

**Brandywine School District Enrollment
2004-2014**

prepared for

Brandywine School District

by

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Executive Summary

Long-term growth in the Brandywine School District is largely a function of growth in New Castle County. On average, the Brandywine School District is now attracting about 15.3 percent of New Castle County's total public school enrollment but that percentage is declining.

New Castle County's population growth has been steady since 1990. Births peaked at 7,412 in 1991. Recently, births have recovered to 7,163 after falling to a low of 6,562 in 1995. Conversely, deaths have increased from 3,500 to 4,300 the 1990-2003 period. The natural increase part of population growth (births – deaths) fell from 3,600 in 1990 to 2,500 in 2003.

The other part of population growth is net migration (people moving into New Castle County less those leaving). Net migration contributed 2,700 persons on average to population growth over the decade. This was reflected fully in school enrollment growth for the county. However, the Brandywine School District grew slower than the county and its enrollment share fell from 19.2% in 1990 to 15.3% in 2003.

The Delaware Population Consortium releases 30-year projections of population for the state and the three counties on an annual basis. Currently, their view is that New Castle County births will continue at about the same level as they are now over the next decade. Deaths will continue to increase in a regular fashion. This will reduce natural increase from its current level of 2,500 to about 2,200 by 2014. Net migration is expected to recover and remain in the vicinity of 1,600 persons per year.

Using this information and enrollment since 1992, a series of eight simulations for enrollment by grade for the next ten years was generated. The most likely scenario suggests that a steady decline in enrollment is likely over the 2004-2014 period. The primary factors influencing this decline are a maturing population, limited land available for new housing growth, and a declining share of countywide births.

The slow growth in housing units in the Brandywine School District is barely sufficient to overcome the reduction in household size. As household size continues to fall, it requires more housing units to support the same number of people. For example, if the same household size existed now as existed in 1950, New Castle County would require 61,000 fewer housing units. In

fact, almost 3,500 units have been constructed to compensate for the decline just since 1990. Similarly, the number of persons 5-17 will decrease from 0.48 per household to 0.43 per household over the next 10 years. The number is even smaller if only those attending public schools are included.

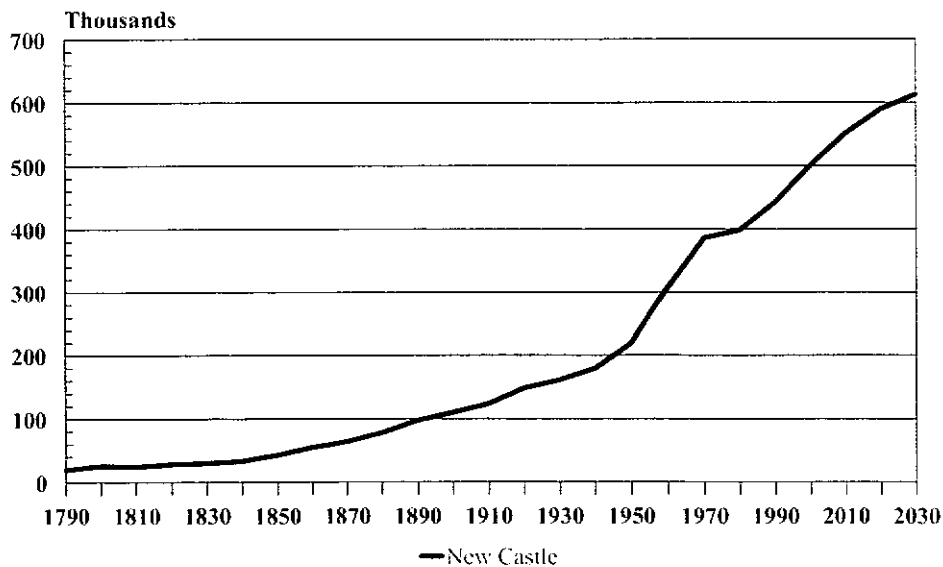
In summary, the Brandywine School District student enrollment will decline gradually over the next 10 years losing on average about 85 students per year. As with any projection there is both upside and downside risk. The projection provided here tries to balance both. In reality, the projection is probably +/- 4% at 2008 and +/- 8% at 2014. Some of the unknowns that could change are the success or failure of the charter schools; a change in the use of private/parochial schools, which currently attracts 3,800 Brandywine School District residents; a change in the desirability of housing in the District, e.g. lower prices, which limits the ability of younger people with children to locate; or a change in the tendency of jobs to move further south of the City of Wilmington.

Demographic Trends

The Brandywine School District does not have its own independent development path. It's growth is heavily influenced by its spatial location both within Delaware and New Castle County. It's residents and businesses are governed by land-use and zoning regulations provided both by county and municipal governments in New Castle County. As a result, growth in the Brandywine School District is largely a function of growth in New Castle County.

As a general proposition, the median employee now lives within 24 minutes of their workplace. That suggests that people in the district are oriented toward the New Castle County labor market. There are people who commute longer distances, but they are in the distinct minority. Overall, growth in New Castle County will be driven by the strength of the local labor market and the diversity of employment opportunities.

Figure 2.1
New Castle County Population
1790-2030

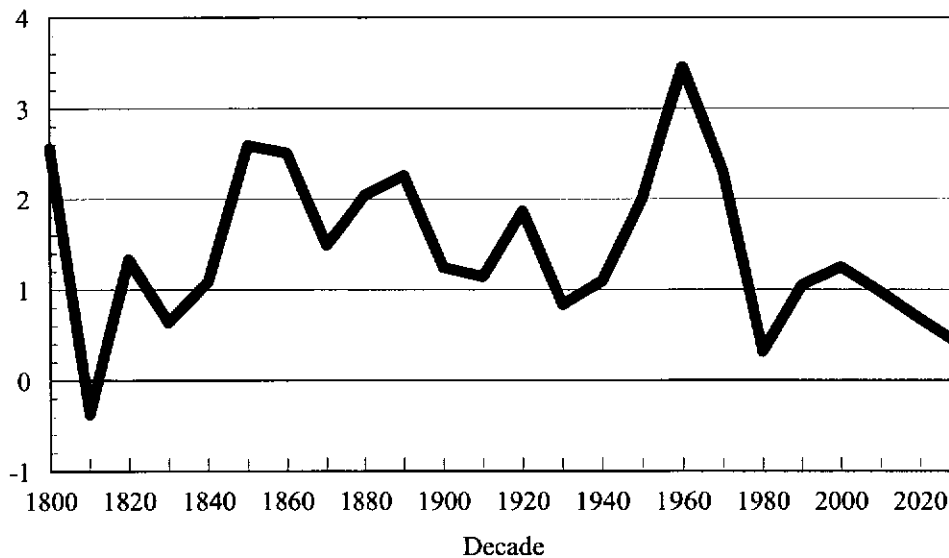


Source: Center for Applied Demography & Survey Research, University of Delaware

Population growth in New Castle County is expected to slow over the next 30 years although the rate of decline will be less than previously expected (Figure 2.1, above). As can be seen, the County enjoyed dramatic growth in the decade of the 1950's and 1960's followed by

dramatically slower rates in the 1970's. More recently, growth resumed but the long-term trend is toward lower growth rates. These rates are best seen in Figure 2.2, below.

Figure 2.2
Average Annual New Castle County Population Growth Rates
1790-2030



Source: Center for Applied Demography & Survey Research, University of Delaware

The long-term (200 year) annual growth rate of population for New Castle County is 1.5% per year. With the exception of the 1950s and 1960s, that rate has remained largely between 0.5% and 2.5% consistently. For the 2010-2030 decades, that rate is seen as falling below its long-run rate largely because of the aging population.

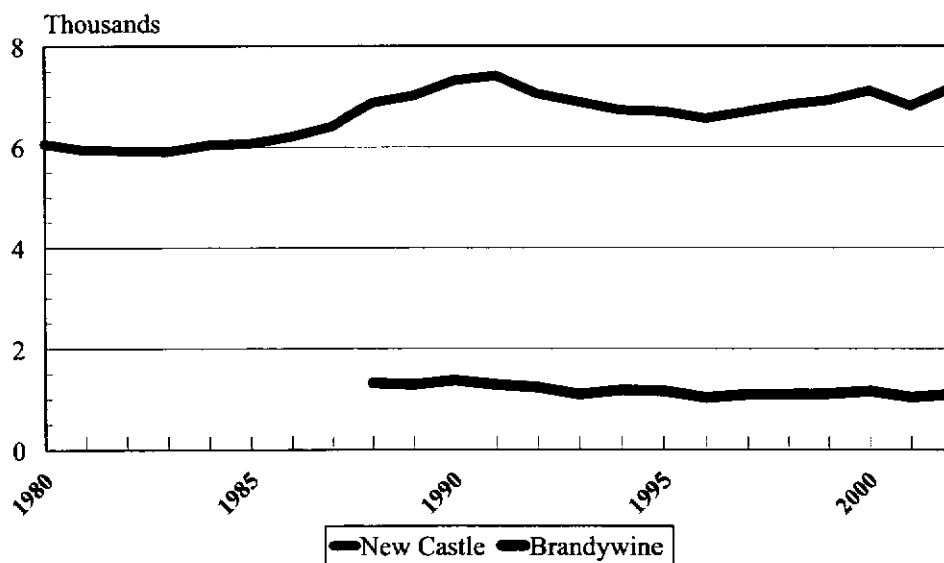
Population growth is generally conceived as the sum of two parts, namely natural increase and net migration. Either factor can be positive (add to the population) or negative (subtract from the population).

Natural increase is simply the difference between births and deaths. In some areas the population has a relatively large number of women in the childbearing years (15-44). In others, e.g. Florida, the age structure is much older and number of births is relatively fewer. Similarly, the older the population is, the more deaths will be produced. Thus, in areas with younger populations, natural increase will be a significant source of population growth. Kent County has the youngest population in the state (median=34.4), while Sussex County has the oldest population (median=41.1) and New Castle County is in the middle (median=35.0).

The second source of growth is net migration. Net migration in New Castle County is the sum of people who move into the county less those that leave. There are substantial numbers in both categories and the result may either increase or decrease the population. This concept holds for smaller regions (like school districts) as well. In areas with rapidly expanding job markets and low unemployment rates relative to surrounding states, a positive net migration would be expected. This has been true for Delaware for more than 15 years. Recently, unemployment rates have been low everywhere, and it has become more difficult to attract new workers and their families into the state. In addition, the recent recession has curtailed the robust growth of employment, which the state enjoyed for nearly a decade. Unemployment rates, however, remain near historical lows.

The other cases for net in-migration are some special circumstances. Sussex County’s growth is being driven by a strong contingent of retirees taking up permanent residence in the vacation homes that they have been visiting for years. A recent trend for retirees to locate near universities may have an impact on the Newark area in the coming decade. The trend of retirees to relocate to the Sunbelt seems to have run its course.

Figure 2.3
New Castle County and Brandywine School District Births
1980-2002

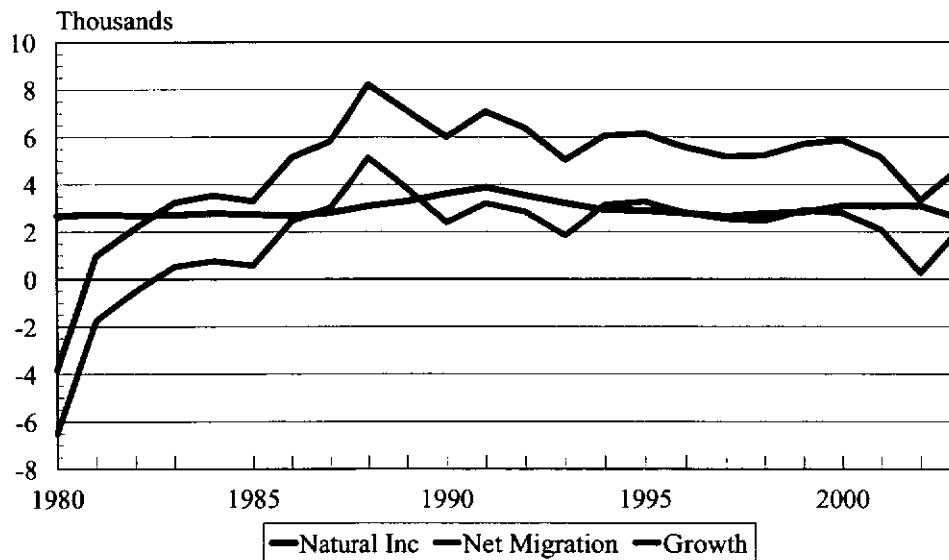


Source: Center for Applied Demography & Survey Research, University of Delaware

New Castle County births for the last 21 years are shown in Figure 2.3, above. The fewest infants were born in 1984. That was the beginning of the trend that is known as the “baby

boomlet". The "boomlet" was created by the offspring of the baby boomers. Fertility rates were falling (although at slower rates) during the period, as they continue to do today, however the significant increase in the number of women in the child-bearing age groups produced a bumper crop even with those lower fertility rates. The number of births in New Castle County rose steadily, if not dramatically, until 1991. After that, the number of births has steadily declined until 1996 when the numbers began to rise once again. This profile suggests that increases in school enrollment should have appeared by 1990, and would increase at least through 1996 before declining during the next eight years. There is a bit of an increase in the preliminary 1998 data, but one year does not make a trend. Births in the Brandywine School District hit a maximum in 1990 with 1370 live births. The district also reached a low point in 1996 (1028) and then began to slowly increase through 2000. However the decrease seen for the County also occurred in the District. Over the period, between 15.2% and 19.2% of New Castle County births occur in the district. The current level is in the lower part of that range, 15.2%. In general, the share of New Castle County births attributable to Brandywine School District mothers has been declining steadily over the period 1988-2002.

Figure 2.4
New Castle County Sources of Population Growth
1980-2003



Source: Center for Applied Demography & Survey Research, University of Delaware

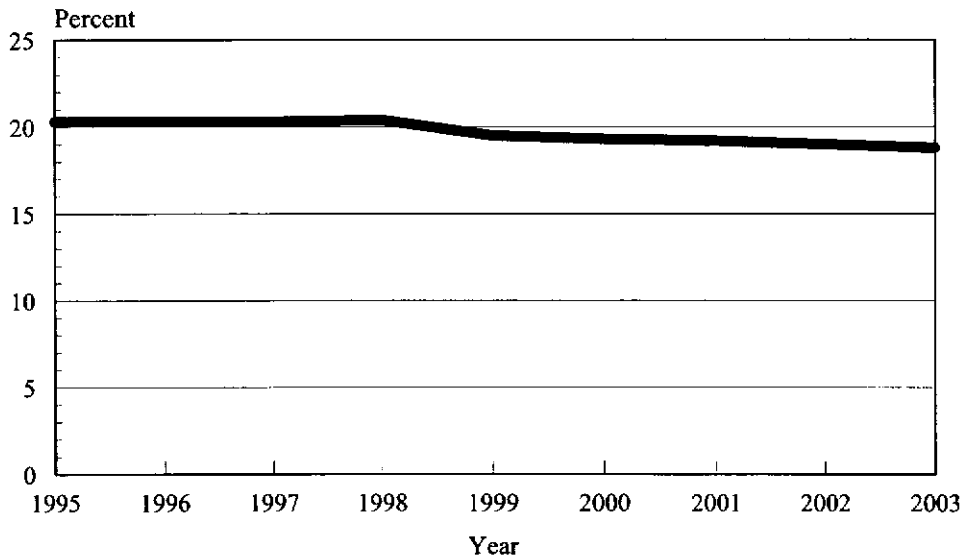
The two sources of New Castle County growth from 1980 through 2003 are shown in Figure 2.4, above. The red line represents natural increase (births – deaths). That source has

tended toward 2,900 persons per year throughout the two decades but did rise to nearly 4,000 in 1990. Since then decreasing births and increasing deaths have reduced the annual additions from natural increase.

Net migration (light green) has been volatile in New Castle County. It has been negative, i.e. net out migration, during the 1980-1983 period. It even exceeded natural increase during 1988 and 1995. In general, after reversing the negative trend in the early 1980's, net migration had remained fairly stable adding an average 2,700 persons to the population annually. However, with the sluggish labor market, net migration has recently fallen below 2,000 persons per year. As a result, overall population growth has slowed, falling back towards the 4,000 persons per year.

It is possible that there might be differential migration rates at the sub-county level. This has certainly been the case in New Castle County. If the Brandywine School District is growing faster than indicated by growth in the county, the share of residential properties should be increasing.

Figure 2.5
Percent of Total Improved Residential Properties
1995-2003



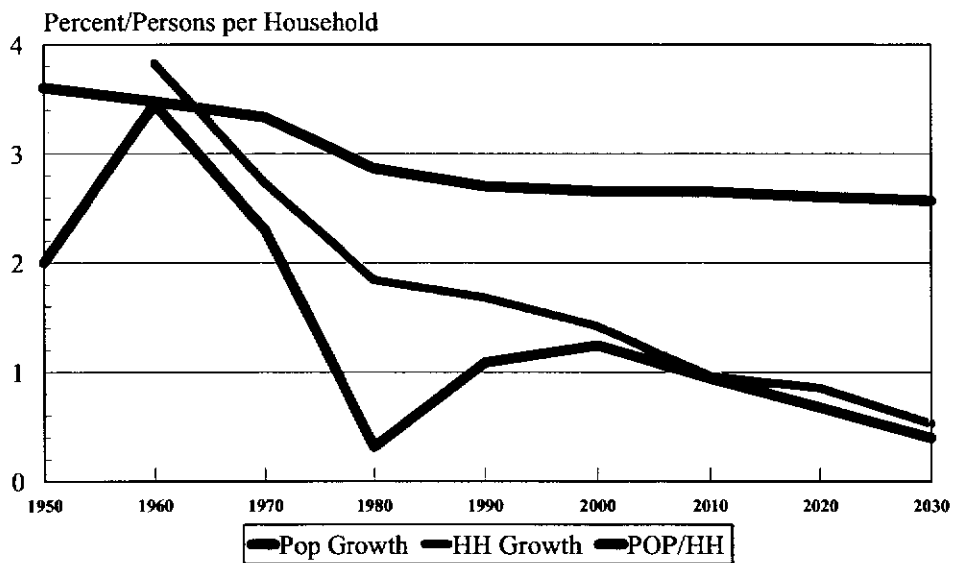
Source: Center for Applied Demography & Survey Research, University of Delaware

In Figure 2.5 previously, the Brandywine School District's share of all residential improved properties in New Castle County is shown. It's readily apparent that there is slight

degradation in that share over time. In 1995, the district contained 20.3% of the properties. Today that share has fallen to 18.8%. This means that the Brandywine School District is growing slower than the rest of the county. Most of the new growth is located in the southern part of the county. Still the District managed to add about 1,000 new units over the period.

One point of considerable contention is why there is so much development going on in the county, but population growth has slowed. This phenomenon is widespread in the state and in the country. It is explained in part by Figure 2.6, below.

Figure 2.6
New Castle County Household and Population Growth Rates
1950-2030

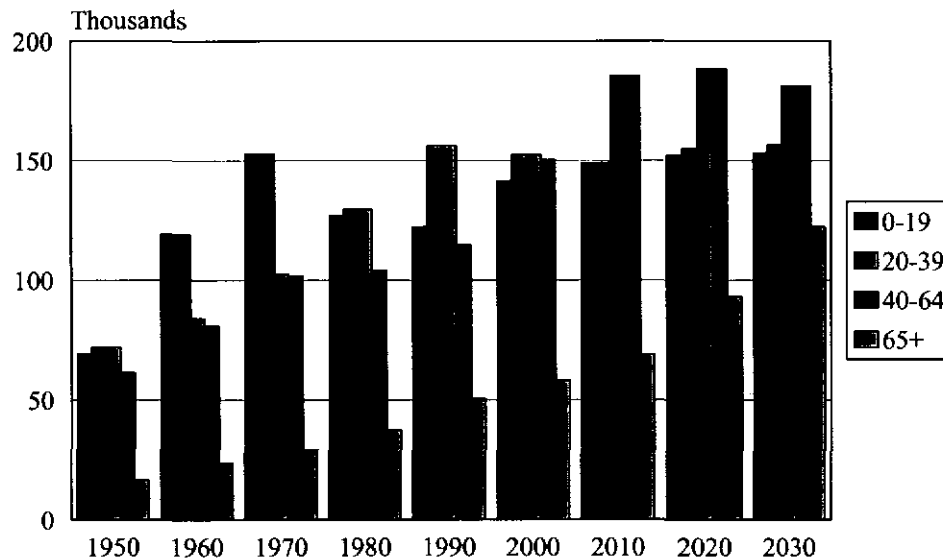


Source: Center for Applied Demography & Survey Research, University of Delaware

The figure shows the huge spurt of growth in the 1950s in both population (green) and households (light blue). Subsequent to 1970, the growth rate in housing has always exceeded that for population. The reason for this phenomenon is declining household size. As the figure shows, persons per household (dark blue line) has been falling since 1950 from its peak of 3.6 persons to about 2.5 persons by 2030. In other words, each house now holds one less person than it did in 1960. This means that nearly 61,000 more housing units are needed to shelter today’s population than would have been necessary in 1950. Of course, this is largely because of significant differences in the structure of households, with many more single person households and single parent households, and the aging population. The percentage of households containing a single

person has risen from 15% to more than 25% since 1970. The percentage of households headed by a single female with children under 18 is now 9%. The percentage of households with children under the age of 18 has fallen to 35% in New Castle County.

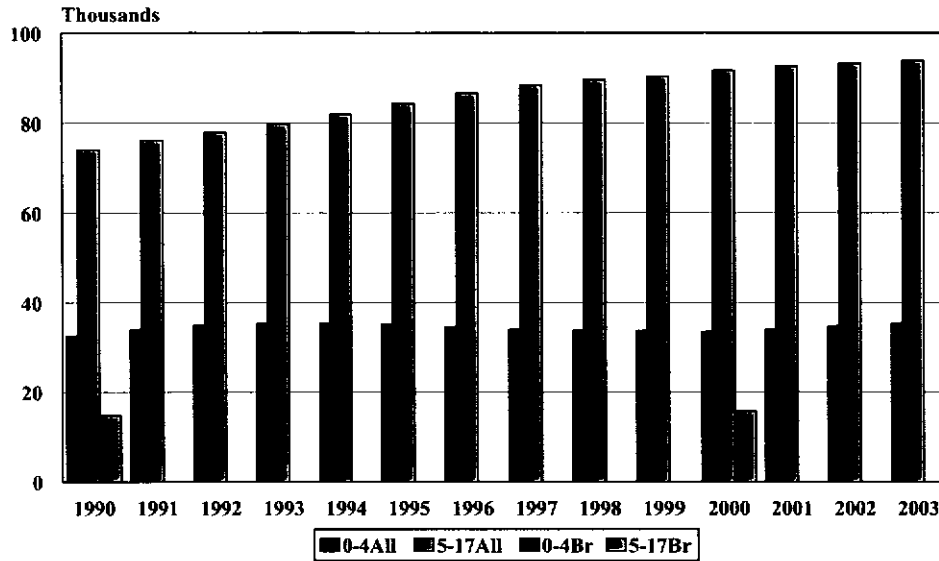
Figure 2.7
New Castle County Population by Age Group
1950-2030



Source: Center for Applied Demography & Survey Research, University of Delaware

Age structure is everything. New Castle County's structure is displayed in Figure 2.7, above. The numbers of people in the four age groups change in substantially different ways. The 0-19 age group (dark blue) grows significantly until 1970. At that it slows and even falls in the 1980s. As the baby boomlet arrives the numbers increase but not dramatically. The projection shows a fairly consistent number in the youngest age group over the next 30 years. Part of the reason for this is that the 20-39 age group (light blue) is also growing slowly. That group holds the majority of the women in the child-bearing age groups. Compare the growth in that group today with that experienced in 1950-1990.

Figure 2.8
New Castle County and Brandywine
Younger Age Groups
1990-2003



Source: Center for Applied Demography & Survey Research, University of Delaware

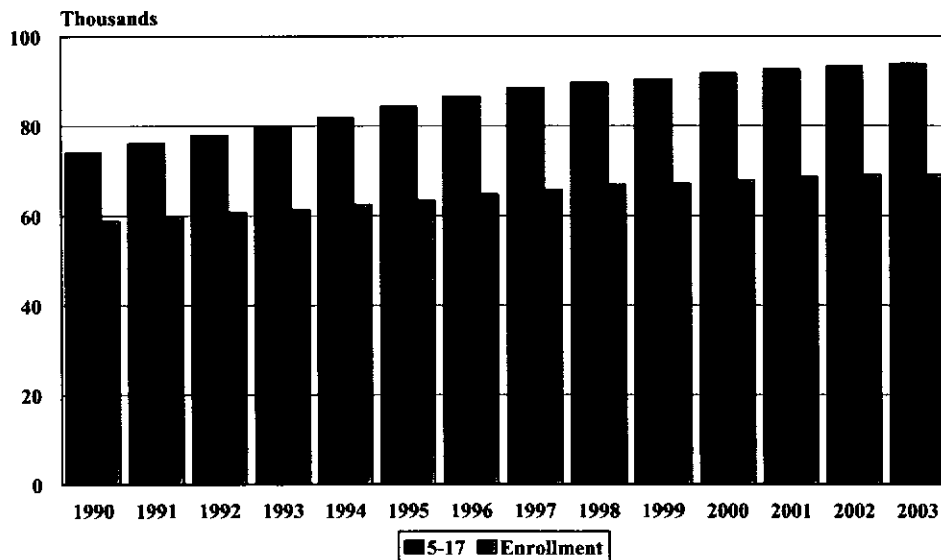
Finally, in Figure 2.8 above, the number of people in the two youngest age groups is shown. The 0-4 age group represents those not yet in school while the 5-17 age group represents the bulk of those already in school. It is clear that the size of the 0-4 age group reached a peak around 1994 and is now declining slowly. The 5-17 age group is still increasing although it clearly has leveled out. This suggests that the New Castle County school districts should be experiencing some growth in the immediate future but stability in later years.

The data for same age groups in the Brandywine School District are also shown in the figure (dark and light red). While intercensal estimates are not available, the pattern is consistent with the overall county data. There is a slight decline in the 0-4 age group and a modest increase in the 5-17 age group.

Enrollment Projections

Projecting school enrollments, like projecting population, is neither simple nor without risk. In general, a projection is wrong almost the minute that it is issued. The reason is the underlying assumptions have changed. Long-term enrollment projections, i.e. those extending past three years, are more hazardous because one is dealing with a subset of the population. Statewide projections of population will always be more accurate than those done at a county level. Likewise projections for school districts will always be less accurate than those developed for an entire county. Similarly a projection of the total population is certainly likely to be more accurate than that for a subset of the population. As the base population or area decreases, the projection process becomes more hazardous.

Figure 3.1
New Castle County School Age Population and Enrollment
1990-2003

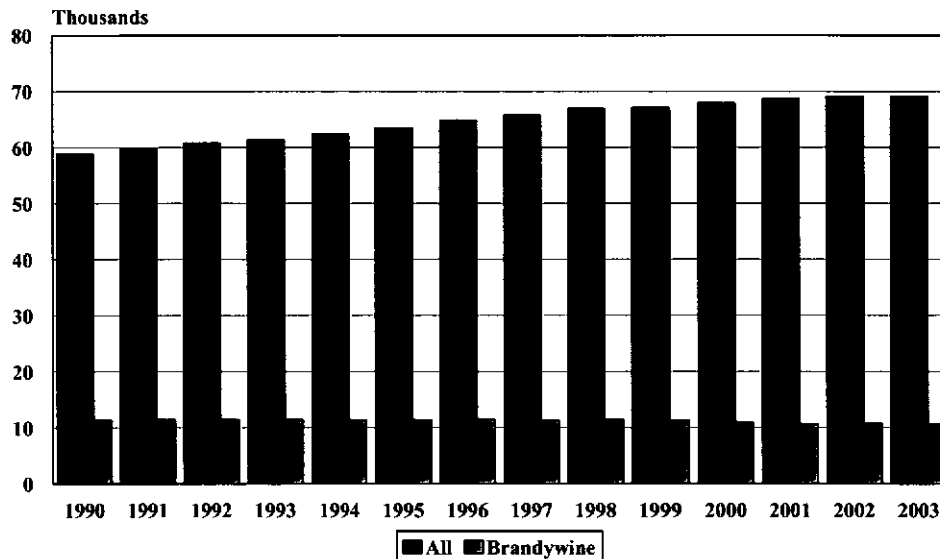


Source: Center for Applied Demography & Survey Research, University of Delaware

Since these projections will involve long-term population projections as well as short-term enrollment measures, one key issue is the stability of the relationships. In Figure 3.1 above, the relationship between past county enrollment and an approximation of the population from which those students came is shown. Enrollment will always be smaller since a large portion (22.5%) of the school-age population attends private or parochial schools. For example, in the 2001-2002 school year, 19,971 students attended private school of 88,619 that attended school.

Even with this complication, the relationship appears to be both stable and strong. In fact the correlation coefficient between the two series is 0.994. This suggests that projections based on the total age distribution, assuming conditions do not change drastically, will be reasonably accurate.

Figure 3.2
New Castle County Public School and
Brandywine School District Enrollment
1990-2003

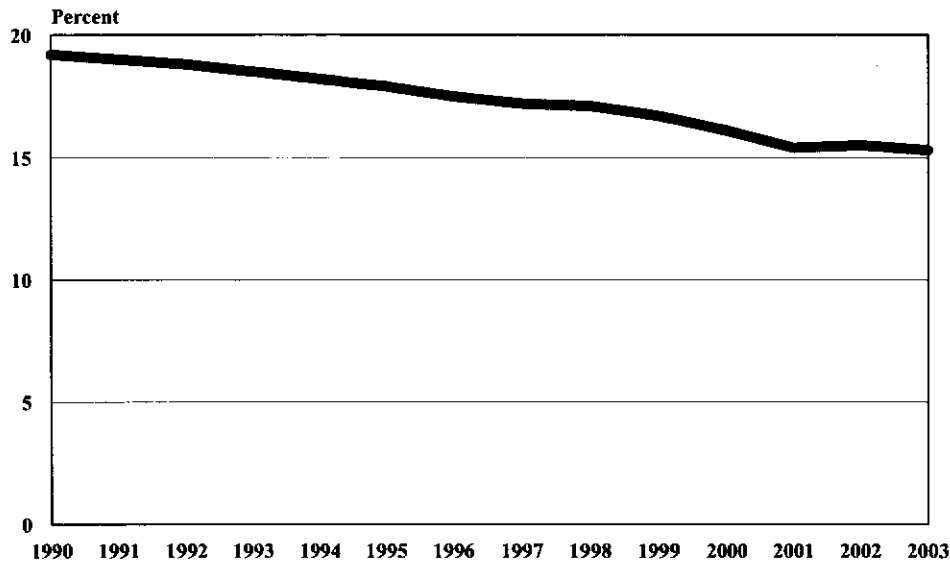


Source: Center for Applied Demography & Survey Research, University of Delaware

Unfortunately, there is no projection available for the age of students in the Brandywine School District from an independent source like the Delaware Population Consortium or the US Census Bureau. To overcome this problem, a relationship must be established between the New Castle County public school enrollments and those for the Brandywine School District. This relationship is shown in Figure 3.2, above. That relationship is not as robust but is still significant. A correlation of -0.68 exists between the two series.

The Brandywine School District has accounted for as much as 19.1% of New Castle County public school enrollment over the decade (Figure 3.3, below). As was noted in the previous figure, the two series are moving in opposite directions with the share stabilizing at 15.2% in the latest two years. Using both of these relationships and projections from the Delaware Population Consortium, projections of total enrollment in the Brandywine School District are possible. It should be noted that these projections are true student head counts (including full-time and part-time) and not “unit” counts.

Figure 3.3
Brandywine School District
Percent of New Castle County Public School Enrollment
1990-2003



Source: Center for Applied Demography & Survey Research, University of Delaware

Every three years small area forecasts of population and housing are prepared for traffic analysis and planning purposes. These projections are done at a sufficiently disaggregated level that they can be recombined into estimates for the Brandywine School District. While only totals are projected, i.e. no age specific detail, it does provide some information about growth. The population of the District fell only from 89,940 to 89,686 over the last decade. The 2010 forecasts include a small increase to 90,535 followed by a decline to 90,187 in 2015. By 2030, the population is expected to decline to 89,956. In other words, the District's population will be basically unchanged. There should be backfilling occurring as the baby boomers exit this world and their housing is bought by younger people. Eventually, this will lead to more children if current fertility rates are suggestive of the future.

Given the total enrollment derived from the projected 5-17 population of New Castle County and the assumption of a share declining from 15.2% to 13.2%, the total Brandywine School District enrollment was projected. Using the observed variance in the share as a guide, an error of +/- 4% or 150 students on either side is expected.

The more difficult task is the grade distribution. It is not simple to map an individual's grade based on his/her age for a variety of reasons. Among these are different ages at starting school, different dropout rates, and different rates of attending non-public schools. In addition, the age distribution is centered at the beginning of July instead of the beginning of September. Finally, the precise distribution of students within the 5-17 age group will vary within each school district.

The final projection was reached using a hybrid model after looking at eight different variations, which employed the same control totals derived earlier. The current grade distribution was employed as a starting point. Births through 2014 were then derived for single years using total projected births from the Delaware Population Consortium and the Brandywine likely share using 1989-2002. Kindergarten students were derived from the first grade estimates and PK students were held constant at a typical value.

The first approach used conventional five year retention rates for all other grades with a number of variations; the average of the five rates, the average of the three middle values, the minimum observed value, the maximum observed value, and averages after excluding any observation that was outside of 0.5 standard deviations of the five year average.

The second approach used the relationship between New Castle County enrollments and Brandywine School District enrollments observed over the 1992-2003 period. Three different measures were simulated; the average of the ten rates, the average of the last five values, and the average excluding observations outside of 0.5 standard deviations of the mean. This approach required the generation of New Castle County enrollment projections first and in the same manner described above. In addition, since there were significant downward trends in the shares over the period, shares were allowed to decline but at a slower rate.

The third approach used two variations of regression models. The first used 12 years of data and 13 equations to estimate next years grade enrollment based on last year's enrollment in the previous grade. The second model was a conventional time series model with one equation for each grade.

The final results were forced to conform to the Brandywine School District control totals developed in the very beginning of the process and they are displayed in Figures 3.4 and 3.5, below. These estimates are neither the most pessimistic nor the most optimistic but rather are the most probable based on the information gathered and the assumptions made.

Figure 3.4
Brandywine School District Enrollment
1992-2003

GRADE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
PK	2	47	39	49	32	50	38	78	47	34	50	40
K	875	805	750	733	773	699	708	715	676	605	685	635
1	919	975	908	931	906	930	932	934	881	823	800	818
2	935	891	978	865	920	893	912	858	816	805	819	751
3	972	928	869	973	866	907	889	808	816	815	808	810
4	882	890	908	859	922	818	879	850	796	783	813	790
5	890	864	887	891	871	919	862	861	802	764	794	813
6	934	891	898	924	923	864	937	892	817	781	819	804
7	940	967	922	933	964	970	990	984	953	896	908	901
8	937	915	965	866	918	941	897	966	949	889	897	898
9	991	991	963	1073	972	1015	1017	986	1071	1029	981	1055
10	817	849	818	833	893	802	870	852	818	860	846	793
11	668	696	741	701	694	787	700	787	731	716	733	740
12	675	665	689	723	720	702	804	669	780	757	749	753
Total	11437	11374	11335	11354	11374	11297	11435	11240	10953	10557	10702	10601

Source: Center for Applied Demography & Survey Research, University of Delaware

Figure 3.5
Brandywine School District Enrollment Projections
2004-2014

GRADE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
PK	40	40	40	40	40	40	40	40	40	40	40
K	644	640	638	636	635	632	627	621	614	607	599
1	809	802	797	794	792	790	787	781	773	764	755
2	776	768	761	757	754	752	750	747	741	734	725
3	749	774	766	759	754	752	750	748	745	739	732
4	792	733	757	749	743	738	735	733	732	729	723
5	783	785	726	751	743	736	732	729	727	725	722
6	829	798	801	740	765	757	750	746	743	741	739
7	900	928	894	897	829	857	848	840	835	832	830
8	878	877	904	871	874	808	835	826	819	814	811
9	1007	984	984	1014	977	980	906	936	926	918	912
10	856	817	798	798	823	792	795	735	760	751	745
11	688	742	709	693	692	713	687	689	637	659	652
12	767	713	769	734	718	717	739	712	714	660	683
Total	10518	10401	10344	10233	10139	10064	9981	9883	9806	9713	9668

Source: Center for Applied Demography and Survey Research, University of Delaware

The key to usable population or enrollment projections is to project often. These projections can be updated annually when the Delaware Population Consortium updates its New Castle County forecast in July. Second, as a new grade distribution is obtained for the Brandywine School District on September 30, the projections should be adjusted first to the new control total and then to the observed enrollment by grade.

It is important to watch the indicators that heavily influenced these projections. These include the share of New Castle County enrollment, the share of residential properties, the share of births, and the share of total population.

APPENDIX

**Delaware Population Consortium
Population Projection Series
New Castle County**

July 1, 2003

	2000	2005	2010	2015	2020	2025	2030
Population	786448	838602	887326	933045	973659	1007382	1032974
Population Change	52154	48724	45719	40614	33723	25592	
Births	54803	56295	58677	59566	60225	60740	
Deaths	37570	42877	47895	52725	57745	63353	
Net Migration	34921	35306	34937	33773	31243	28205	
Households	298864	321466	343208	365058	384964	401722	413818
Household Change	22602	21742	21850	19906	16758	12096	
Total Labor Force	408533	427953	444064	455052	462918	467993	472119
Civilian	404741	425240	441351	452339	460205	465280	469406
Employed	376811	408231	423696	434246	441797	446669	450630
Private	305421	330565	342919	351301	357256	361029	364040
Government	52043	56590	58750	60234	61317	62057	62703
Self-Employed	18686	20358	21280	21944	22441	22790	23087
Unpaid Family	661	718	747	767	783	793	800
Unemployed	27930	17009	17655	18093	18408	18611	18776
Military	3792	2713	2713	2713	2713	2713	2713
Jobs by Place of Work	418769	453148	469621	480699	488519	493439	497373
Jobs by Residence	401304	434766	451236	462472	470513	475701	479920
Net Commuting	17465	18382	18385	18227	18006	17738	17453

Source: Report of the Delaware Population Consortium, 2003.