



February 14, 2003

Memorandum

To: Montgomery County Planning Board

From: Karl Moritz, Research Manager, 301-495-1312

Re: Annual Growth Policy: Factors Affecting School Enrollment Change

Please find attached a short report on the factors affecting school enrollment change in Montgomery County that MCPS staff has prepared for the AGP study. Among the issues involved in evaluating the current AGP school test is the extent to which enrollment change is due to new development, and the extent to which it is due to other factors. As the MCPS report notes, all of the factors affecting school enrollment are interrelated and these interrelationships are variable and complex. For example, new development can have major or modest impacts on school enrollment, depending on the background enrollment trends in the area.

Park and planning staff appreciates MCPS's contribution to the AGP study, which has involved providing analytical material such as this report and participating in policy discussions, the AGP focus groups, and informal meetings.

Factors Affecting Montgomery County Public Schools

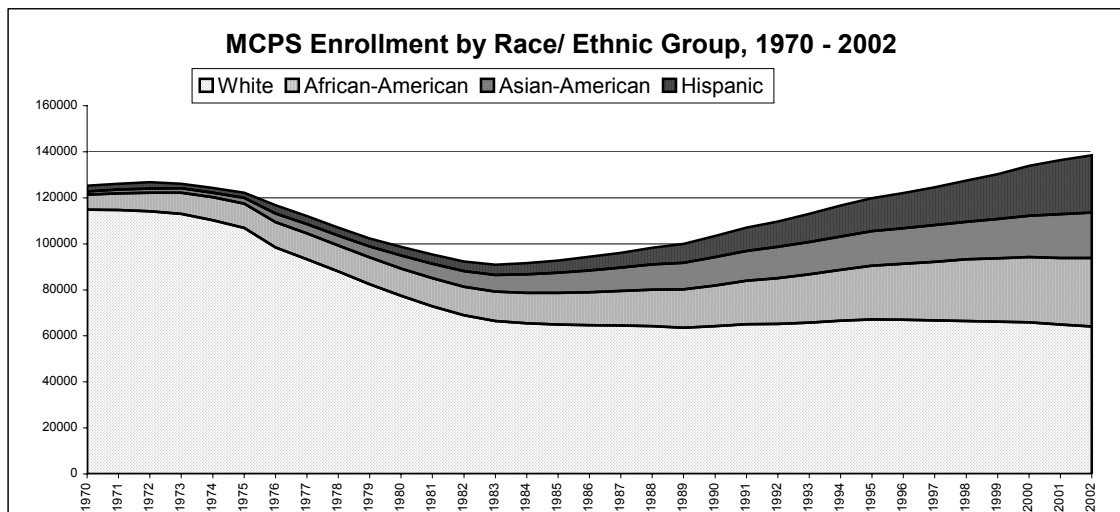
Enrollment Change

February 11, 2003

Background

Since 1986, when the Annual Growth Policy (AGP) was first applied, Montgomery County Public Schools (MCPS) enrollment has grown from 94,460 to 138,891 students. This increase of 44,431 students represents nearly a 50 percent increase in the size of the system since the AGP schools test began. From 1986 to the current 2002-03 school year 23 elementary schools, 15 middle schools, and 4 high schools have opened. Numerous additions to schools have also been built over this period. At the same time as space has been added to the system, there has been the need to modernize older schools. From 1986 to the current 2002-03 school year 42 elementary schools, 8 middle schools, and 8 high schools have been modernized. The need for both new schools and modernized schools compounds funding requirements for the MCPS Capital improvements Program (CIP.)

One of the most important characteristics of the enrollment change seen since 1986 has to do with the race and ethnic composition of enrollment. The entire enrollment increase since 1986 can be attributed to growth in African-American, (+15,413), Asian-American (+10,294), Hispanic (+19,070), and American Indian (+286), enrollment. White (non-Hispanic) enrollment has decreased by 632 since 1986.



As changes in race and ethnic diversity have contributed to enrollment growth, so has a more socio-economically diverse student population. In the mid-1980's, participation rates in the Free and Reduced-Price Meals (FARMS) program were at about 12 percent of total enrollment. Today the rate has nearly doubled to approximately 22 percent. Enrollment in the MCPS English for Speakers of Other Languages (ESOL) program has

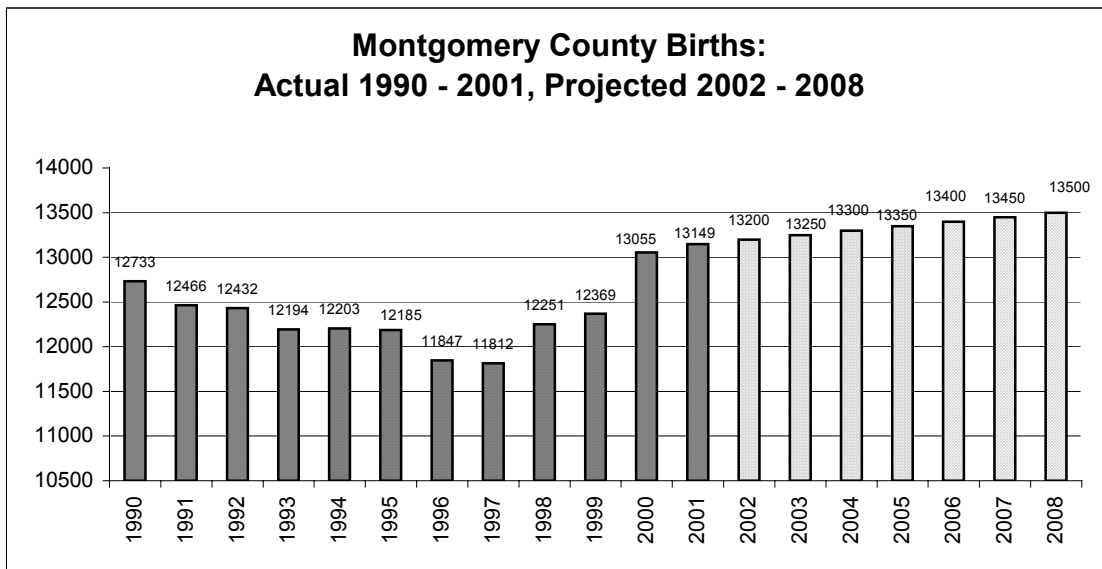
seen similar increases. In the mid-1980's about 4.5 percent of MCPS enrollment was enrolled in the ESOL program. Today 8.5 percent of enrollment is in the program.

Factors Affecting Enrollment Change

Enrollment change is the result of the interaction of three factors; births, aging of the school-age population, and migration. Births and the aging of children constitute what may be seen as “natural increase” in enrollment (comparable to natural increase in the total population.) Economic forces tied to job and housing opportunities drive migration, the more variable element of change.

Births

Montgomery County resident births increased from 10,351 in 1986 to 13,149 in 2001. Between 1990 and 1997 county births trended downward. There was some thought that this presaged a long term trend for births, and hence for school enrollment. Such a peaking and cycling downward in births and school enrollment would have followed the model of the baby boom – baby bust eras. Under this model schools that are currently at high enrollment levels could look forward to declines in the future as smaller birth cohorts began aging through the system. However, birth counts from 1998 through 2001 showed increases each year. In 2000 a particularly dramatic increase to 13,055 births was recorded. Then, in 2001, an even higher birth count, of 13,149 was reported. Birth forecasts from the Montgomery County Department of Park and Planning were raised over this period, to the point where now the forecast is for continuing gradual increases in annual births for the foreseeable future. This forecast is in agreement with national forecasts for births that show comparable increases.



The upward trend in births is a by-product of a more diverse population with differences in fertility rates, household size, and median age. The 2000 U.S. Census shows that, with 26.7 percent of county population foreign born, trends in the county's diverse population are having a major impact on overall county demographics. In 2000 the White, non-Hispanic population had the lowest average household size, at 2.44, and the highest

median age, at 40.8. In contrast other race and ethnic groups had larger household sizes (Hispanic 3.87, Asian American 3.17, and African-American 2.68) and lower median ages (Hispanic 28.5, African-American 32.2, and Asian-American 35.2.) As these trends have taken hold in the county, births to White, non-Hispanic women have become a decreasing share of total births. In 2001, White, non-Hispanic, births dropped below 50 percent of total county births for the first time.

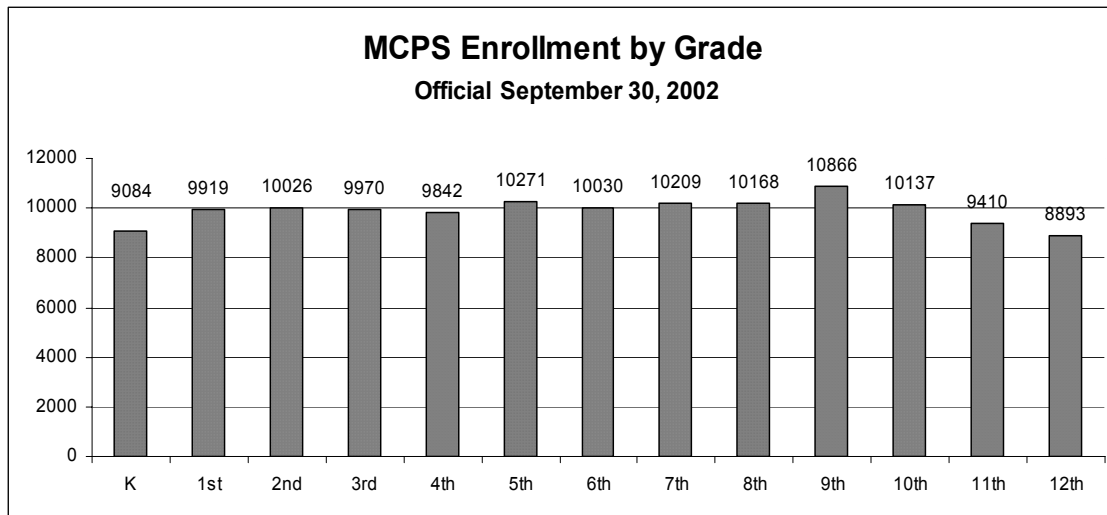
Trends in county births compared to Kindergarten enrollment are assessed every year by MCPS. Kindergarten enrollment in any given year represents about 75 percent of resident births five years earlier. This relationship makes it possible to fairly accurately project future Kindergarten enrollment based on the latest trends in births and the forecast for future births. With the dramatic increase in births recorded in 2000 and 2001 it became evident that the school system could not look forward to the kind of long-term facility relief that the county had seen in the previous 1960's and 1970's enrollment cycle.

Aging

Once students are enrolled in Kindergarten, forecasting enrollment by the "aging" of students from Kindergarten through Grade 12 is the simplest and most reliable component of the enrollment forecast. Past records of the rate of change between grades show that at most grade levels a large share of total enrollment can be accurately forecast by simply moving forward the grade cohort one grade for each year of the forecast. There are, however, points in system where this does not apply. Between Kindergarten and Grade 1 a sizeable increase (from 700 to 900) occurs. This is attributed to students entering public school for Grade 1 after attending full-day Kindergarten programs in nonpublic schools. A similar increase occurs between Grade 8 and Grade 9 (from 800 to 1,000) as students enter public high schools from nonpublic schools. After Grade 9 there is some reduction from Grades 10 to 12 as students exit the system prior to graduation.

The consistency of grade cohort movements is dependent on the economic climate. During a period of rapid job growth and housing construction migration to the system will increase and the grade cohort change from one level to the next will increase. During more stable periods, or during recession, fewer students will migrate into the system from outside of MCPS. During these periods the simple aging of the resident student population will contribute most to enrollment change. These factors will be further discussed in the section on migration.

The size of each grade level at any given time in the school system is a good predictor of trends for the next several years. During the current era of enrollment growth elementary school increases came first, followed by middle school, and then high school increases. In 1987 Grade 1 enrollment was the highest of any grade in the system. Today, in the 2002-03 school year, Grade 9 enrollment is the greatest. This shows that the so-called "demographic bulge" has moved up through the system over a 15 year period. The aging of large grade cohorts is now driving facility needs at the high school level. As children from the higher birth years of 2000 and 2001 enter the public schools, beginning in 2005, another "demographic bulge" will start its' path through the system.



Migration

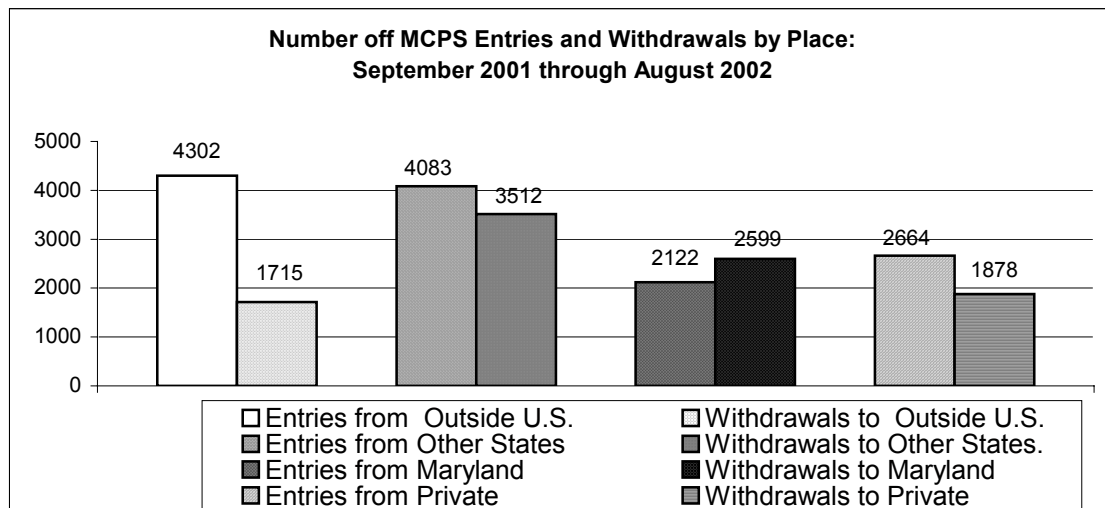
The aging of the student population accounts for a large share of enrollment change in any given year. The vast majority of the students enrolled in the school system next year will be students enrolled in the school system this year. Migration, defined as the movement of students into and out of the school system, is a smaller component of annual enrollment change, but one with long-lasting impact. Over time migration has fundamentally altered the race/ethnic and socio-economic profile of the school system.

Another important impact of migration has to do with its' role in rejuvenating MCPS enrollment. A fact about school enrollment that is obvious, but often overlooked, is the need for the supply of students to be constantly refreshed to maintain enrollment. If the service area of a school was shut down and no new families could move in and none could leave, eventually the school would empty of enrollment. This extreme example highlights the necessity of migration to sustain enrollment. The process of community turnover and student aging makes it difficult to attribute a school's enrollment level to individual factors. Enrollment change is inseparably tied to the combined affects of births, aging, and migration.

Viewed as a whole, MCPS enrollment appears to change in a fairly smooth and gradual manner. However, below the surface of total enrollment is a student population that has substantial numbers moving into and out of the system on a daily basis. From the fall of 2001 through the summer of 2002, for example, over 14,000 students entered MCPS and over 12,000 withdrew from MCPS. (These figures do not include students entering MCPS in Kindergarten, making the normal grade progression annually, or graduating from MCPS at the end of Grade 12.) This level of student mobility constantly refreshes the student population profile in ways that may not be apparent by just looking at total enrollment at any given point in time.

MCPS records of student entries and withdrawals allow trends in the origins of entering students and the destinations of departing students to be known. By far the greatest net

amount of migration into the school system is from outside the country. In the 2001-02 period 4,302 students entered MCPS from outside the country, while only 1,715 withdrew from MCPS to leave the country. Other categories of migration are more balanced, with entries closer to the number of withdrawals. This greater than two-to-one ratio of net in-migration from outside the country has been the pattern for many years. This pattern has driven the diversification of the student population, just as comparable immigration figures for Montgomery County have diversified total population. As the affects of immigration continue to accrue, further shifts in the demographic profile of MCPS can be expected.



Migration to the county and the school system is driven by job opportunities and, in turn, the ability of the housing market to meet the needs of households interested in living in the county. Consequently, the clearest indicator of migration is activity in the housing market. Following is a discussion of the relationship between enrollment change and housing.

Housing

In 1986, when the AGP was first applied, there were an estimated 259,200 housing units in Montgomery County. By 2000, the U.S. Census reported 334,632 housing units in the county, an increase of over 75,000 housing units. (The number of households in the county in both years was somewhat lower due to about a 3 percent vacancy rate.) Between 2000 and 2020 the Montgomery County Department of Park and Planning projects an additional 80,000 housing units will be built.

The turnover of existing homes and apartments, and new home sales and apartment rentals, facilitate migration of households to the county. Because there is always a larger pool of existing homes up for resale or rental than there are new housing units, the impact on enrollment of migration to existing residences is greater than the impact of new home sales and new apartment rental. In the housing resale market increases in enrollment are due to the net enrollment increase created by more students entering a school service area than students aging out of school-age or moving. Past records show that resales of existing housing constituted about 85 percent of sales for all types of housing units (existing and new) throughout the 1990's. As this turnover process goes on enrollment

growth has occurred throughout the county, even in areas with little or no new home construction.

This is not to say that new home sales and new apartment rentals do not have a significant impact on enrollment. This type of added housing supply is most abundant in the county’s growth areas where new communities have been built. In these areas new housing has been the major source of enrollment increases and has driven the need for many more school facilities.

Activity in both housing markets is subject to a great deal of variation year to year. Job opportunities in the county and region, coupled with low mortgage interest rates and a limited supply of new housing, have driven a strong market in recent years. Projects that were originally expected to proceed over a multi-year period have been built on accelerated schedules. Housing market pressures also have strengthened the resale market and driven up housing costs.

Activity in the housing market is factored into enrollment forecasts. In the case of new housing, MCPS tracks subdivision applications and incorporates them into school enrollment forecasts once they have received preliminary plan approval. Developers and builders are contacted regularly to determine their build schedules and estimated completion dates. Information on the market demand for projects also is obtained. School enrollment forecasts are adjusted to account for new home construction scheduled in school service areas. Factors are applied to the different housing types to estimate the number of school age children, by school level, that will be generated by a development. One source of “yield” factors is the Montgomery County Department of Park and Planning Census Update Survey. Shown below are the countywide rates from the most recent Census Update Survey.

COUNTYWIDE: NEW HOUSING STUDENT YIELD FACTORS				
Housing Type	Factors (number of students generated per unit)			
	Elementary	Middle	High	Total K-12
Single Family	0.33	0.11	0.12	0.56
Townhouse	0.25	0.10	0.12	0.47
Multi-Family	0.15	0.08	0.06	0.29
High Rise	0.07	0.02	0.02	0.11

Housing yield factors also are available for regions of the county. Factors tend to be somewhat higher in upcounty growth areas, and lower in downcounty, more built-out areas. In addition to these factors MCPS regularly samples housing projects to fine-tune estimated student generation. In recent years this sampling has shown that two popular types of housing developments have lower student generation than the countywide rates would indicate. In the area of neo-traditional design communities, housing developments like Kentlands, Lakelands, and King Farm have lower student generation rates for single

family detached, townhouse, and multi-family units than the county average. The other area where lower student generation rates have been seen are in high density, upscale rental communities. Many of these are underway in the county, especially at locations close to METRO stations and highway access. These high amenity, high rent communities often have structured parking. Student generation rates for this type of product have been well below the countywide rates for multi-family units. While this is the current experience from this new type of product, there is some concern that student generation rates may go up as these apartment communities age.

Estimating the impact of resales of existing homes, and rentals of existing apartments, is not as straight forward as it is for new housing. Since there is no way of knowing when an individual homeowner or renter will choose to move, broader indicators of turnover must be assessed. MCPS monitors enrollment change each year at every school to spot trends in the school's service area. MCPS enrollment constitutes an annual census of the school age population, and shifting trends in school service areas can be detected by analyzing this yearly data. In addition, all school principals in the county are surveyed each year. Principals are asked to identify any trends they have observed in the communities they serve. Finally, activity in the housing market is examined to spot changes in supply and demand that may be occurring.

One area of increasing concern in the housing market is the trend to multiple families occupying a single housing unit. This trend has most affected schools in areas of the county with affordable housing and large inventories of rental units. As with turnover of homes, this factor is best perceived, and projected, by studying enrollment trends at schools and discussing community change with principals and community members.

Movement of households into existing and new housing is a complex variable in the forecasting of school enrollment. Variation in this factor is the source of most forecast error, especially for individual school forecasts. Over the course of a six-year enrollment forecast the economic conditions that drive the housing market can change substantially. Lately that change has been to a stronger than expected market and accelerated housing construction schedules. In addition, recent research has shown that the region is behind in the number of housing units available relative to the supply of jobs. This gap is expected to increase greatly over the next decade. This suggests that, barring a major economic disturbance, a strong housing market should characterize the county for many years to come.

Assessing the Impact of Housing Change

The interrelated nature of the factors affecting enrollment change makes it difficult to disaggregate the impact of any single factor. Of interest to the Annual Growth Policy is the impact of new housing. The most dramatic impact of new housing occurs in growth areas of the county, where large communities are being built. In more established areas of the county, where a majority of the housing supply already exists, the impact of infill subdivisions is more modest. Depending on the size of an infill subdivision, turnover of existing housing is likely to have as much, if not a more of an impact, than new housing construction.

Unfortunately there is no reliable way to separate out the impact of housing construction and turnover on school enrollment. In all areas of the county enrollment at a school fluctuates on an almost daily basis as students come and go. School enrollment levels are not static. Enrollment will change in a school even if no migration into the attendance area occurs. This happens simply through the student aging process. For example, in an elementary school where Grade 5 enrollment is the largest of any grade, total school enrollment is likely to decline the following year as that grade cohort moves on to middle school and is replaced by a smaller Grade 5. In instances like this, new home construction and housing turnover may not increase total enrollment. Following are two examples from recent experience that highlight the large degree of variation in the impact of new home construction and enrollment change at schools.

The phenomenon of a large amount of housing construction and little to no change in a school's enrollment has recently been illustrated by construction at the King Farm in Rockville. The southern portion of this development is assigned to College Gardens Elementary School. Over the past several years a mix of approximately 1,300 housing units have been occupied in this area. Records show about 100 elementary students reside in this portion of King Farm. However, enrollment at College Gardens Elementary School has remained at the same level as before development began. This illustrates how new development can sometimes maintain a school's enrollment level, if enrollment from other portions of a school attendance area is declining.

On the other end of the spectrum, from the experience at College Gardens Elementary School, is the example of Matsunaga Elementary School in Germantown. This is a school dominated by recently completed homes and faster than expected build-out of large subdivisions. In this case there is no older community where the student population is declining, as was the case in College Gardens Elementary School. During the planning stages for Matsunaga Elementary School developers and builders had estimated a ten year building period for homes surrounding the school. Almost as soon as construction got underway the housing market became much stronger than expected. Consequently, forecasts for Matsunaga Elementary School were too low, and the school has exceeded forecasts since it opened for the 2001-02 school year. Last year it was determined that another elementary school will be needed in Germantown to address space deficits at Matsunaga and Germantown elementary schools.

The dual impacts of new housing construction and housing turnover are reflected in facility requests in the current MCPS FY 2004 Capital Budget and Amendments to the FY 2003 to FY 2008 Capital Improvements Program (CIP.) Requests for new facilities in upcounty areas of new housing construction are mirrored almost one to one by requests for comparable school facilities in downcounty areas. For example, the CIP includes a new high school in Clarksburg and the reopening of Northwood High School. The CIP includes a new middle school for the Quince Orchard Cluster, and the reopening of Belt Middle School in the Wheaton Cluster. The CIP includes one new elementary school each in Clarksburg and Germantown, and the reopening of two elementary schools in the downcounty (Arcola in the Kennedy Cluster, and Connecticut Park in the Wheaton

Cluster.) In addition, the new CIP includes the construction on an elementary school on the former Brookview Elementary School site in the Northeast Consortium.

Summary

This description of factors that affect MCPS enrollment change shows them to be highly interrelated. Long and fairly predictable arcs of enrollment growth are foreseen, given birth trends and the process of aging in the student population. The impact of migration on future enrollment is more difficult to project since this factor is tied to more changeable economic conditions and housing availability.

MCPS enrollment forecasts, by taking account of the factors described in this paper, have a high degree of accuracy. The total county level forecast is typically within one percent of actual enrollment. This year total enrollment is just 159 over forecast. Examination of six year forecast accuracy shows that in most forecast years enrollment is within one to two percent of what was forecast six years prior. More challenging are forecasts for individual school service areas. A forecasting maxim holds that accuracy is greatest the larger the area being projected. At the small level of individual schools, more pronounced variations in enrollment trends result in a larger margin of forecast error. Forecasting schools within five percent of actual enrollment on an annual basis is the desired goal at this geographic level. In most years 75 to 85 percent of schools have fallen within this desired range.

In conclusion, more than any factor the dramatic upturn in births seen in 2000 and 2001 substantially shifted the thinking of MCPS planners in terms of long term enrollment and facility needs. Before this upturn there was some hope that there would be a peaking in enrollment, followed by a period of gradual decline. In this scenario, relief from facility deficits would occur naturally as enrollment passed its' peak for schools. National as well as local demographic forecasts have altered this view.

At the same time as the outlook for sustained enrollment growth has become more clear, the school system remains behind in providing adequate capacity at its' schools. This year 635 relocatable classrooms are in use at 117 of the school system's 191 schools (61 percent of schools.) This is the case despite the substantial investments the county makes each year to address school facility needs. This situation has not only made it difficult to provide needed school capacity, but also has jeopardized the modernization program for older schools. With births now projected to continue going up indefinitely, and with an additional 80,000 housing units forecast by 2020, the school system must brace for ever greater facility needs. These conditions make deliberations on the county's Annual Growth Policy timely.