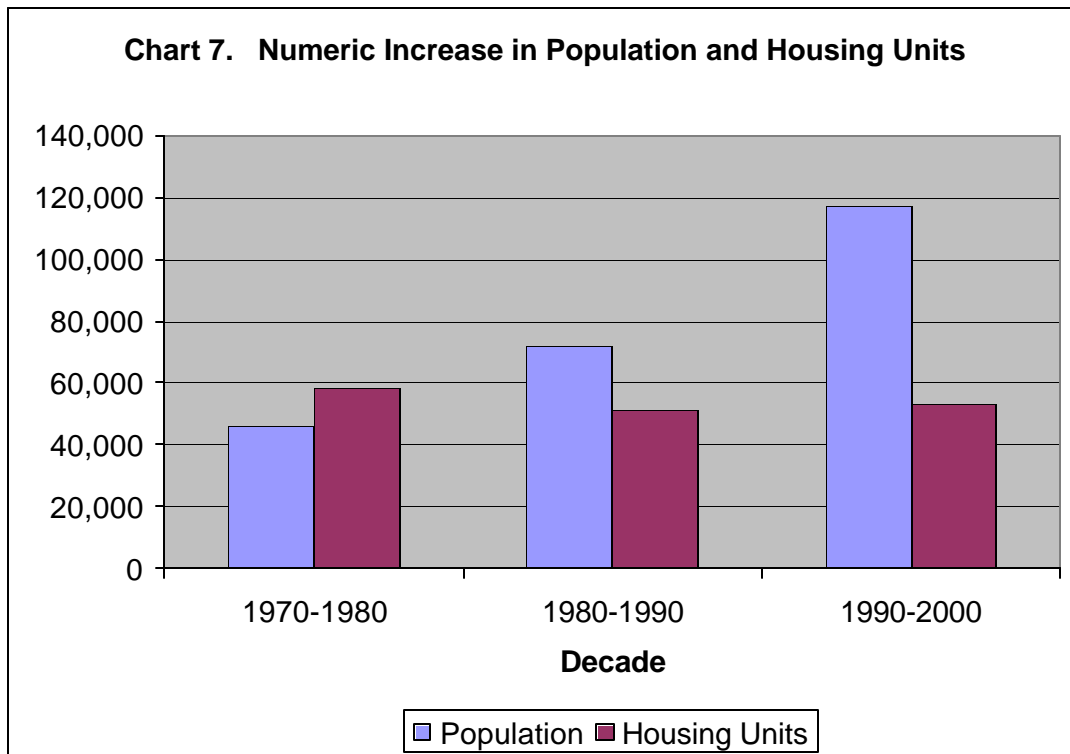
Table 7. Growth in Delaware, 1970-2000						
Year	Population	Increase	% Increase	Housing Units	Increase	% Increase
1970	548,104			180,233		
1980	594,338	46,234	8.4%	238,611	58,378	32.4%
1990	666,168	71,830	12.1%	289,919	51,308	21.5%
2000	783,600	117,432	17.6%	343,072	53,153	18.3%
Total		234,596			162,839	
Source: U.S. Census Bureau						

Between 1970 and 1980 the state’s population increase slowed to 8 percent, the lowest rate of increase since the depression era of the 1930s. Indeed, the state and much of the nation experienced an economic recession during the 1970s.⁷ Total employment in Delaware increased only half as much in the 1970s as it did in the 1960s. At the same time, between 1970 and 1980, housing units increased by 32 percent, or four times the rate of population. Two reasons for this were the number of baby boomers establishing their own households and the number of second homes established near the Delaware shore. The Census Bureau reports that between 1970 and 1980 total housing units in the state increased by almost 56,000. Of this total over 11,000 or 20 percent were multifamily units, and almost 10,000 or 17 percent were mobile homes.

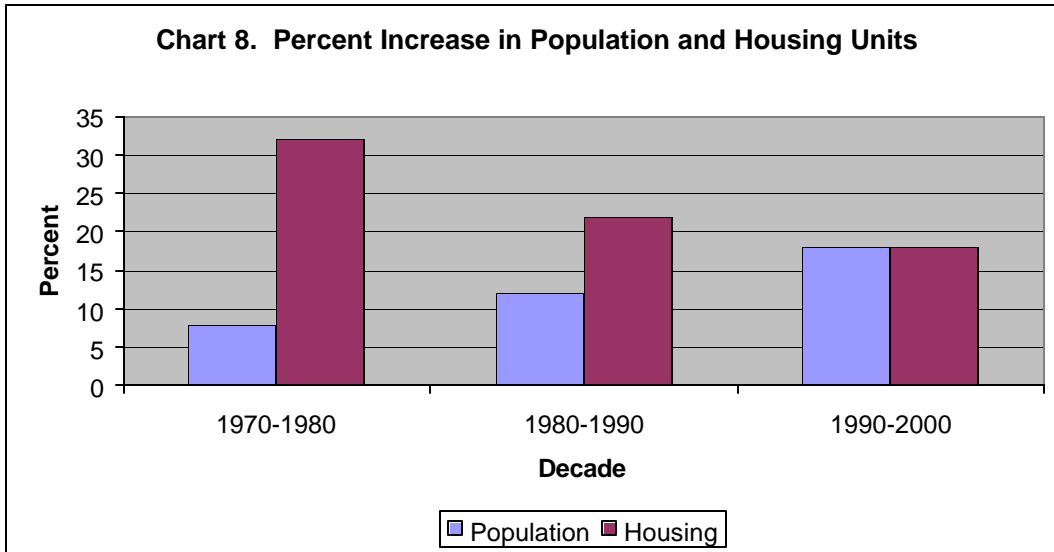
By the late 1970s the level of state spending on education, transportation and welfare programs was in danger of overwhelming the tax base and encouraging employers to leave the state. In response, Governor duPont reduced state spending and the legislature passed the Financial Center Development Act of 1981, which relaxed regulations on interest rates and attracted more than 30 banks to the state. Of these, more than a dozen out-of-state banks established credit card operations in Delaware. As a result of these developments, by the mid 1980s the state was able to reduce its personal income tax rates four times in four years.

⁷ Edward C. Ratledge, *Delaware: 1945-1998*, p. 21.

In 1988 Delaware passed a law discouraging hostile corporate takeovers. As a result, the state is now the home of hundreds of corporations that take advantage of unrestrictive incorporation law and state and federal courts that are highly experienced in corporate law.⁸ Between 1980 and 1990, total employment grew by 33 percent — almost as high an increase as that of the 1960s. Along with these healthy economic conditions, during the 1980s the state’s population increased by 12 percent and its housing units by 22 percent. This is shown in Charts 7 and 8.



⁸ Hoffecker and Stansfield



The Census Bureau reports that total housing units increased by almost 60,000 between 1980 and 1990. Of this total, over 11,000 or 19 percent were multifamily units and almost 20,000 or 33 percent were mobile homes. Delaware’s coastal county, Sussex, gained almost 13,000 mobile homes during the 1980s, while its urban county, New Castle, gained over 6,700 multifamily units between 1980 and 1990.

Between 1990 and 2000, both population and housing units increased by about 18 percent, while total employment increased by 10 percent. The 1990s population increase of 117,432 was almost as high as the spike of the 1960s. Some reasons for this include the continued growth of the financial services sector⁹; the attractiveness of the Wilmington area to people moving out of other cities, especially Philadelphia; and aging baby boomers and others buying second homes or retirement homes in Delaware.

The decade’s increase in housing units totaled over 53,000, 95 percent of which were single-family units. More than half of these were located in New Castle County, where more than 27,000 were built in the 1990s.

Trends in Land Use/Land Cover

Beginning in 1974, aerial photos of Delaware counties have been digitized, mapped and interpreted. The resulting interpretations document changes in land use and land cover in the state between the following time periods: 1974–1984, 1984–1992, 1992–1997 and 1997-

⁹ Ratledge, p. 23.

2002. Over the 28-year period, almost 143,000 acres were developed into urbanized uses — an average of more than 5,000 acres per year.

It has been widely observed that recent residential development in Delaware has tended toward larger houses on larger lots, accompanied by big box stores, suburban office parks and other sprawling commercial development. To test that assumption, AFT compared the increase in acres of developed land to increased housing units.

Increase in Developed Land

The Delaware Office of State Planning Coordination provided four documents to show land use/land cover data. The first is *Land Use Transitions in Delaware, 1974–1984* by John Mackenzie of the University of Delaware. Its data are summarized in Table 8.¹⁰

Table 8. Increase in Developed Acres, 1974-1984				
Land Use Category	Kent Co.	New Castle Co.	Sussex Co.	State of DE
Resid.-Sngl. Fam./Duplex	6,880	4,514	4,606	16,000
Resid.-Multifamily	146	547	215	908
Resid.-Mobile Home	280	96	1,645	2,021
Resid.-Other	72	40	230	342
Commercial	1,278	774	591	2,643
Industrial	556	916	533	2,005
Utility/Transport./Commun.	79	358	0	437
Recreation-Other	137	559	386	1,082
TOTAL	9,428	7,804	8,206	25,438
Source: MacKenzie, <i>Land Use Transitions in Delaware, 1974-1984</i> .				

John Mackenzie and Kevin McCullough of the University of Delaware documented *Delaware Land-Use/Land Cover Transitions, 1984-1992*, which reports changes in fewer land use categories than the previous one, as shown in Table 9.

Table 9. Increase in Developed Acres, 1984-1992				
Land Use Category	Kent County	New Castle County	Sussex County	State of Del.
Residential	8,353	13,661	17,797	39,811
Commercial/Industrial	2,616	12,649	7,047	22,312
Recreation	237	306	223	766
TOTAL	11,206	26,616	25,067	62,889
Source: Mackenzie and McCullough, <i>Delaware Land-Use/Land Cover Transitions, 1984-1992</i> .				

¹⁰ John Mackenzie, *Land Use Transitions in Delaware, 1974–1980*. The categories in this report are the most detailed of the four documents showing landuse/land cover data. In order to be consistent with the other three sources, we have used the *Total Gain* columns from Appendix Tables 1.1 through 1.4 to this report.

The Office of State Planning Coordination prepared a document entitled, *Gross Land Use Changes in Delaware, 1992 to 1997*. Table 1 of this report shows a category called “Developed” acres in 1997; this is the sum of the three land use categories shown in Table 10.

Table 10. Increase in Developed Acres, 1992-1997				
Land Use Category	Kent County	New Castle County	Sussex County	State of Del.
Residential/Urban	6,068	5,893	10,408	22,369
Commercial/Industrial	383	1,048	519	1,950
Transport./Govt./Utility	342	1,029	586	1,957
TOTAL	6,793	7,970	11,513	26,276
Source: Delaware Office of State Planning Coordination, <i>Gross Land Use Changes in Delaware, 1992-1997</i>				

The *Absorption Analysis of the 2004 Update of the Strategies for State Policies and Spending* reports land uses within built areas grouped into five categories: Residential/Other Urban, Commercial, Transportation/Utility, Institutional, and Recreation. In order to show the increase in developed residential acres between 1997 and 2002, total Residential/Urban acres for 1997 are subtracted from the sum of Residential/Other Urban and Recreation acres for 2002. The Recreation category includes golf courses, sports fields, recreation centers, swimming pools and other uses associated with residential development.

To show the increase in developed commercial acres, the sum of Commercial/Industrial and Transportation/Government/Utility acres for 1997 is subtracted from the sum of Commercial, Transportation/Utility, and Institutional acres for 2002. The results are shown in Table 11.

Table 11. Increase in Developed Acres, 1997-2002				
Land Use Category	Kent County	New Castle County	Sussex County	State of Del.
Residential/Other Urban	9,327	5,668	10,129	25,124
Commercial	714	0	3,267	3,981
TOTAL	10,041	5,668	13,396	29,105
Source: Delaware Office of State Planning Coordination, <i>Absorption Analysis of the 2004 Update of the Strategies for State Policies and Spending</i> .				

There are several reasons why these data show no increase in acres of commercial land in New Castle County. The aerial photographs in 2002 used a much higher resolution than those in 1997. As a result, parcels with *any* commercial uses probably were counted *entirely* as commercial in 1997 but counted as separate uses (commercial, open space, residential, etc.) in 2002. Secondly, much of the commercial development in Wilmington/New Castle County, a mature urban area, is actually redevelopment, or higher density uses on already developed land. Finally, the county adopted a Unified Development Code in 1997, which slowed development between 1997 and 2002.

Table 12 summarizes the statewide increase in developed acres over the four time periods in two land use categories — Residential, including Recreation, and Commercial, including Industrial, Utility, Transportation, Communication, Institutional, and Government.

Table 12. Statewide Increase in Developed Acres, 1974-2002				
Land Use Category	1974-1984	1984-1992	1992-1997	1997-2002
Residential	20,353	40,578	22,368	25,124
Commercial	5,085	22,312	3,906	3,978
TOTAL	25,438	62,890	26,274	29,102

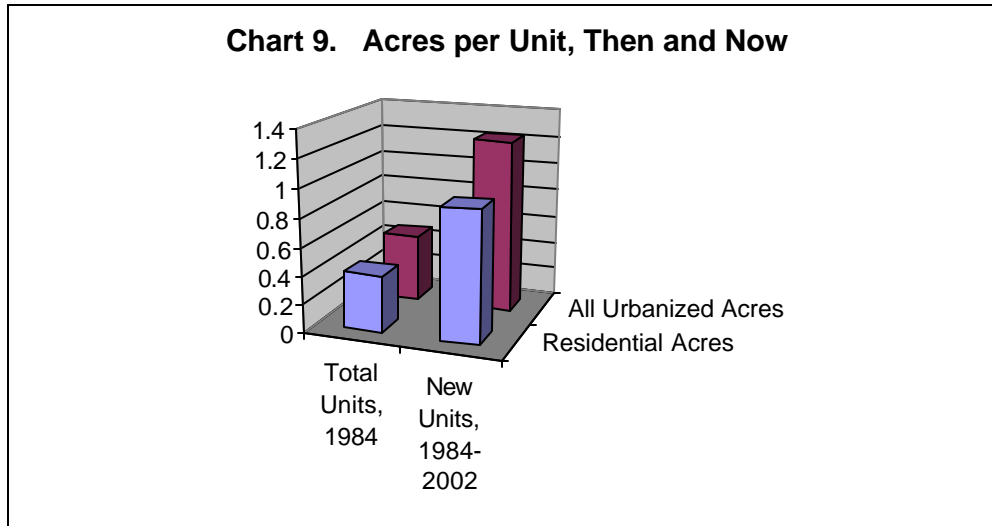
Land Consumption per Housing Unit

Table 13 shows recent total housing units based on years corresponding to the land use/land cover data. Total housing unit counts were obtained from the 1970, 1980, 1990 and 2000 Censuses. For interim years, the decade’s average annual increase was used to estimate total housing units. For years since 2000, AFT used the Census (www.census.gov) estimate of 367,448 total housing units in 2004. This represents an average increase of 6,094 units per year since 2000, which AFT used to estimate Delaware’s total housing units in 2002 and 2005.

Year	Total Units
1970	180,233
1974	203,584
1980	238,611
1984	259,134
1986	269,396
1990	289,919
1992	300,550
1997	327,126
2000	343,072
2002	355,260
2004	367,448
2005	373,542
Source: U.S. Census Bureau	

To summarize recent trends in land use/land cover, AFT compared acres per new unit built over roughly the last 20 years (1984-2002) to acres per unit for all units built prior to 1984. In Table 14 and Chart 9, the base acres for 1984 were calculated by subtracting the increases in developed acres between 1984 and 2002 from the totals for 2002 reported by the Office of State Planning Coordination.

Up to 1984		1984-2002	
Total Housing Units	259,134	New Housing Units	96,126
Residential Acres	104,804	Increased Residential Acres	88,070
Residential Acres per Unit	0.4	Residential Acres per Unit	0.92
Urbanized Acres	125,384	Increased Urbanized Acres	118,266
Urbanized Acres per Unit	0.48	Urbanized Acres per Unit	1.23



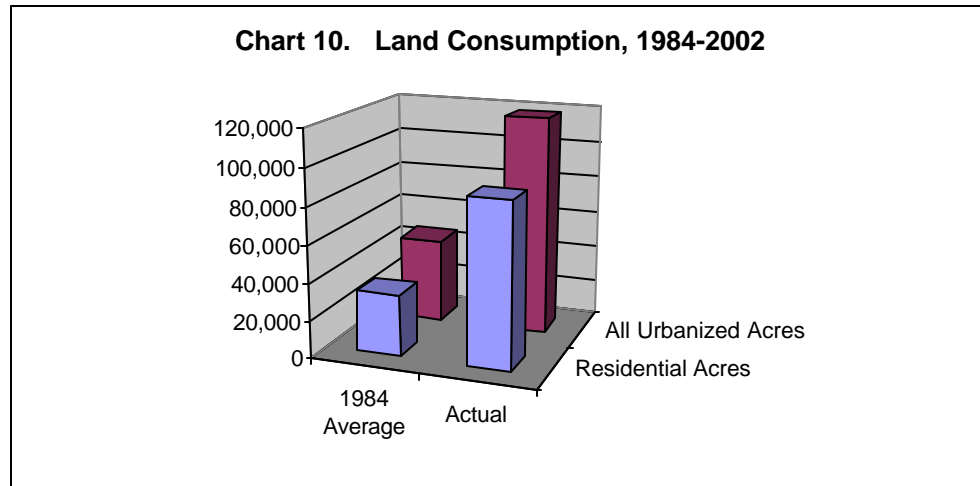
In 1984 there were almost 260,000 total housing units in the state, covering a little more than 100,000 acres. This represents an average of *four-tenths of an acre* of residential land per existing housing unit in 1984. There were over 125,000 acres of urbanized land (e.g., developed land of all residential and commercial types). This represents an average of about *one-half* of an acre of urbanized land per existing housing unit in 1984.

Contrast these results with those for new units built between 1984 and 2002. The more than 96,000 new units represent an 88,000-acre increase in developed land. This is an average of *almost an entire acre* of residential land per new housing unit, or more than *twice the land consumption* of the historical average. When new units are compared to the increase in urbanized acres of all types, over 118,000, the result is almost *one and one-quarter acres* of urbanized land per new housing unit. This represents *over two and one-half times the land consumption* of the historical average.

What if the lower land consumption figures in 1984 had continued to 2002? The results are shown in Table 15 and Chart 10.

Increased Units	96,126	Increased Units	96,126
Residential Acres per Unit	0.4	Urbanized Acres per Unit	0.48
Historic Avg. Residential Acres	38,450	Historic Average Urban. Acres	46,140
Actual Residential Acres	88,070	Actual Urbanized Acres	118,266
Difference in Residential Acres	49,620	Difference in Urbanized Acres	72,126

Table 15 shows that, if the 1984 average of 0.4 acres of residential land per new housing unit had remained in place, by 2002 the state would have developed *almost 50,000 fewer acres of residential land*. Likewise, if the 1984 average of 0.48 acres of urbanized land per new housing unit had remained in place, by 2002 the state would have developed *over 72,000 fewer acres of urbanized land*. This is almost as high a figure as the number of acres of farmland preserved in Delaware as of March 2006, which is 79,955.¹¹



Recent Growth in State Spending

Finally, AFT examined measures of state spending. Recent trends in infrastructure spending are discussed in the next section of this report. This section focuses on recent trends in pupil transportation spending. Public Education is the single largest line item in the state operating budget, representing one-third of General Fund expenditures. With growth in population, housing units and land cover, one of the Public Education items that might be expected to increase is pupil transportation.

The Office of Management and Budget provided data on state funding of pupil transportation between 1970 and 2005. These represent budgeted General Funds for both Public School Transportation and Non-Public School Transportation. They do not include local funds. Except for the first fiscal year included in our analysis, 1970, these figures do include personnel costs. Because records for 1974 and 1975 were missing, in order to estimate pupil transportation spending in 1974, we divided the increase between 1973 and 1976

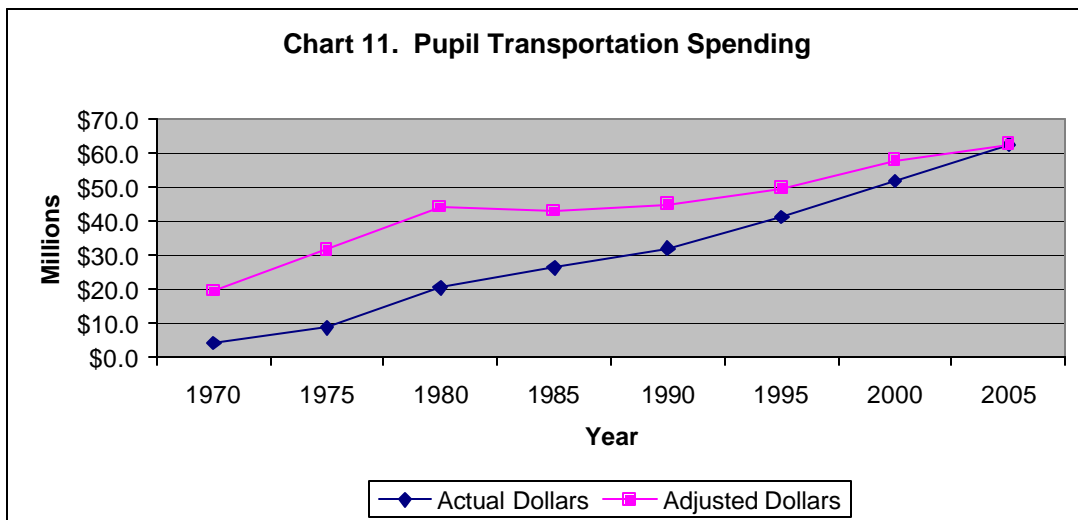
¹¹ State of Delaware Department of Agriculture, "Delaware Agricultural Lands Preservation Foundation Current Situation Report as of Tuesday, March 7, 2006."

(\$1,721,990) by three and added the result as a proxy for the annual increase between 1973 and 1976. State spending on pupil transportation has been inflated to 2005 dollars using the Consumer Price Index.

Table 16 and Chart 11 show that state spending on pupil transportation increased over \$58 million from 1970 to 2005. In adjusted dollars, the increase is over \$43 million, from a base of \$19.9 million in 1970.

Year	Budgeted Amount	In 2005 Dollars
1970	\$4,200,000	\$19,858,575
1975	\$8,797,993	\$31,658,641
1980	\$20,631,600	\$44,224,674
1985	\$26,277,800	\$43,043,709
1990	\$32,148,100	\$45,113,074
1995	\$41,324,000	\$49,800,005
2000	\$51,916,500	\$57,929,245
2005	\$62,810,600	\$62,810,600

Sources: State of Delaware Executive Department, Office of the Budget, "State Funding of Pupil Transportation FY1970 to FY2006," and U.S. Department of Labor, Bureau of Labor Statistics, *Consumer Price Index-All Urban Consumers, Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD, Transportation*.



One way to compare state spending on pupil transportation across the years is to look at the level of spending per school-aged resident of Delaware. The Statistical Abstract provides Census estimates of state population by age groups. In Table 17 and Chart 12, the number of

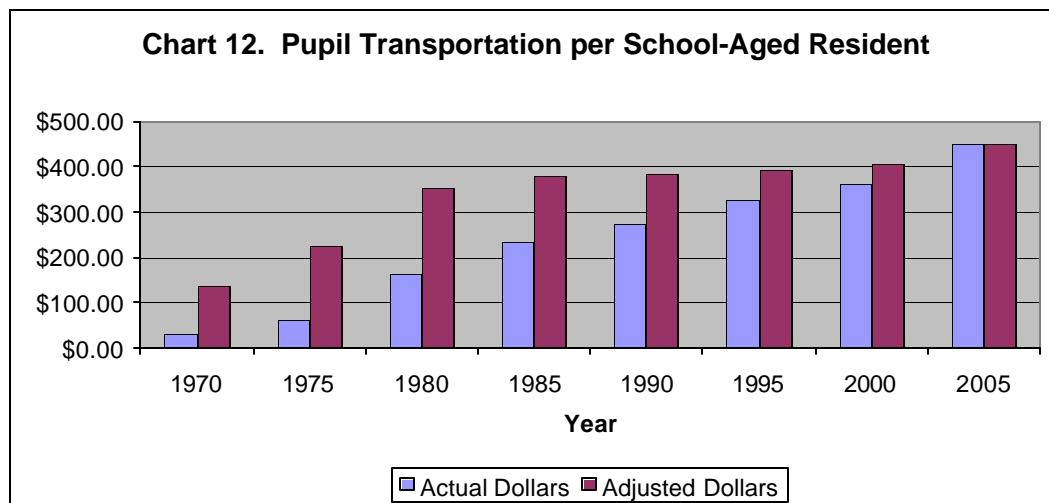
Delaware residents ages 5 through 17 is used to represent public and private school students, since both groups receive state-subsidized transportation.

Table 17. Pupil Transportation Spending per School-Aged Resident			
Year	Ages 5-17	Actual Dollars	Adjusted Dollars
1970	148,000	\$28.38	\$134.18
1975	141,800	\$62.05	\$223.26
1980	126,000	\$163.74	\$350.99
1985	113,000	\$232.55	\$380.92
1990	118,000	\$272.44	\$382.31
1995	127,000	\$325.39	\$392.13
2000	143,000	\$363.05	\$405.10
2005	140,000	\$448.65	\$448.65
Sources: U.S. Census Bureau, Statistical Abstract of the United States; State of Delaware Executive Department, Office of the Budget, "State Funding of Pupil Transportation FY1970 to FY2006;" and U.S. Department of Labor, Bureau of Labor Statistics, <i>Consumer Price Index-All Urban Consumers, Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD, Transportation</i> .			

Table 17 shows that transportation costs in adjusted dollars have risen from \$134 per student in 1970 to \$449 in 2005, a three-fold increase. This has occurred despite the fact that the number of school-aged residents in Delaware has actually declined. One reason for this 235 percent increase in pupil transportation spending is the increase in miles traveled to serve houses scattered throughout the state, or sprawling residential development.

The Texas Transportation Institute conducts an annual Urban Mobility Study for 85 large urban areas, including Philadelphia-Wilmington-Atlantic City. It shows that between 1982 and 2003, Daily Vehicle Miles of Travel on the region's road system grew from 57,395 to 102,950, an increase of 80 percent over that 21-year period.¹² That is twice as high as the increase in population and housing units for the period, but it is consistent with the increase in developed residential acres in Delaware between 1984 and 2002, or 84 percent.

¹² Texas Transportation Institute, *Urban Mobility Study 2003*, "Performance Measure Summary for Philadelphia Urban Area."



Growth in Bonded Indebtedness

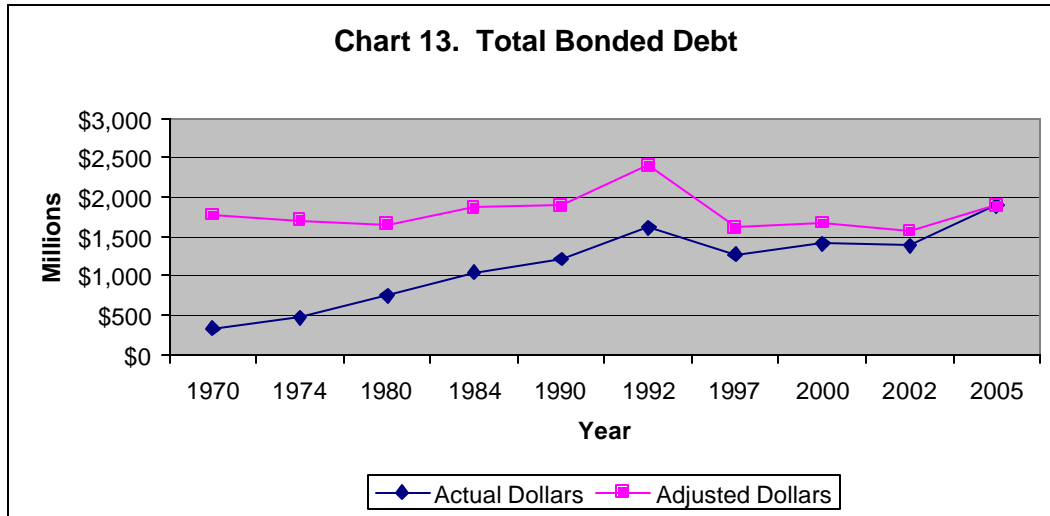
Since 1970 the state has continued to incur significant debt for schools, roads and other capital facilities. To be consistent with the historical data for 1900 to 1970, AFT examined long-term debt, both general obligation bonds and revenue bonds. Total indebtedness data were collected for the years in which the land use/land cover data was available, 1974, 1984, 1992, 1997 and 2002. In addition, data were collected for the decennial Census years of 1980, 1990 and 2000, and for the most recently completed year, 2005.

Table 18 and Chart 13 show that total bonded indebtedness increased from over \$300 million in 1970 to almost \$1.9 billion in 2005.

Year	Actual Dollars	Adjusted Dollars
1970	\$331,645,000	\$1,774,216,698
1974	\$465,286,000	\$1,701,748,994
1980	\$725,476,034	\$1,655,797,633
1984	\$1,044,898,000	\$1,861,964,887
1990	\$1,212,226,000	\$1,892,630,112
1992	\$1,616,231,000	\$2,395,328,912
1997	\$1,271,064,000	\$1,611,847,036
2000	\$1,408,801,000	\$1,673,078,571
2002	\$1,386,101,000	\$1,566,306,850
2005	\$1,888,657,000	\$1,888,657,000

Sources: State of Delaware Auditor of Accounts Annual Reports; State of Delaware Division of Accounting, *Combined Balance Sheets for 1990, 1992, 1997 and 2000*; State of Delaware Division of Accounting, *Comprehensive Annual Financial Reports*, "Statement of Net Assets for 2002 and 2005"; and ENR *Construction Cost Index History*.

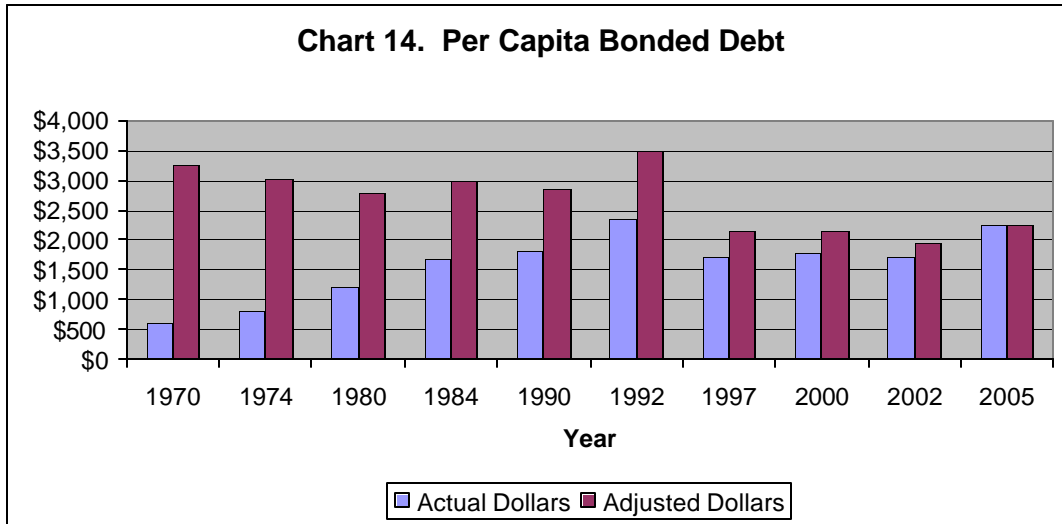
The Delaware legislature imposed strict new limits on the annual increase in bonded debt in 1991. As a result, bonded debt in adjusted dollars peaked in 1992 at \$2.4 billion.



One way to compare total state bonded indebtedness across the years is to look at the level of spending per resident. Table 19 and Chart 14 show the results when state debt is divided by population. Per capita bonded debt peaked in 1992, at \$3,473 in adjusted dollars. Since that time, bonded debt per capita has remained around \$2,000 in adjusted dollars.

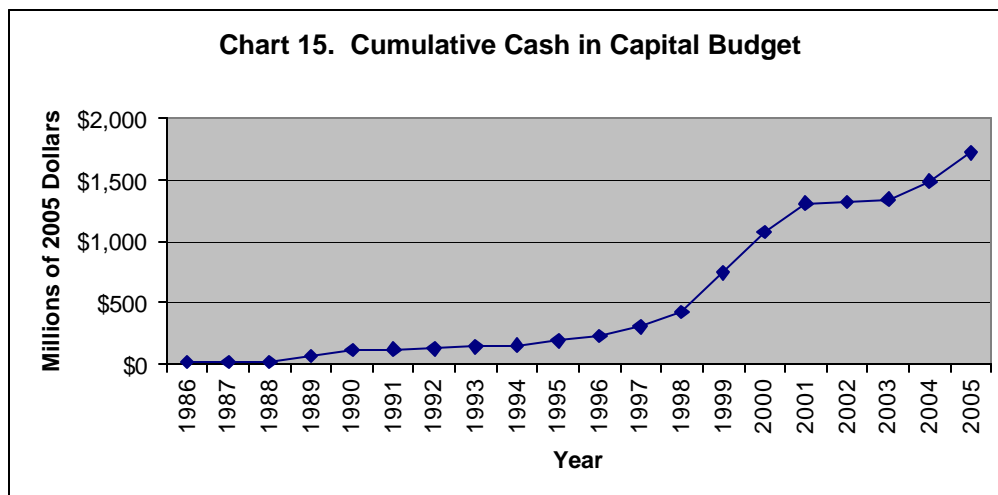
Year	Actual Dollars	Adjusted Dollars
1970	\$605.08	\$3,237.01
1974	\$821.19	\$3,003.45
1980	\$1,220.65	\$2,785.95
1984	\$1,677.02	\$2,988.37
1990	\$1,819.70	\$2,841.07
1992	\$2,343.54	\$3,473.23
1997	\$1,698.44	\$2,153.81
2000	\$1,797.86	\$2,135.12
2002	\$1,717.41	\$1,940.69
2005	\$2,239.01	\$2,239.01

Sources: State of Delaware Auditor of Accounts Annual Reports; State of Delaware Division of Accounting, *Combined Balance Sheets for 1990, 1992, 1997 and 2000*; State of Delaware Division of Accounting, *Comprehensive Annual Financial Reports*, "Statement of Net Assets for 2002 and 2005"; ENR *Construction Cost Index History*; and U.S. Census Bureau.



Growth in State Spending on Infrastructure

Over the last 20 years, the state has used significant amounts of cash to pay for its capital facilities. This may be partly due to the strict limits on the issuance of new bonds. It may also be due to Delaware’s good fortune during the 1990s. Between 1986 and 2005, the amount of cash used to fund the capital budget adds up to over \$1.7 billion in adjusted dollars. This is shown in Chart 15.



In addition to Cash, the other funding sources in the Capital Improvements Act History include General Obligation Bonds, the Transportation Trust Fund, and Other. (The “Other” category includes such items as reversions, deauthorizations, Stripper Well and the First State Improvement Fund.) Chart 16 and Table 20 show the results when these funding sources are totaled and adjusted to 2005 dollars.

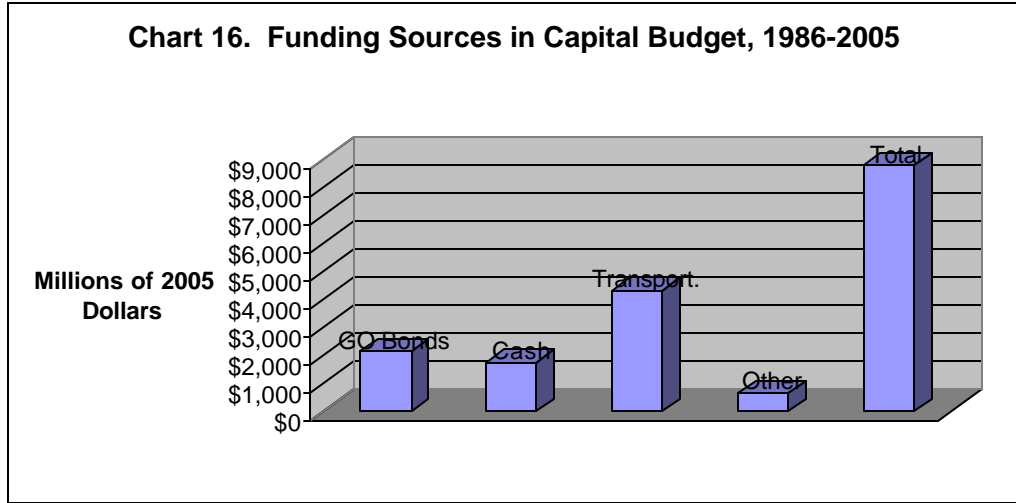


Table 20. Funding Sources in Capital Budget, 1986-2005

Source	GO Bonds	Cash	Transport.	Other	Total
<i>Millions, Adjusted</i>	\$2,124.5	\$1,720.4	\$4,296.7	\$650.5	\$8,792.0
<i>Percent of Total</i>	24%	20%	49%	7%	

Source: State of Delaware Executive Department, Office of the Budget, "Capital Improvements Acts History Fiscal Years 1986-2006"; and ENR *Construction Cost Index History*.

Over the past 20 years, Cash and G.O. Bonds have made almost equal contributions to the state's capital budget, 20 percent and 24 percent respectively. The Transportation Trust Fund has provided 49 percent of funding, and other sources have made up the remaining 7 percent. Table 21 and Chart 17 show total capital spending for each year, in actual and adjusted dollars. The Engineering News-Record *Construction Cost Index* history was used to adjust for inflation.

Year	Actual Dollars	Adjusted Dollars
1986	\$97,749,814	\$168,143,335
1987	\$96,665,938	\$162,089,866
1988	\$133,046,056	\$217,513,667
1989	\$239,819,973	\$383,919,818
1990	\$366,322,904	\$571,934,407
1991	\$369,043,698	\$563,907,930
1992	\$275,903,500	\$408,901,717
1993	\$226,305,000	\$320,910,046
1994	\$171,443,900	\$234,213,671
1995	\$238,983,600	\$322,721,776
1996	\$201,258,600	\$264,572,693
1997	\$347,232,600	\$440,328,604
1998	\$354,376,500	\$442,252,294
1999	\$534,323,600	\$651,523,809
2000	\$537,008,600	\$637,746,269
2001	\$590,491,300	\$687,773,881
2002	\$436,241,600	\$492,957,011
2003	\$407,176,700	\$449,390,717
2004	\$576,613,300	\$598,737,746
2005	\$772,481,900	\$772,481,000

Sources: State of Delaware Executive Department, Office of the Budget, "Capital Improvements Act History Fiscal Years 1986-2006," and ENR *Construction Cost Index History*.

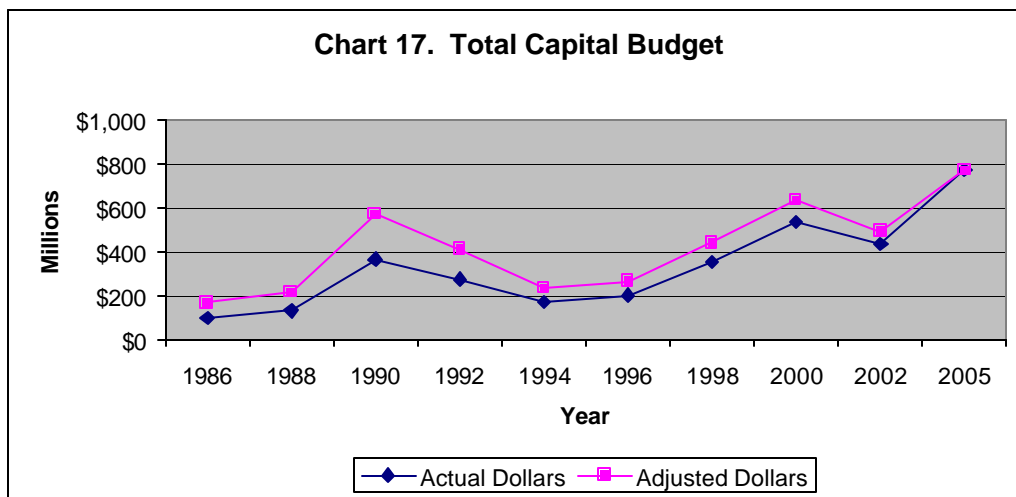
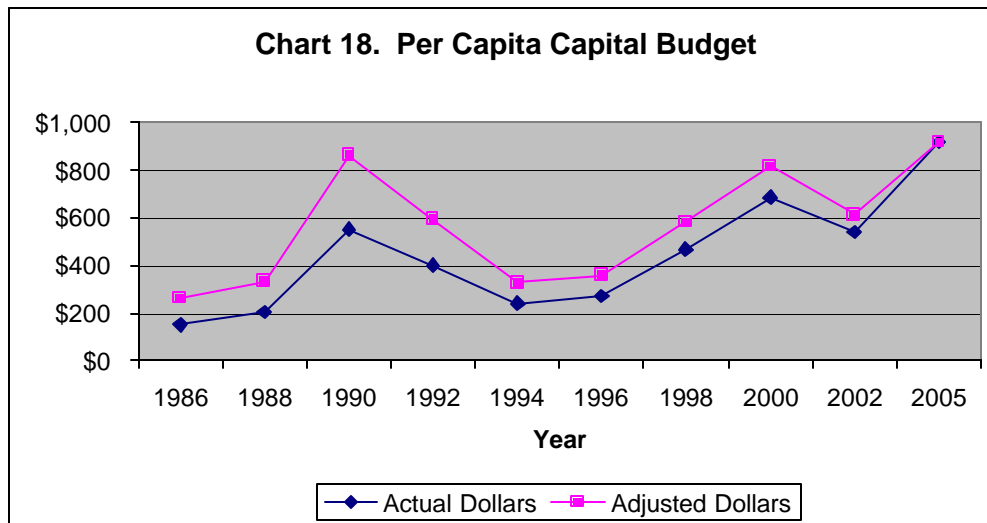


Table 21 shows that, when adjusted dollars are compared, the total capital budget increased by a factor of five between 1986 and 2005. After the 1991 debt limits were imposed, the total budget declined sharply, from \$572 million in 1990 to \$323 million in 1995. However, by

1999 the capital budget had reached a second peak of \$652 million, or \$80 million above its 1990 level. By 2005 the capital budget reached a third peak of \$773 million, or \$200 million above its 1990 level. Table 22 and Chart 18 show the results when the total capital budget is divided by population.

Table 22. Per Capita Capital Budget		
Year	Actual Dollars	Adjusted Dollars
1986	\$153	\$264
1987	\$150	\$251
1988	\$204	\$334
1989	\$364	\$583
1990	\$550	\$859
1991	\$544	\$832
1992	\$400	\$593
1993	\$323	\$458
1994	\$240	\$328
1995	\$330	\$445
1996	\$273	\$359
1997	\$464	\$588
1998	\$466	\$582
1999	\$692	\$844
2000	\$685	\$814
2001	\$742	\$865
2002	\$541	\$612
2003	\$498	\$549
2004	\$695	\$721
2005	\$916	\$916
Sources: State of Delaware Executive Department, Office of the Budget, "Capital Improvements Act History Fiscal Years 1986-2006"; ENR <i>Construction Cost Index History</i> ; and U.S. Census Bureau.		

The most striking finding from Table 22 is the fact that the per capita capital budget *increased by almost 250 percent* over the last 20 years. This is *eight times greater* than the state's population increase over that period *and six times greater* than the increase in total housing units. However, it is similar to the *increase in land consumption per new unit* — another indicator of the impact of sprawling residential development.



Conclusions Regarding Recent Trends

This section summarizes recent trends in Delaware. To facilitate comparison with the land use/land cover data, population and housing units are discussed for the most recent 20-year period, 1986 to 2005. The estimate for the state's 1986 population was taken from the Census Bureau's Statistical Abstract.

- Between 1986 and 2005, the state population grew from 637,436 to 843,524, an increase of 32 percent.
- During the same time period, the total number of housing units in Delaware grew from 269,396 to 373,542, an increase of 39 percent.
- Over the most recent 18-year period, acres of all developed land in the state increased from 125,384 to 243,650, or 94 percent. This is over twice the rate of increase of total housing units.
- In 1984, there were almost 260,000 housing units in the state, occupying a little over 100,000 acres of residential land, or 0.4 residential acres per unit.
- Between 1984 and 2002 each new housing unit consumed 0.92 acres of residential land. This is *over twice as much residential land per unit* as the historical average.
- In 1984, there were a little over 125,000 acres of urbanized land in the state, or 0.48 urbanized acres per housing unit.

- Between 1984 and 2002 each new housing unit consumed 1.23 acres of urbanized land. This is over *two and one-half times as much urbanized land per unit* as the historical average.
- If the historical averages had been maintained, there would have been almost *50,000 fewer residential acres and over 72,000 fewer urbanized acres* developed in the state by 2002.
- Over the first 300 years of its history, 125,000 acres of land were developed in Delaware. *It only took 18 more years (1984 to 2002) for another 118,000 acres to be developed into urbanized uses.*
- State school transportation spending per pupil increased 235 percent between 1970 and 2005, despite the fact that the number of school-aged residents actually declined. One reason for this rise in cost is increased miles traveled to serve sprawling residential development throughout the state.
- On a per-capita basis, the capital budget *increased by almost 250 percent* over the last 20 years. This is *eight times greater* than the state's population increase over that period *and six times greater* than the increase in total housing units. However, it is similar to the *increase in land consumption per new unit* — another indicator of the impact of sprawling residential development.
- While limits on bonded debt have been in place since 1991, there have been no corresponding limits imposed upon the demand for new state-financed capital facilities. In the 1990s, Delaware's population grew by 117,000 — an absolute increase almost as high as that of the 1960s. *As a result, the state is now under pressure to pay for roads and schools needed to serve new development.*

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