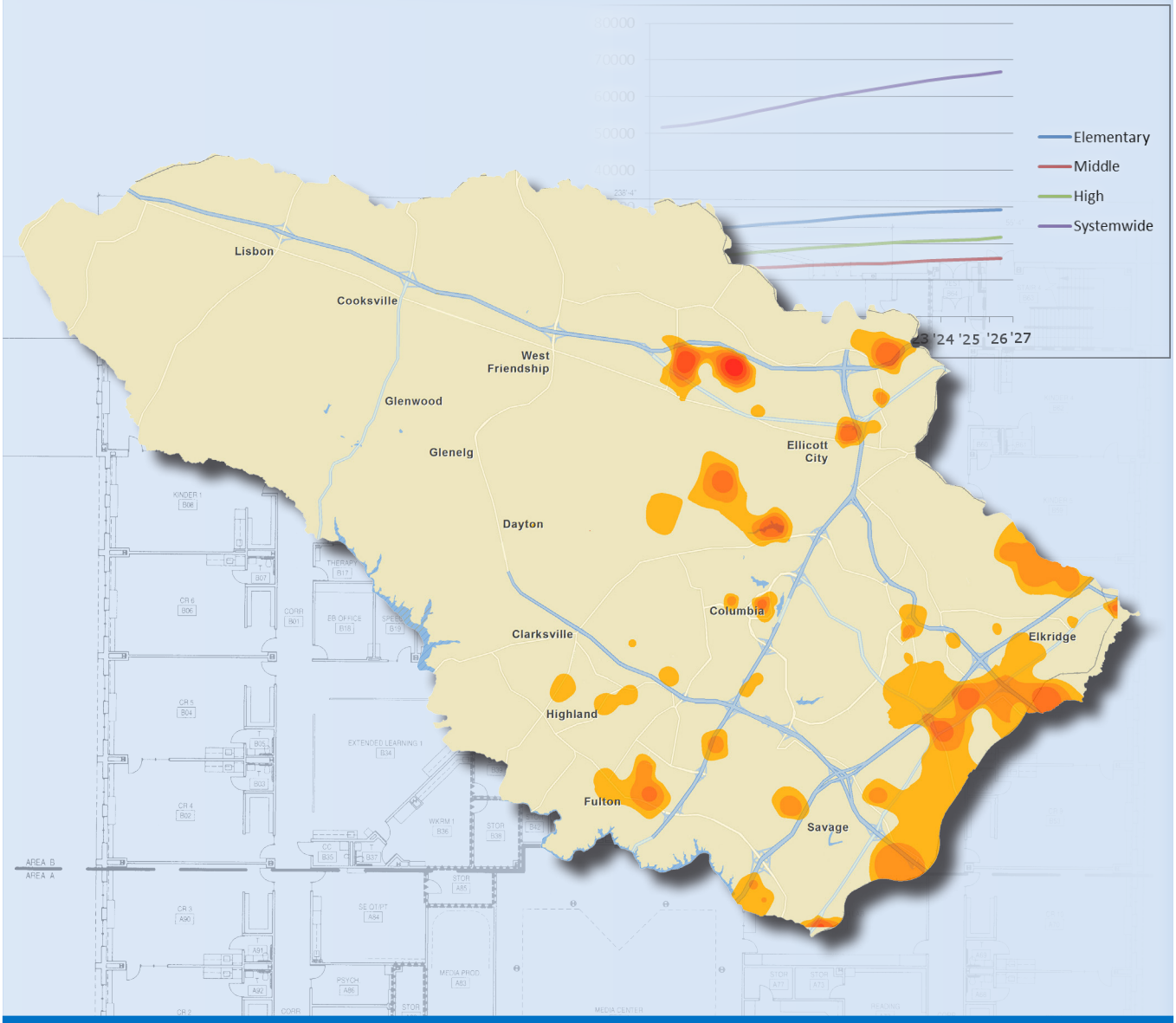
2015 Feasibility Study

An Annual Review of Long-Term Capital Planning and Redistricting Options



Howard County Public School System

Howard County Public School System

Feasibility Study: An Annual Review of Long-Term Capital Planning and Redistricting Options

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Howard County Public School System

Feasibility Study
An Annual Review of Long-Term Capital Planning and Redistricting Options

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This is a publication of the Howard County Public School System.

Electronic copy of the 2015 Feasibility Study can be found on the school system's website at www.hcpss.org

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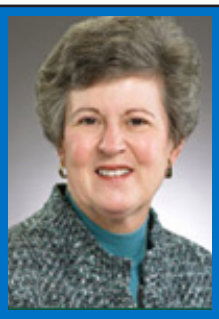

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Howard County Public School System

Feasibility Study
An Annual Review of Long-Term Capital Planning and Redistricting Options

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Howard County Public School System

Feasibility Study
An Annual Review of Long-Term Capital Planning and Redistricting Options

Introduction

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Introduction

Each year the Board of Education (Board) of the Howard County Public School System (HCPSS) reviews capital planning options and redistricting scenarios through a feasibility study. The report has four goals:

1. Inform the long term planning process.
2. Facilitate discussion of decisions that may lay ahead.
3. Provide strategic information to the school system.
4. Prepare for scheduled redistricting.

The annual student enrollment projection is introduced in this report along with scenarios that are intended to provide a comprehensive look at suggested capital additions, renovations, and any attendance area adjustments that are anticipated within the ten-year Capital Improvement Program period. Plans examined in this document may only be implemented through the Board of Education's approval of both the capital budget and any change to current school attendance areas. This report is the starting point for the annual process of developing the capital budget.

Experience has shown that by presenting this report annually, assumptions and trends can be given consideration on a regular basis and appropriate adjustments can be made to the capital budget or redistricting plans. New plans may be needed to react to population shifts or new residential development plans. This document makes note of scenarios that may be developed in future attendance area review processes. Full plan assessments will then be made in a future report prior to Board deliberation to show how those plans conform to Board policy.

Annual enrollment projections are used in short-term decision making, such as determining staffing and supplying schools. The allocation of relocatable classrooms is also made using projections. The projection is presented in a format similar to the Adequate Public Facilities Ordinance (APFO) chart. The "pre-measures" chart shows the effect of projected enrollment with capacity projects included in the Board approved FY 2016 Capital Budget. The "post-measures" chart gives a preliminary view of projected enrollment with new or accelerated capital projects recommended in this report.

Projects in the Capital Improvement Program that increase student capacity will be tested in the feasibility study with a redistricting plan consistent with Board policy on redistricting policy goals. Plans will be linked within and across organizational levels to form a short- and long-range redistricting plan. The Board of Education will review the plan and set direction. In years when redistricting is anticipated, the Attendance Area Committee will evaluate the plan, providing review and comment to the Superintendent. At this time redistricting is not recommended until 2017 and will include the opening of New Elementary School #42 (ES #42).

The Office of School Planning maintains a portion of the HCPSS website with information relevant to the process. During redistricting the School Planning page is frequently updated with maps, reports, and meeting minutes.

Howard County Public School System

Feasibility Study

An Annual Review of Long-Term Capital Planning and Redistricting Options

Executive Summary

June 2015

Executive Summary

This feasibility study is an annual presentation containing reports of projected enrollment and feasible redistricting in compliance with Policy 6010 - School Attendance Areas. Since new capacity, either as additions or new facilities, factors into these considerations, this document forms the basis for the development of the Capital Improvement Program (CIP). The following sections highlight continuing considerations included in this study. In September 2015, the FY 2017 Superintendent's Proposed Capital Budget will be presented, which includes the five-year CIP. The additions and new schools approved as part of the FY 2016–2025 Long-Range Master Plan are included in the assumptions for this document.

Since the 2014 Feasibility Study was presented, constraints to local capital funding have appeared. These come despite recently approved general plan amendments and strong enrollment growth. Responding to these constraints requires adjustment to the long-range plan and perhaps redistricting. Every effort was made during the budget process to preserve existing capacity projects. This document provides some adjustments and interim measures.

The replacement of Wilde Lake MS is critical to help manage growth in student enrollment stemming from the Columbia Town Center development. The Swansfield ES addition also serves Downtown Columbia growth since feasible redistricting including Swansfield and Bryant Woods ES can relieve Running Brook ES. ES #42 is a high priority need to address future growth in both the Northeastern and the Southeastern Regions, and was approved for acceleration. Steady enrollment growth in the area has validated a recommendation to open this facility in 2018. The Board decided last March to permit the modification of the CIP to allow for an August 2018 opening of ES #42 and designated a site adjacent to Thomas Viaduct MS for this school. The Board also approved use of the 788 seat elementary school prototype. These approvals are incorporated in this document.

Recommendations:

1. Preserve funding to open Swansfield ES addition. With feasible redistricting, this capacity can help defer the opening of a new elementary school most likely at the Faulkner Ridge site.
2. Preserve funding to open Waverly ES addition but consider options to better use West Friendship ES and western capacity, perhaps with some interim capital investment, to help defer a new elementary school in the vicinity.
3. Consider alternative delivery of regional programs to open capacity at existing schools.
4. Consider redistricting at multiple levels in the same year to better align feeds.

Planning Considerations

This section identifies planning assumptions and considerations. The annual projection is developed with assumptions about enrollment growth that have evolved over the years. Other planning considerations involve implications for capital facilities. Some of the previous planning assumptions have been adjusted, while others have been added for this study. This section presents a discussion of the major components and adjustments included in this year's planning considerations.

June 2015

Policy Guidance

This document is guided by Board of Education Policy 6010. Projects in the Capital Improvement Program that increase student capacity will be tested in the feasibility study with a redistricting plan consistent with stated redistricting policy goals. Plans will be linked within and across organizational levels to form a short- and long-range redistricting plan. The Board of Education will review the plan and set direction, as appropriate, during the capital budget presentations each year. Policy 6010 recommends consideration of redistricting under certain conditions such as the opening of a school or adjusting to some other change. When school capacity utilization projections fall outside the target capacity utilization range of 90–110 percent over a period of time, redistricting may be considered.

Redistricting is not planned until 2017. When redistricting is planned, staff will refine the goal-directed short- and long-range plan in the Feasibility Study based on the most current set of projections that conform to System-Level Process Requirements. The Superintendent will appoint an Attendance Area Committee to test alternate scenarios consistent with the direction set by the Board of Education and the standards and factors in Policy 6010. Plans may be presented in regional meetings, and various methods will be used to collect additional input from the public. A Superintendent's plan that takes into account previous staff, committee, and community input is presented to the Board.

Figure 3.1

Policy 6010 - School Attendance Areas - identifies eleven redistricting factors for consideration

1. **Educational welfare of the impacted students in both the sending and receiving schools**
2. **Frequency with which students are redistricted**
3. **Impact on the number of students bused and the distance bused-students travel**
4. **Cost**
5. **The demographic makeup and academic performance of students in both the sending and receiving schools**
6. **Number of students to be redistricted**
7. **Maintenance of feeder patterns**
8. **Changes in a school's program capacity**
9. **Impact on specialized or regional programs**
10. **Functional and operational capacity of school infrastructures**
11. **Building utilization (90–110 percent where possible)**

The Board of Education evaluates the Superintendent's plan according to the standards of Policy 6010 which are listed above in Figure 3.1. In their deliberations they may consider new scenarios using these considerations. It is unlikely that one plan can fully satisfy all considerations. Capacity utilization over time and the number of students redistricted are considerations often given the most attention. The other factors are emphasized to different degrees, but all are given consideration. The distribution of enrollment growth and capacity is never perfect, so it can be difficult to make plans that satisfy all factors and move few students. Some are dissatisfied with the outcome, but most feedback affirms the process laid out in Policy 6010 as being transparent. Once a decision is made, a robust transition process is undertaken to facilitate students' adjustment to new school assignments.

Alignment with Strategic Plan

Vision 2018: Fulfilling the Promise of Preparation is the Board's strategic plan to build an educational program that is among the best in the world. The feasibility study supports achievement of each goal in *Vision 2018*.

Input session for middle school redistricting

The anticipation of growth trends and planning for adequate permanent or temporary space is needed to serve student needs. When attendance area changes are necessary, a student-centered transition process is provided to welcome the students to the new school. These efforts are made to ensure every student achieves academic excellence in an inspiring, engaging, and supportive environment.

Crucial decisions about budget and attending areas must be the result of an open process that includes many of the stakeholders. Board of Education decisions need to be informed by both the technical guidance of staff, and the concerns and desires of the families and community. For this reason, the Office of School Planning maintains an extensive web presence and supports many meetings of committees, PTAs, and other community groups. It is also necessary that the office serves as a liaison to various county and state agencies to communicate agency direction. These efforts ensure that families and the community are engaged and supported as partners in education.

Table 3.1	**Strategic Plan Strategies Relevant to Feasibility Study**
1.4.6 Configure physical spaces to facilitate learning.	
2.1.2, 3.1.3, 4.62 Consistently include representatives from stakeholder groups in planning processes to inform school system actions and decisions.	
2.1.6 Provide timely, relevant, and easily accessible information.	
3.3.2 Tailor communications to user needs.	
4.4.1 Utilize technology tools that are intuitive, efficient, effective across platforms, and requirements-driven in a standardized environment.	
4.4.2 Streamline and automate organizational processes in alignment with industry best practices.	
4.5.1 Refine central services to streamline operations, optimize efficiency and effectiveness, and facilitate collaboration.	
4.5.2, 4.6.4 Utilize consistent performance management practices to plan, evaluate, and refine initiatives.	
4.5.3 Implement continuous improvement practices, including quality control and process management, in every school and division.	
4.6.1 Regularly consider research-based best practices.	
4.6.3 Routinely benchmark with comparison organizations to analyze current practices and identify best practices.	

Relationship to Capital Budget

Figure 3.2 Capital Budget and Redistricting Flow Chart

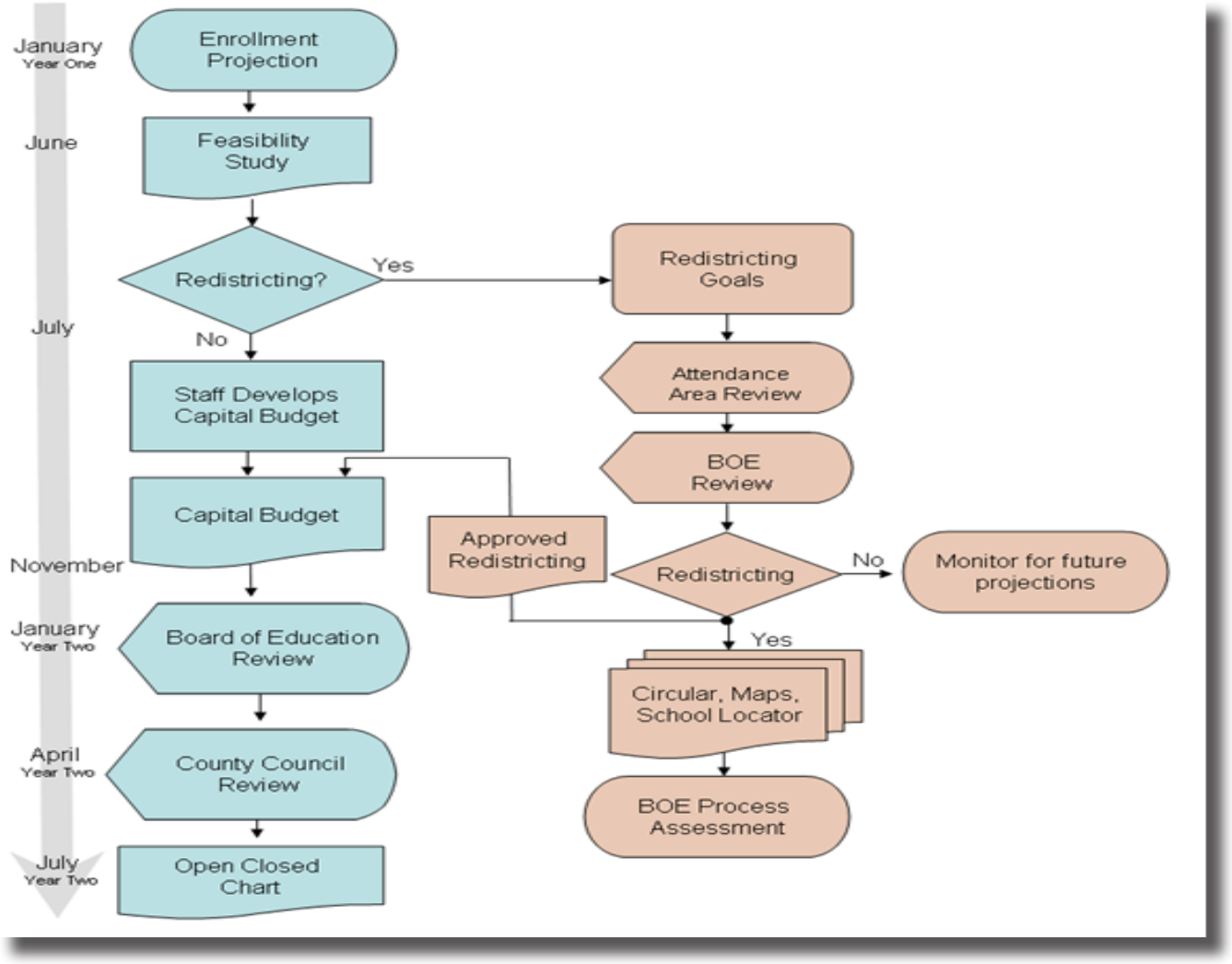


Figure 3.2 shows the redistricting process in the context of the capital budget. The Feasibility Study is presented as the capital budget is being prepared. The graphic shows that while redistricting may not take place annually, it is given consideration annually in the feasibility study.

There are a number of ways to address enrollment growth. In some cases, new capacity or a capital project is the best solution. In other cases, a redistricting consistent with policy may allow better use of existing capacity. Sometimes a change to regional program location can open capacity. Relocatable buildings can also be used to relieve overcrowding. The process is ongoing but may be tracked through this document and the capital budget process.

Relationship to Capital Budget

The annual capital budget contains a capital improvement plan (CIP) and long-range master plan. Table 3.2 is a copy of the long-range master plan from the FY 2016 Board Requested Capital Budget. (The CIP is the first five years.) Capital projects are shown with anticipated funding phased out over future fiscal years. The feasibility study evaluates enrollment trends and discusses adjustments and changes that may be reflected in the CIP and Long Range Master Plan.

Table 3.2 Example of Long Range Master Plan

FY 2016-2025 Long-Range Master Plan

Board of Education Approved — May 27, 2015

(In Thousands)

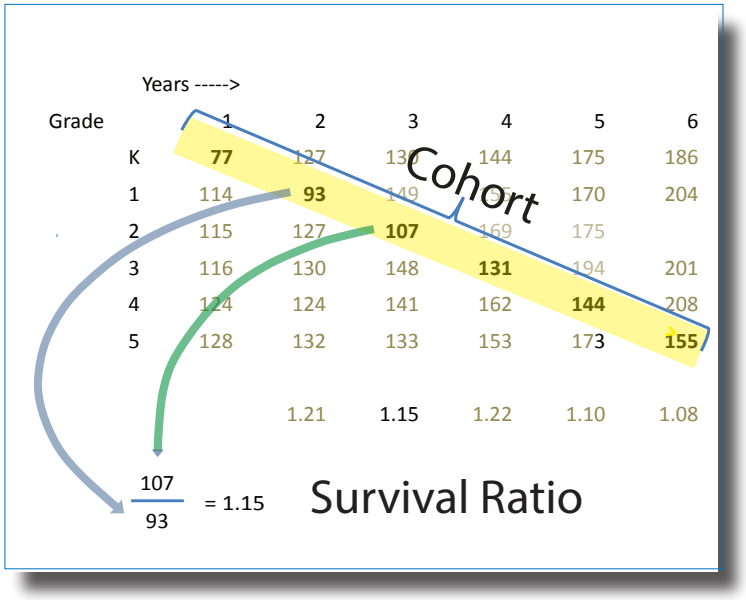
Project	Approved Appropriations	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total Approp. plus FY16-FY25 Request
Wilde Lake MS Replacement School	10,858	18,234	12,895	-	-	-	-	-	-	-	-	41,987
Patuxent Valley MS Renovation	8,145	10,000	10,385	-	-	-	-	-	-	-	-	28,530
Swansfield ES Renovation/Addition	1,898	9,875	11,567	1,751	-	-	-	-	-	-	-	25,091
Waverly ES Renovation/Phase II Addition	-	3,770	6,430	16,898	-	-	-	-	-	-	-	27,098
New Elementary School #42	-	2,807	11,640	23,633	2,460	-	-	-	-	-	-	40,540
Oakland Mills MS Limited Renovation	-	-	4,000	5,000	5,000	-	-	-	-	-	-	14,000
Hammond HS Renovation	-	-	3,790	18,124	18,999	18,374	19,000	-	-	-	-	78,287
Ellicott Mills MS Addition	-	-	432	3,440	2,293	-	-	-	-	-	-	6,165
Oakland Mills HS Renovation	-	-	-	-	-	6,167	38,685	25,790	-	-	-	70,642
New Elementary School #43	-	-	-	-	-	4,180	14,300	14,300	11,518	-	-	44,298
Centennial HS Renovation	-	-	-	-	-	-	-	6,151	38,592	25,728	-	70,471
New Elementary School #44	-	-	-	-	-	-	-	4,320	15,670	15,670	11,334	46,994
New Elementary School #45	-	-	-	-	-	-	-	-	4,460	16,330	16,330	37,120
New High School #13	-	-	-	-	-	-	-	-	-	10,764	51,226	61,990
New Middle School #21	-	-	-	-	-	-	-	-	-	-	4,880	4,880
Systemic Renovations/Modernizations	218,887	9,263	18,708	59,909	88,114	78,338	52,135	61,293	64,358	67,576	70,955	789,536
Roofing Projects	40,537	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	90,537
Playground Equipment	2,380	-	300	300	300	300	300	300	300	300	300	5,080
Relocatable Classrooms	16,210	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	30,910
Site Acquisition & Construction Reserve	20,836	-	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	38,836
Technology	29,486	5,000	10,000	6,000	5,000	7,500	10,000	5,000	7,500	10,000	6,000	101,486
School Parking Lot Expansions	4,200	-	600	600	600	600	600	600	600	600	600	9,600
Planning and Design	-	300	300	300	300	300	300	300	300	300	300	3,000
Barrier Free	5,228	200	200	200	200	200	200	200	200	200	200	7,228
State Allocations for Prior Year Projects*	-	1,821	-	-	-	-	-	-	-	-	-	1,821
TOTALS	**$ 358,665**	**$ 67,470**	**$ 99,747**	**$ 144,655**	**$ 131,766**	**$ 124,459**	**$ 144,020**	**$ 126,754**	**$ 151,998**	**$ 155,968**	**$ 170,625**	**$ 1,676,127**

Ten-Year Long-Range Master Plan = $1,317,462

Enrollment Projections

Projections used for this study were generated in the spring of 2015. The projection methodology used by the HCPSS is based on historic cohort survival ratios—the number of students in a "cohort" that "survive" from one grade level to the next. In Figure 3.3, a cohort-survival ratio is calculated from historic data. The rate of 1.15 can be used to predict how many second graders will result from the previous year's first graders. Ratios from multiple years and all grade transitions are calculated for each school. Other effects, such as housing yields and apartment turnover, are added to the projection. These variables are combined to project enrollment for each school for September 30 of each future year.

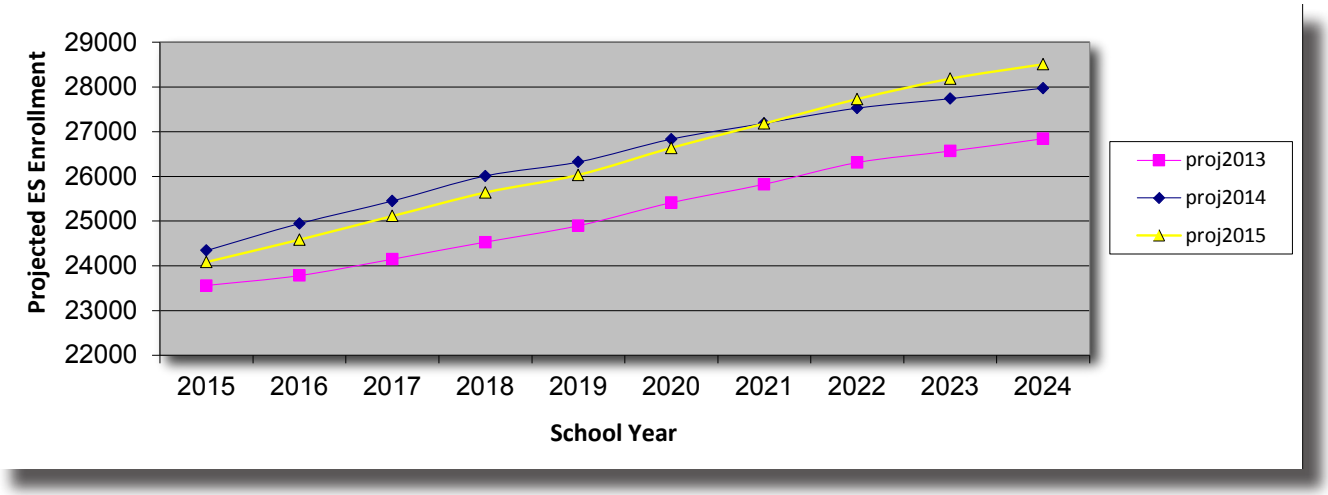
Figure 3.3



The projection is presented out to 2025 in this document. Certain decisions, such as site acquisition are appropriately informed by the latter part of the projection. Planning issues may become apparent by comparing the current projection to those made in previous years. The following charts use a ten-year series and present three consecutive annual projections.

As shown in Figure 3.4, the 2015 projection is initially showing a more modest rate of enrollment growth at the elementary level than the 2014 projection. The trend in the 2015 projection is for elementary enrollment to increase by 4,426 students by 2024. As a result of this enrollment growth, the capacity utilization of all elementary schools combined will begin to exceed 110 percent by 2021. Projects approved as part of the FY 2016 CIP can absorb most of this growth.

Figure 3.4 Comparison of Three Enrollment Projections - Elementary



Enrollment Projections

Figure 3.4 shows that the trend in the 2015 projection is for middle school enrollment to increase by 2,493 students by 2024. The 2015 middle school growth rate is also lower than 2014. As a result of this enrollment growth, the capacity utilization of all middle schools combined will begin to exceed 110 percent beyond 2024. Most of the projected growth is in the east, and projects approved as part of the FY 2016 CIP can only partially absorb this growth.

Figure 3.5 Comparison of Three Enrollment Projections - Middle

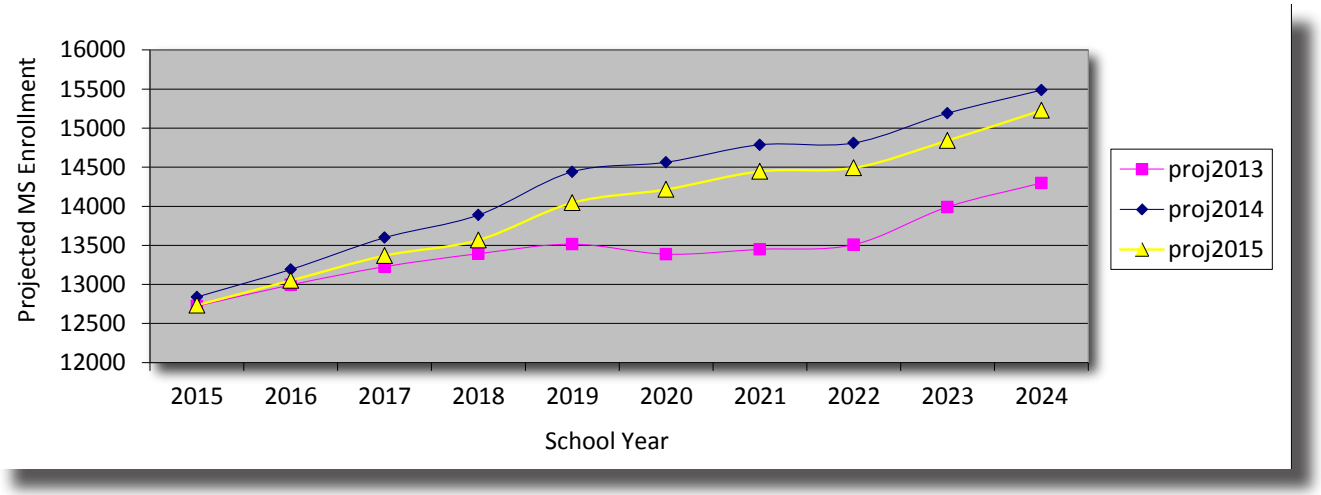
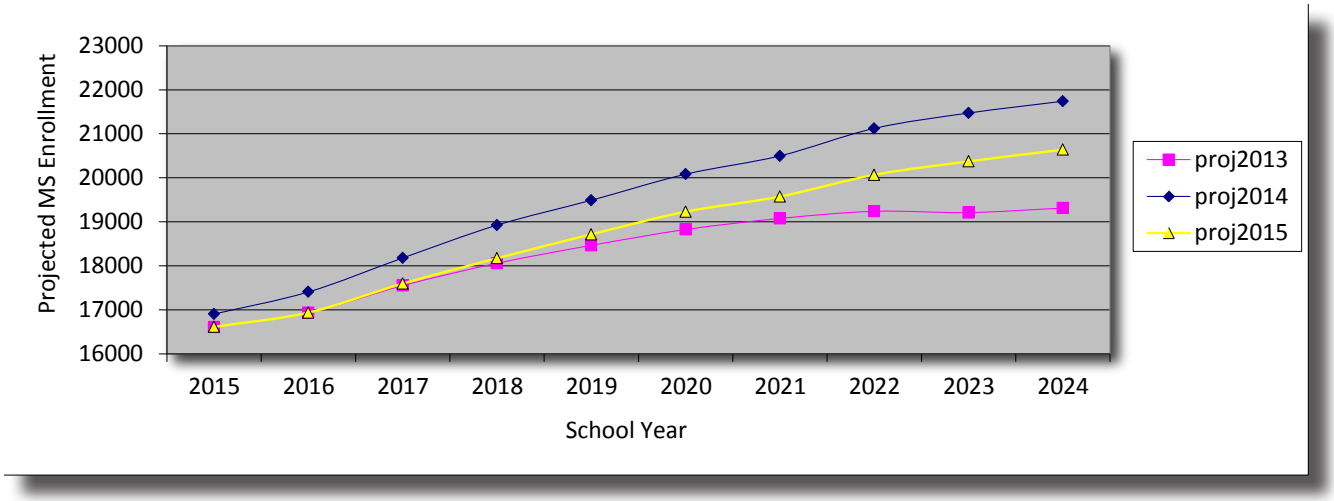


Figure 3.6 shows that the trend in the 2015 projection is for high school enrollment to increase by 4,028 students by 2024. While a lower trend than in the 2014 projection, the capacity utilization of all high schools combined will begin to exceed 110 percent by 2020. Based on the long-term growth trends, land should be banked for future high school needs in the eastern part of the county.

Figure 3.6 Comparison of Three Enrollment Projections - High

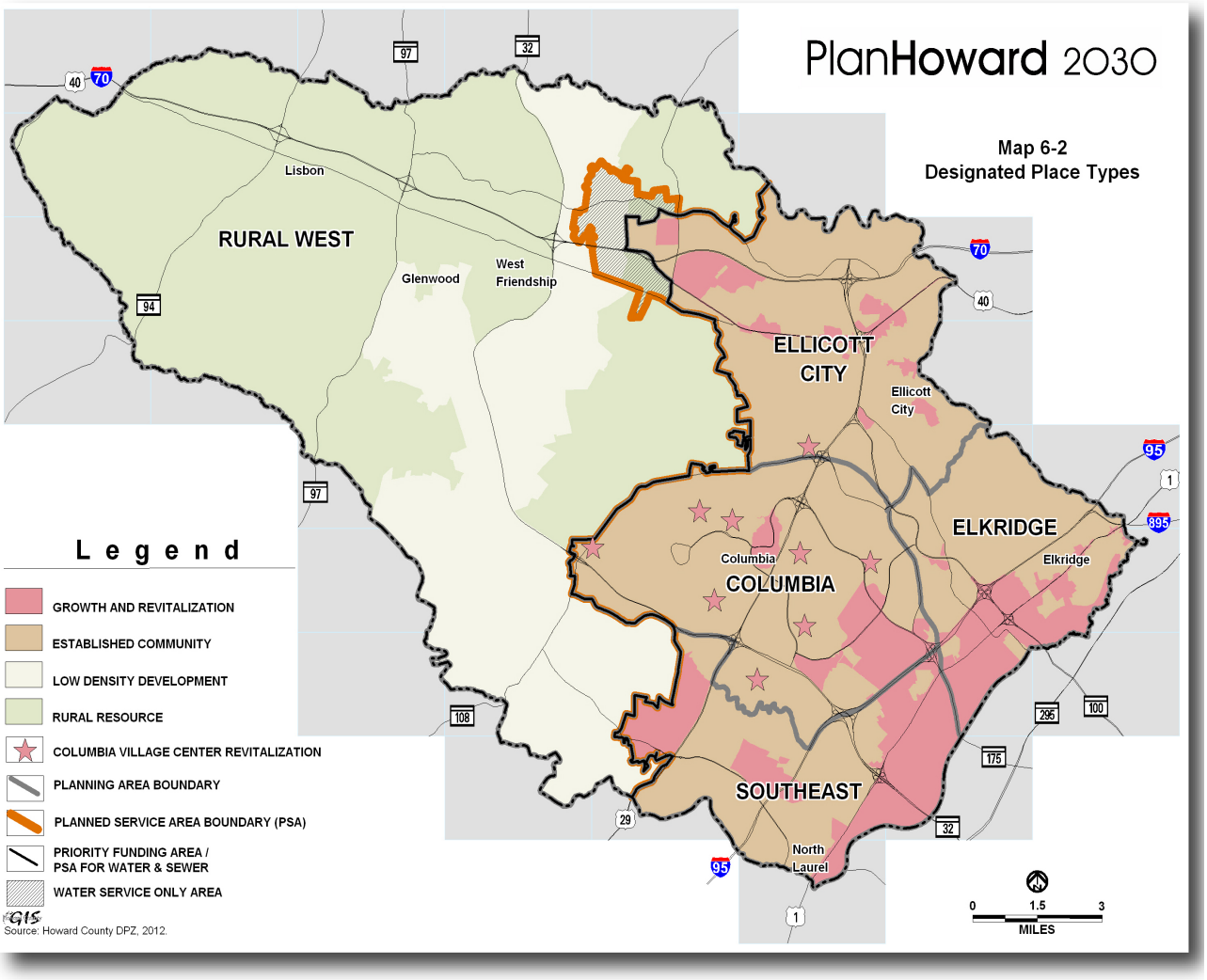


Land Use

Development is guided by the general plan and implemented with zoning. "PlanHoward 2030," the Howard County General Plan, sets priorities for growth and was adopted by the County Council in July 2012. Comprehensive zoning took effect in October 2013. As a result, new development is expected that will affect future school planning. These changes were not anticipated in the projections used for the redistricting to open Ducketts Lane ES. Land use changes are captured in the annual projection to facilitate analysis of options in this document and the capital budget.

The General Plan included the adoption of a designated places map. Figure 3.7 depicts the Designated Places map and is taken from the plan. Most future development, and anticipated school needs, are planned where the map shows "Growth and Revitalization" areas in pink. Generally these are in the eastern part of the county and the village centers of Columbia. Projected enrollment growth is associated with this future development.

Figure 3.7 Plan Howard 2030 Designated Places Map



Land Use

The FY 2016 Long-Range Master Plan proposed three additional elementary schools and one middle school in a plan that already included one future elementary school and one high school. Despite projections indicating these six new schools are needed, there are indications that capital funding will be constrained in the next few years.

The timing of residential development depends upon actual land development applications which can change. Projections are adjusted each year to account for phasing. The Department of Planning and Zoning provides the Office of School Planning with the amount of existing and projected housing units in the county by school planning unit. Future housing is calculated using a software tool that simulates the residential build-out of the County's remaining undeveloped residentially-zoned properties under real world conditions, such as the constraints imposed by current zoning of properties, the logistics of residential construction, and the growth limits of the County's General Plan. The output from this simulation informs the enrollment projection.

Figure 3.8 Recent development

Oxford Square construction.

Verde apartments at Howard Square.

Maple Lawn section shown in 2013 left and 2015 on the right.

Capacities

Equitable evaluation of the impact of projected enrollment growth requires calculation of the capacities of schools. Capacities are not necessarily fixed to the capacity designed when a building first opened. Changes in use, program, and standards can effectively change capacity. Capacity methodologies have been reviewed at all three levels in recent years. This document expresses the projected enrollment by level and by school as a function of capacity utilization. Capacity utilization is the percentage of the building that will be utilized by the actual or projected enrollment. In the Pre- and Post- Measure Charts starting on page 45, the effect of considered plans on capacity utilization are depicted in tabular form.

The example below from the 2014 Feasibility Study, illustrates how capacity is shown in these charts. Figure 3.9 shows the effect of the larger capacity of the Wilde Lake MS replacement school. The capacity columns show the number of seats, which changes from 467 to 701 in 2017 when the replacement school opens. The corresponding calculation of the percentage utilization also changes, dropping from 122.7 percent to 95.6 percent in 2017. (Wilde Lake MS capacity was subsequently updated to a capacity of 760 in the FY 2016 Capital Budget .)

Figure 3.9 Capacity Chart Example

Post-Measures

Aggregate Plan

Chart reflects May 2014 Projections, Board of Education's FY 2016 Requested capacities and estimated redistricting.

		Capacity				2015-16			2016-17			2017-18		
Columbia - East		**2015**	**2016**	**2017**	**2018**	**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**	
Lake Elkhorn MS		643	643	643	643	554	86.2		563	87.6		604	93.9	
Oakland Mills MS		506	506	506	506	486	96.0		484	95.7		486	96.0	
Region MS Totals		1149	1149	1149	1149	1040	90.5		1047	91.1		1090	94.9	
Columbia - West														
Harpers Choice MS		506	506	506	506	559	110.5		574	113.4		598	118.2	C
Wilde Lake MS	R	467	467	701	701	573	122.7	C	599	128.3	C	670	95.6	
Region MS Totals		973	973	1207	1207	1132	116.3	C	1173	120.6	C	1268	104.7	

High school program capacities are a product of either 80 or 85 percent of the total number of teaching stations multiplied by 25 students, exclusive of special education classrooms, and factored with consideration that not all teaching stations can be scheduled for use every period of the school day. Further, special-use teaching stations may not be adaptable for academic programs even if the space is available for a period of the school day.

Middle school program capacities are a product of 95 percent of the total number of teaching stations multiplied by 20.5 students, exclusive of special education classrooms. Like high schools, not all teaching stations can be scheduled for use every period of the school day.

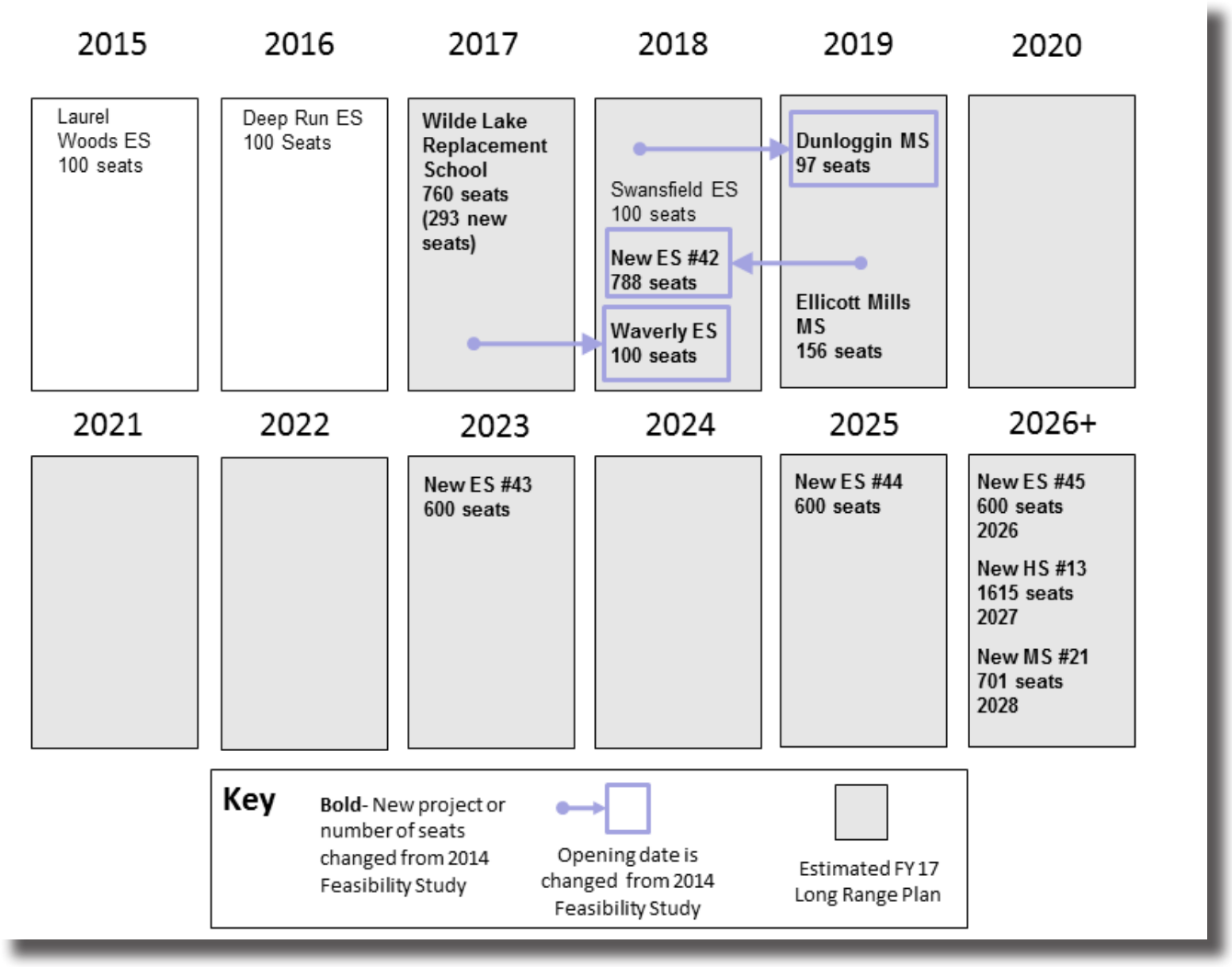
Elementary school program capacities are based on 22 students for each Kindergarten classroom, 19 students for each classroom in Grades 1 and 2, and 25 students for each classroom in Grades 3–5. Elementary school special education classroom capacities are established by the mandated student/teacher ratios for the various programs. Not included in the capacities for elementary schools are resource/instructional spaces that are utilized on a schoolwide basis where no one group of students

Capacities

is assigned exclusively. Some examples of spaces not included in the capacity are gymnasiums, cafetoriums, art rooms, music rooms, media centers, gifted and talented rooms, or rooms dedicated to regional programs such as Regional Early Childhood Centers or Pre-K.

The FY 2017 Capital Budget will include updates to the Long Range Plan. Figure 3.10 below shows potential changes to the Long Range Plan considered in this document.

Figure 3.10 Capacity Projects



HCPSS Facilities and Land Bank

The Howard County Public School System (HCPSS) maintains well over seven million square feet of school facilities and other buildings in service of delivering the educational program and for use by the community. This document examines utilization of the 73 elementary, middle, and high schools, and anticipates future schools.

HCPSS School Facilities

73 schools
41 elementary schools
20 middle schools
12 high schools
3 education centers

The HCPSS maintains sites for future school construction, commonly known as the "Land Bank." Some properties are held by other parties for the future use by the Board of Education for school construction and when needed, the Board may utilize these properties. Most school site reservations result from agreements made during Columbia planning and development. Howard County has aided the school system in the past through exchanges of county land where needed. Opportunities for additions to the land bank in eastern Howard County to host projects noted in Figure 3.10 on page 15 are under consideration. An elementary school site is also sought to accommodate Turf Valley development. The HCPSS will continue to reach out to local and state agencies as it searches for additional sites along the Route 1 Corridor and other areas of identified growth. Table 3.3 shows the inventory of school sites presented in the annual capital budget:

Table 3.3 Land Bank

Owned Sites	Acreage	Location	Date Acquired	Cost
Sunny Spring Drive	10	Sunny Spring Drive	1974	$1.00
Future MS Site	41	2865 Marriottsville Road	2007	$1,700,000
Future School Site	8	Banbury Drive Parcel G	2013	$4,200,000
Faulkner Ridge Center	9.01	Marble Faun Lane	1968	$1.00
Reserved Sites	**Acreage**	**Location**		
Clary's Forest	10	Little Patuxent Parkway near Bright Passage		
Dickinson	11	Eden Brook Drive and Weather Worn Way		
Dickinson	20	Sweet Hours Way east of Eden Brook Drive		
Harper's Choice	5	Rivendell and Cedar Lane		
Hopewell	10	Rustling Leaf and Deepage Drive		
Huntington	11	Vollmerhausen Road east of Murray Hill Road		

Needs and Strategies

Prior to examining future redistricting plans, it is necessary to review the implications of the new projection and identify needs and potential strategies. When school capacity utilization is outside of the acceptable range per Board of Education Policy (90–110 percent), redistricting may be considered.

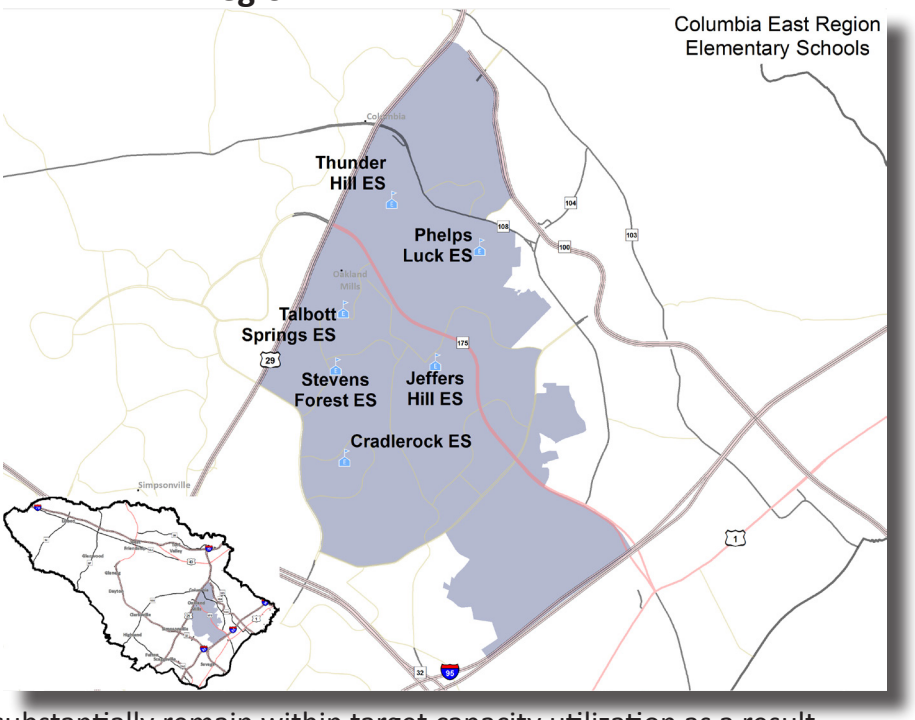
June 2015

Elementary Schools Columbia East Region

Need:
No capacity is needed in short term.

Strategy:
Continue to model enrollment projections in future studies.

Figure 4.1 Elementary schools of the Columbia East Region



Most schools in this region will substantially remain within target capacity utilization as a result of approved redistricting and capital projects. Capacity increasing projects have recently been completed at Thunder Hill ES, Phelps Luck ES, and Stevens Forest ES. Thunder Hill ES will experience some crowding despite recent redistricting changes, but the anticipated rate of growth is not dramatic. Relocatable classrooms have been installed and this condition will be monitored. Talbott Springs ES shows some crowding, which is also addressed with relocatable classrooms. A renovation is planned that may be an opportunity to gain capacity through construction swing space depending upon renovation design and the availability of funding.

Table 4.1 Five year elementary school utilization in the Columbia East Region

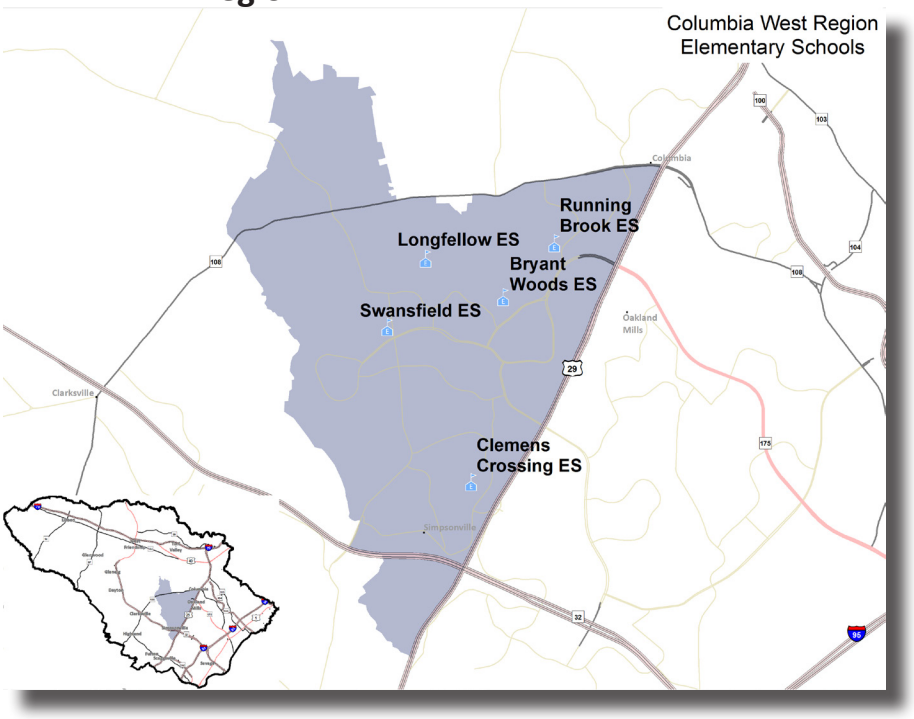
Columbia - East	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Cradlerock ES	425	398	106.8	386	398	97.0
Jeffers Hill ES	467	421	110.9	444	421	105.5
Phelps Luck ES	553	616	89.8	539	616	87.5
Stevens Forest ES	404	399	101.3	419	399	105.0
Talbott Springs ES	433	377	114.9	424	377	112.5
Thunder Hill ES	552	509	108.4	580	509	113.9
Region Totals	**2834**	**2720**	**104.2**	**2792**	**2720**	**102.6**

Elementary Schools Columbia West Region

Need:
The region will have existing capacity through 2020 despite growth at Running Brook ES

Strategy:
Provide interim capacity within the region using the addition at Swansfield ES. Maintain Faulkner Ridge site for a future elementary school.

Figure 4.2 Elementary schools of the Columbia West Region



Investment in a 100-seat addition at Running Brook ES, which opened last August, has been a key capital project for managing growth in this area. Even with this addition, Running Brook ES is expected to continue to grow. A 100-seat addition is also planned at Swansfield ES and will open in 2018. A study of Columbia schools attached to the 2014 Feasibility Study recommended the Faulkner Ridge site for a new school. The combination of the additional capacity at these two schools will help to delay the need for a new school with feasible redistricting.

Table 4.2 Five year elementary school utilization in the Columbia West Region

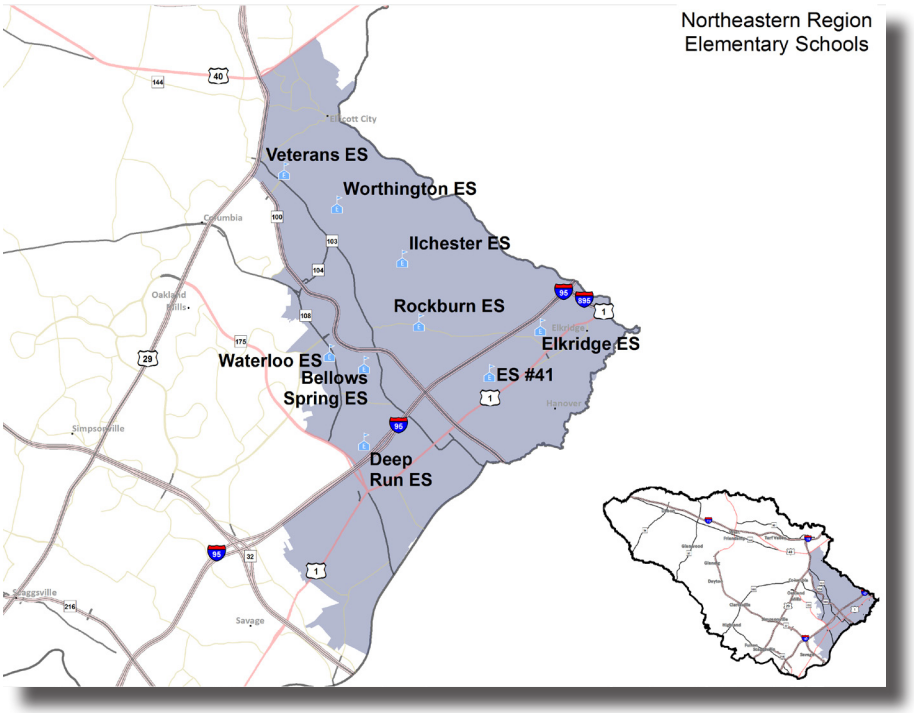
Columbia - West	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Bryant Woods ES	322	361	89.2	342	361	94.7
Clemens Crossing ES	500	521	96.0	530	521	101.7
Longfellow ES	428	512	83.6	436	512	85.2
Running Brook ES	517	405	127.7	735	505	145.5
Swansfield ES	555	521	106.5	519	621	83.6
Region Totals	**2322**	**2320**	**100.1**	**2562**	**2520**	**101.7**

Elementary Schools Northeastern Region

Need:
There is adequate capacity in this region until 2017.

Strategy:
Open Elementary School #42 in 2018.

Figure 4.3 Elementary schools of the Northeast Region



Capacity utilization at Ducketts Lane ES will remain over 110 percent in 2020, even with the reassignment of regional programs to other locations. The region will exceed 115 percent utilization in 2021 and require close to 1,000 additional seats. The most elementary enrollment growth is in this region, east of Interstate 95. Accelerating the construction of Elementary School #42 to allow opening in 2018 was approved by the Board on March 26, 2015. This decision, with the change to the 788 seat model, helps respond to the growth trend.

Table 4.3 Five year elementary school utilization in the Northeast Region

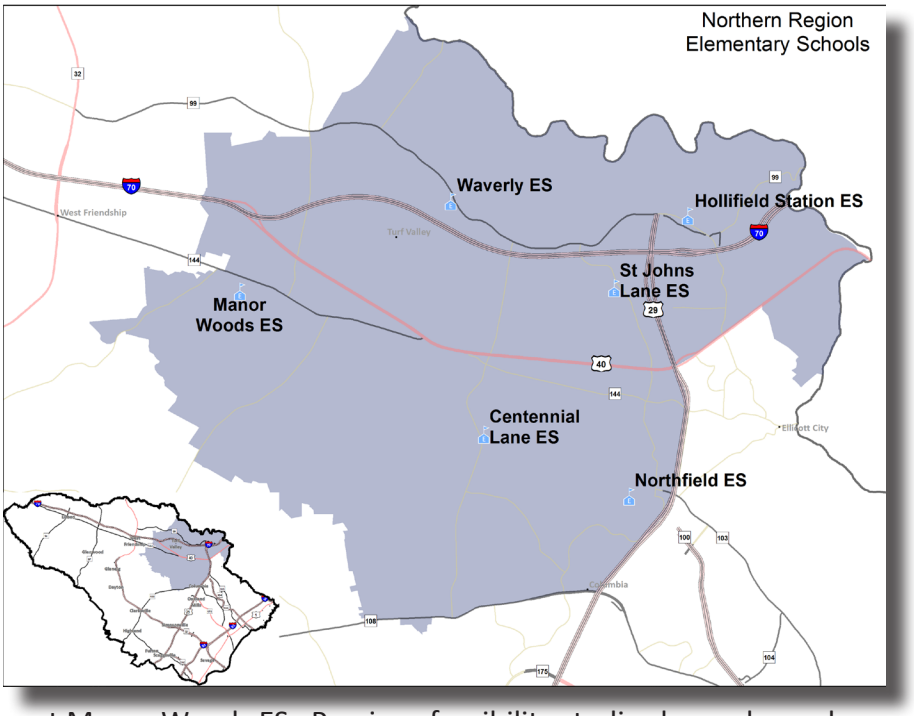
Northeastern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Bellows Spring ES	668	751	88.9	886	751	118.0
Deep Run ES	708	672	105.4	903	772	117.0
Ducketts Lane ES	754	669	112.7	1354	669	202.4
Elkridge ES	790	760	103.9	840	760	110.5
Ilchester ES	698	653	106.9	618	653	94.6
Rockburn ES	605	672	90.0	600	672	89.3
Veterans ES	848	788	107.6	836	788	106.1
Waterloo ES	562	663	84.8	594	663	89.6
Worthington ES	537	590	91.0	473	590	80.2
Region Totals	**6170**	**6218**	**99.2**	**7104**	**6318**	**112.4**

Elementary Schools Northern Region

Need:
Monitor growth at Manor Woods ES and St. John's Lane ES.

Strategy:
Complete the Waverly ES addition and plan for other new capacity.

Figure 4.4 Elementary schools of the Northern Region



Growth is projected at Manor Woods ES that will require redistricting and new capacity, depending upon the timing of the Turf Valley development. A key feature in capital planning for this development is the Phase II addition at Waverly ES. Constructing this addition in 2018 can help relieve overcrowding at Manor Woods ES. Previous feasibility studies have planned for a new elementary school in Turf Valley and considered the possibility that this could serve as a replacement for West Friendship ES. Considering the constraints to the capital budget, this plan should be adjusted. It remains a good idea to own land bank sites in the area, particularly a site in Turf Valley. In the interim West Friendship Elementary should be used to its fullest.

Table 4.4 Five year elementary school utilization in the Northern Region

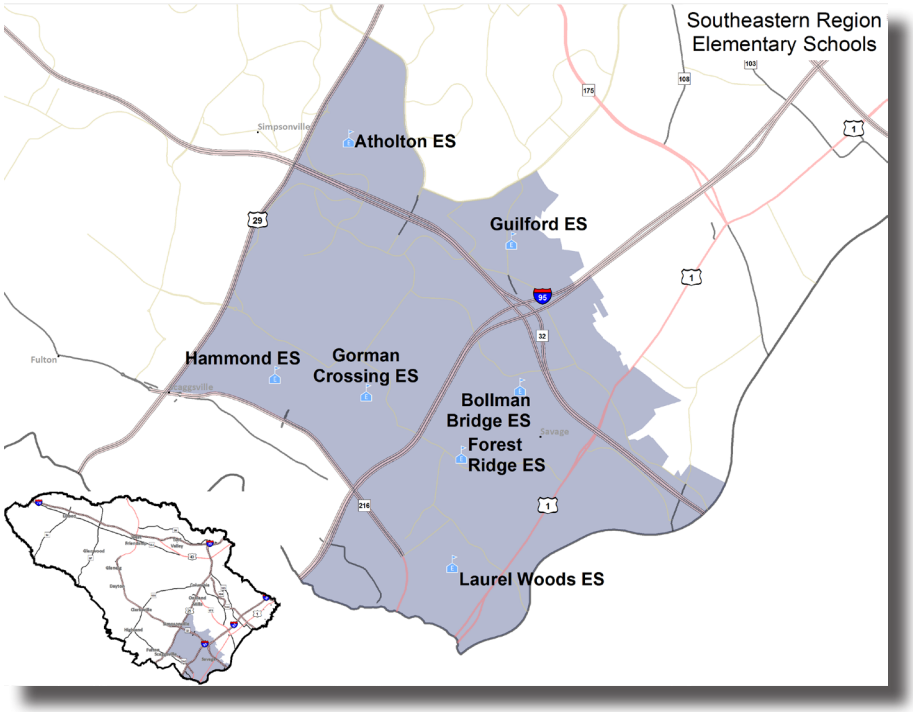
Northern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Centennial Lane ES	683	647	105.6	769	647	118.9
Hollifield Station ES	713	694	102.7	834	694	120.2
Manor Woods ES	716	681	105.1	1257	681	184.6
Northfield ES	677	700	96.7	731	700	104.4
St Johns Lane ES	725	612	118.5	721	612	117.8
Waverly ES	688	638	107.8	572	738	77.5
Region Totals	**4202**	**3972**	**105.8**	**4884**	**4072**	**119.9**

Elementary Schools Southeastern Region

Need:
Future enrollment growth is projected, primarily at Bollman Bridge ES and Forest Ridge ES.

Strategy:
Open Elementary School #42 in 2018. Obtain a site for the land bank.

Figure 4.5 Elementary schools of the Southeast Region



Schools in the region, with the exception of Forest Ridge ES, are projected below 110 percent utilization at the start of this coming school year. Growth at Forest Ridge ES was anticipated in the last redistricting. It was planned for Forest Ridge to contain some of the growth that will later comprise the Elementary School #42 attending area. In the meantime, temporary capacity has been provided and more may be used in the near future. Growth continues in the region, supporting the opening of the next elementary school which is currently planned for 2018.

Table 4.5 Five year elementary school utilization in the Southeast Region

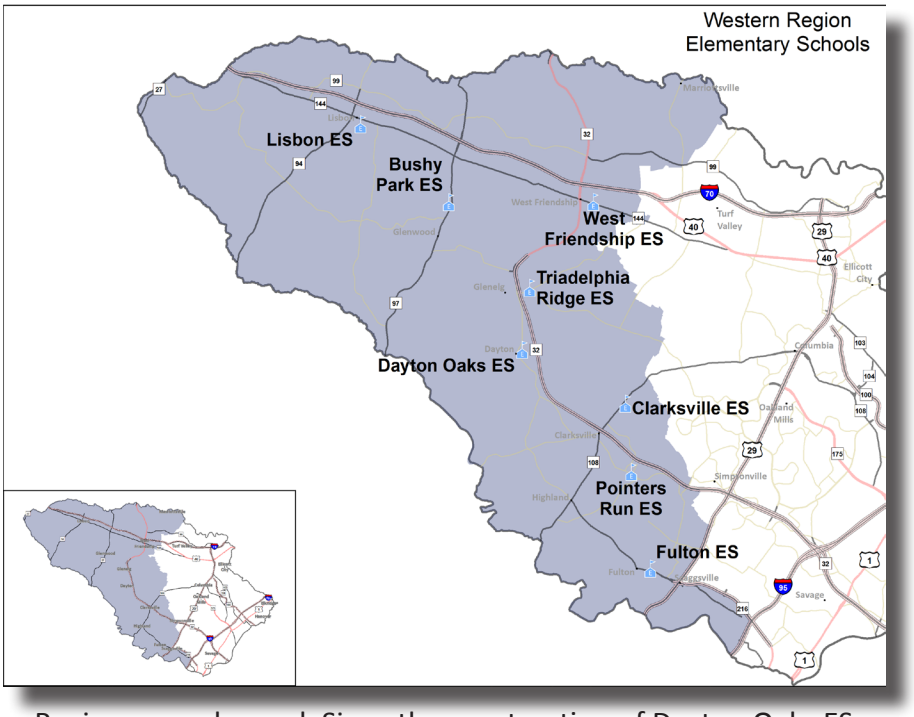
Southeastern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Atholton ES	366	424	86.3	399	424	94.1
Bollman Bridge ES	708	666	106.3	796	666	119.5
Forest Ridge ES	744	669	111.2	846	669	126.5
Gorman Crossing ES	672	700	96.0	764	700	109.1
Guilford ES	490	465	105.4	553	465	118.9
Hammond ES	647	653	99.1	728	653	111.5
Laurel Woods ES	561	640	87.7	552	640	86.3
Region Totals	**4188**	**4217**	**99.3**	**4638**	**4217**	**110.0**

Elementary Schools Western Region

Need:
Capacity is available which could be used to relieve other regions.

Strategy:
Monitor projections and consider scenarios that may better use capacity.

Figure 4.6 Elementary schools of the Western Region



Elementary capacity in the Western Region exceeds need. Since the construction of Dayton Oaks ES and the replacement of Bushy Park ES, lower enrollment trends have been evident in the region. This trend seems to be tied to land use and housing value changes. West Friendship ES has consistently shown declining enrollment in recent projections. Previous studies examined closure of West Friendship ES but needs in the Northern region and limited capital funds now support using Western region capacity to relieve the Northern region. In the next region, growth at Fulton ES and Pointers Run ES may be balanced with redistricting that includes Clarksville ES and Dayton Oaks ES.

Table 4.6 Five year elementary school utilization in the Western Region

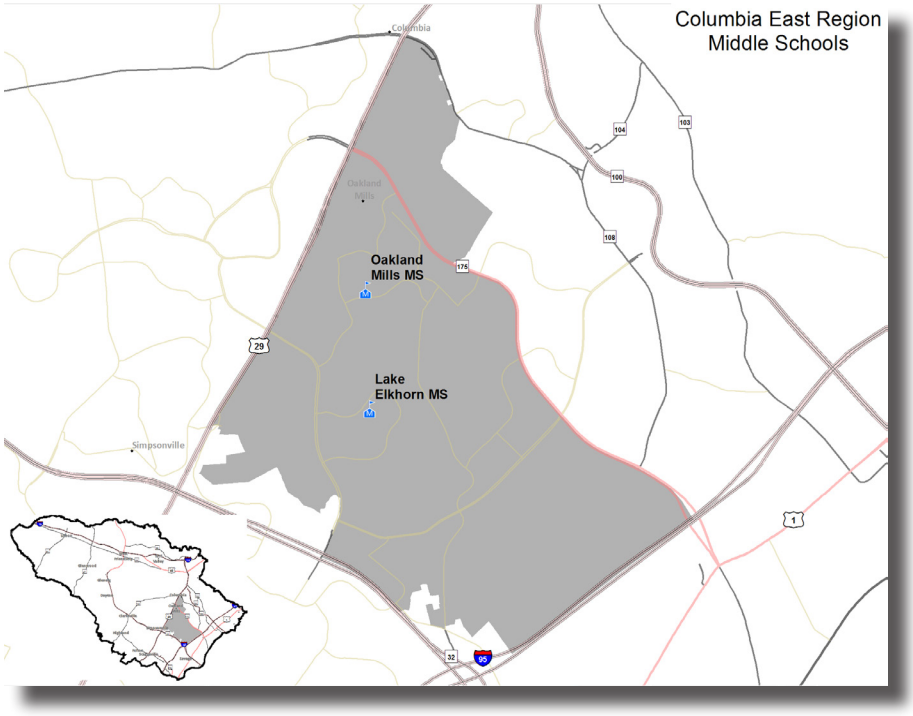
Western	2015			2020		
	Projected Pop.	Capacity	Projected Utilization	Projected Pop.	Capacity	Projected Utilization
Bushy Park ES	611	788	77.5	602	788	76.4
Clarksville ES	467	612	76.3	430	612	70.3
Dayton Oaks ES	602	788	76.4	591	788	75.0
Fulton ES	756	788	95.9	878	788	111.4
Lisbon ES	410	527	77.8	447	527	84.8
Pointers Run ES	722	744	97.0	855	744	114.9
Triadelphia Ridge ES	523	581	90.0	620	581	106.7
West Friendship ES	278	414	67.1	236	414	57.0
Region Totals	**4369**	**5242**	**83.3**	**4659**	**5242**	**88.9**

Middle Schools Columbia East Region

Need:
Some capacity exists in this region.

Strategy:
Monitor long-term needs.

Figure 4.7 Middle schools of the Columbia East Region



Lake Elkhorn MS has some available capacity for the foreseeable future. Oakland Mills MS is also on target for many years.

Table 4.7 Five year middle school utilization in the Columbia East Region

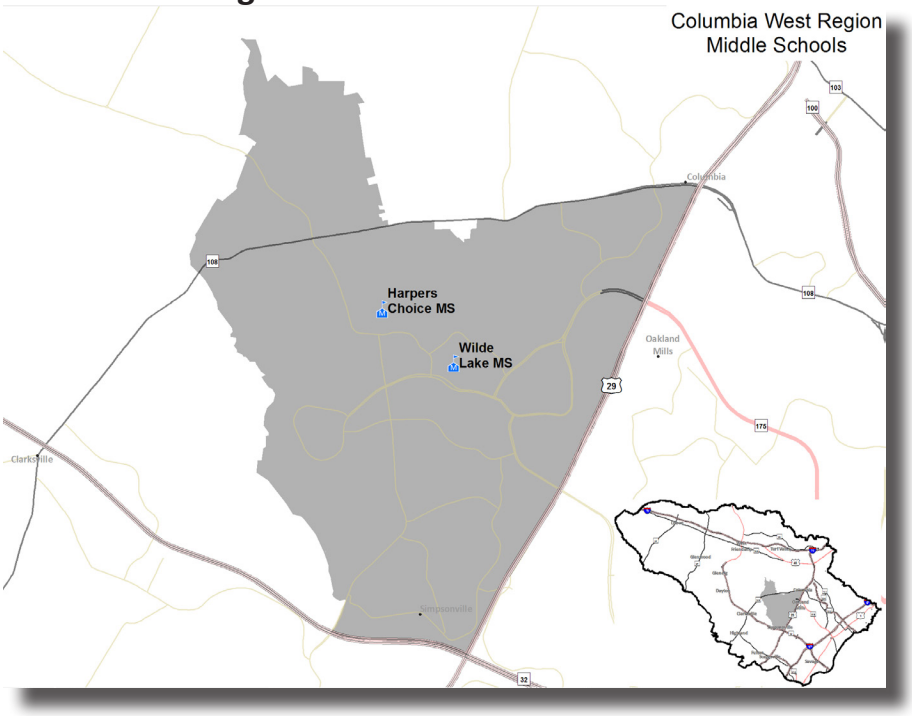
Columbia - East	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Lake Elkhorn MS	500	643	77.8	557	643	86.6
Oakland Mills MS	431	506	85.2	489	506	96.6
(Region MS Totals)	931	1149	81.0	1046	1149	91.0

Middle Schools Columbia West Region

Need:
Enrollment exceeds 110 percent of regional capacity.

Strategy:
Utilize temporary capacity until the replacement school is built at Wilde Lake MS in 2017.

Figure 4.8 Middle schools of the Columbia West Region



The Columbia West Region capacity utilization is now above 110 percent. This supports the decision to replace Wilde Lake MS, a project that is scheduled to open in 2017. The new school is planned to be 293 seats larger than the existing one, and will stay within target utilization until 2024, based on the current projection. The pre- and post- measure charts show intermittent crowding at Harper's Choice MS, which does not happen to occur in the selected years below. This will be monitored for relocatable classroom consideration.

Table 4.8 Five year middle school utilization in the Columbia West Region

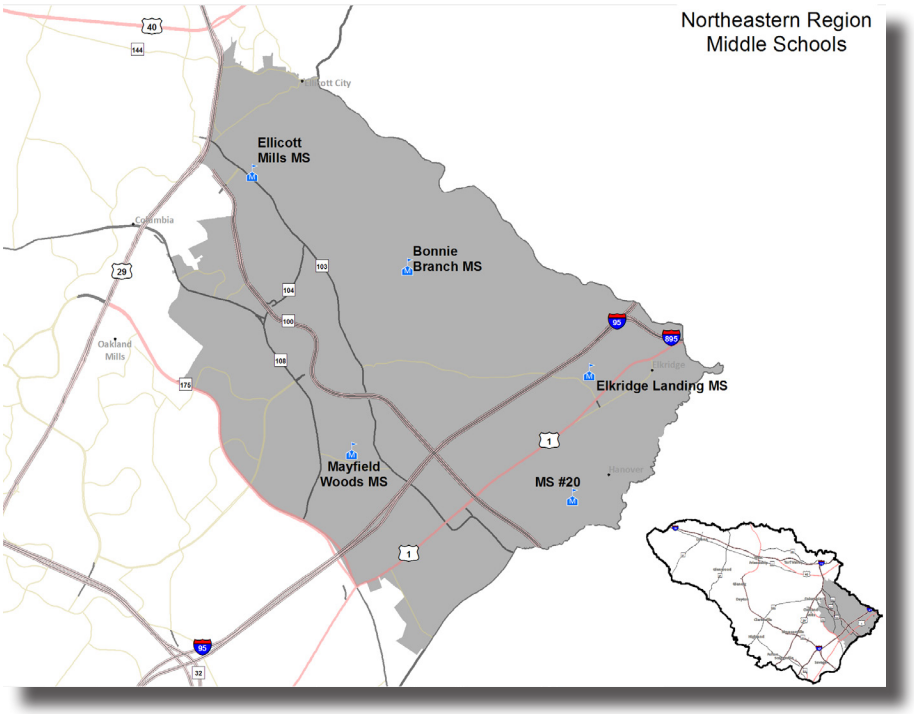
Columbia - West	Projected Pop.	Capacity	2015 Projected Utilization	Projected Pop.	Capacity	2020 Projected Utilization
Harpers Choice MS	546	506	107.9	542	506	107.1
Wilde Lake MS	573	467	122.7	692	760	91.1
(Region MS Totals)	1119	973	115.0	1234	1266	97.5

Middle Schools Northeastern Region

Need:
Enrollment growth continues in the region.

Strategy:
Projected crowding at Thomas Viaduct MS in the next decade will be monitored.

Figure 4.9 Middle schools of the Northeast Region



The opening of Thomas Viaduct MS relieved overcrowding at all schools except Ellicott Mills MS, which is slated for an addition of 156 seats in 2019. When elementary redistricting is considered to open ES #42, adjustments to middle schools should be considered. In the meantime, relocatable classrooms may be required until an alternative solution is implemented.

Table 4.9 Five year middle school utilization in the Northeast Region

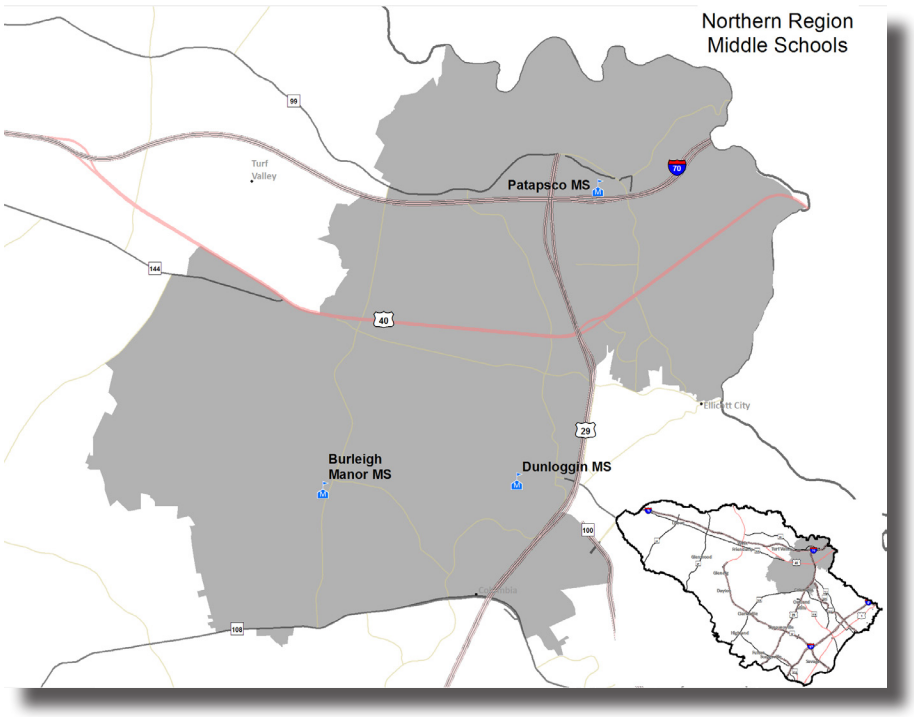
Northeastern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Bonnie Branch MS	671	662	101.4	690	662	104.2
Elkridge Landing MS	716	779	91.9	672	779	86.3
Ellicott Mills MS	788	662	119.0	904	818	110.5
Mayfield Woods MS	681	798	85.3	858	798	107.5
Thomas Viaduct MS	570	701	81.3	865	701	123.4
(Region MS Totals)	3426	3602	95.1	3989	3758	106.1

Middle Schools Northern Region

Need:
Enrollment exceeds 110 percent of regional capacity after 2020.

Strategy:
Monitor long-term needs.

Figure 4.10 Middle schools of the Northern Region



In the years beyond 2020, the Northern Region is projected to be above the 110 percent capacity utilization guideline. Dunloggin MS and Patapsco MS are scheduled for systemic renovations in the next few years. Additional capacity should be considered as part of these renovations or the use of temporary capacity may be needed. When continued growth in the adjacent Northeast Region is factored in with the needs of this region, the land bank site on Marriottsville Road will probably be needed to serve as a future middle school.

Table 4.10 Five year middle school utilization in the Northern Region

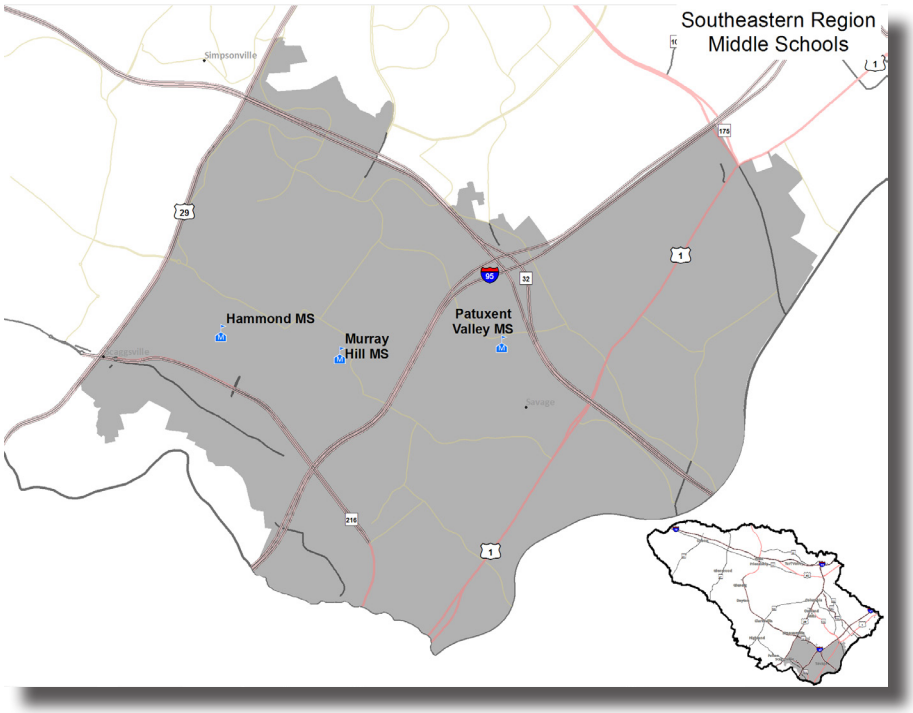
Northern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Burleigh Manor MS	771	779	99.0	868	779	111.4
Dunloggin MS	615	565	108.8	660	662	99.7
Patapsco MS	718	643	111.7	756	643	117.6
(Region MS Totals)	2104	1987	105.9	2284	2084	109.6

Middle Schools Southeastern Region

Need:
Enrollment growth is evident in the region.

Strategy:
Long-term growth trends in this region should be monitored.

Figure 4.11 Middle schools of the Southeastern Region



Hammond MS and Murray Hill MS are projected to exceed 110 percent capacity utilization in 2020. Relocatable classrooms are available at both schools, which would manage this crowding through 2020. The region will exceed 110 percent utilization in 2020 and enrollment will continue to gradually rise for the foreseeable future. Projected needs beyond this time period will be monitored.

Table 4.11 Five year middle school utilization in the Southeastern Region

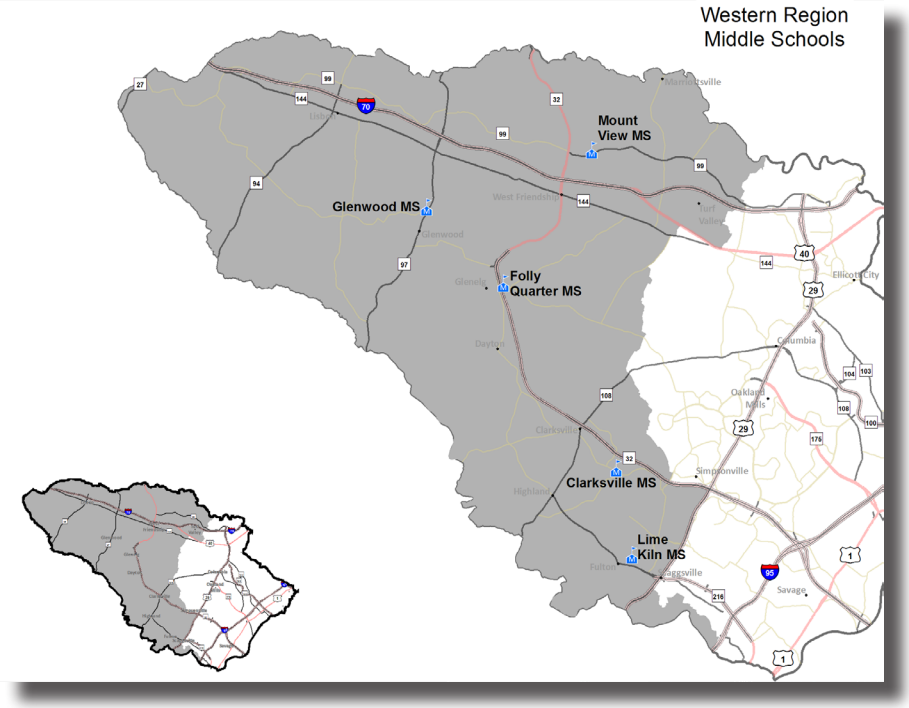
Southeastern	Projected Pop.	Capacity	2015 Projected Utilization	Projected Pop.	Capacity	2020 Projected Utilization
Hammond MS	582	604	96.4	710	604	117.5
Murray Hill MS	624	662	94.3	792	662	119.6
Patuxent Valley MS	676	760	88.9	757	760	99.6
(Region MS Totals)	1882	2026	92.9	2259	2026	111.5

Middle Schools Western Region

Need:
Some capacity exists in this region.

Strategy:
Monitor long-term needs.

Figure 4.12 Middle schools of the Western Region



Capacity utilization in the region remains within targets throughout the projection. A land bank site in the northeastern end of this region on Marriottsville Road must be retained for a new middle school, which will ultimately relieve crowding in the Northern and Columbia West Regions.

Table 4.12 Five year middle school utilization in the Western Region

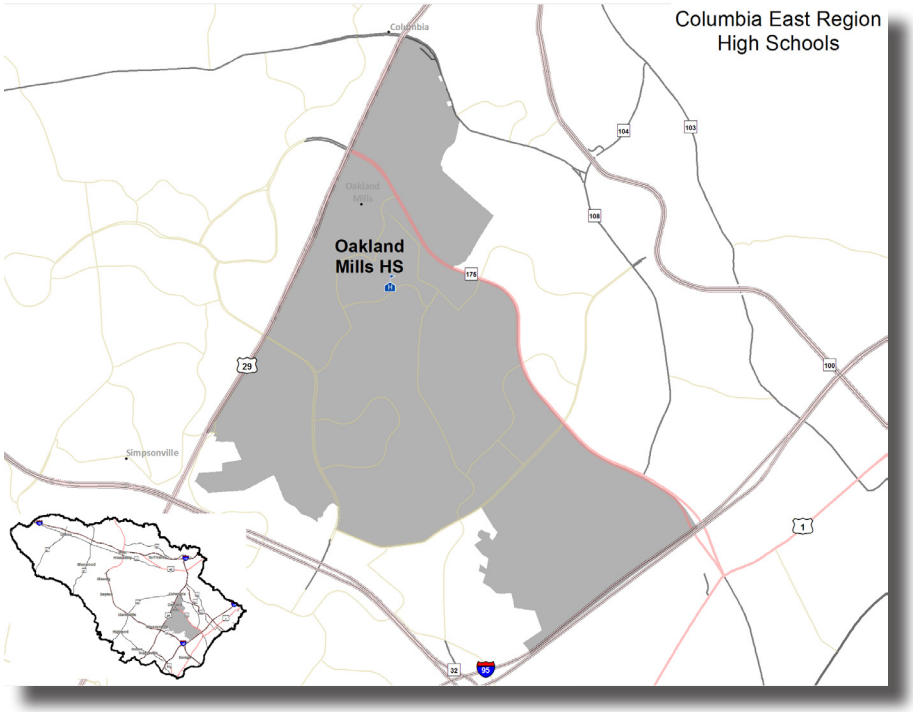
Western	Projected Pop.	Capacity	2015 Projected Utilization	Projected Pop.	Capacity	2020 Projected Utilization
Clarksville MS	621	643	96.6	562	643	87.4
Folly Quarter MS	607	662	91.7	675	662	102.0
Glenwood MS	577	545	105.9	578	545	106.1
Lime Kiln MS	724	701	103.3	765	701	109.1
Mount View MS	743	798	93.1	823	798	103.1
(Region MS Totals)	3272	3349	97.7	3403	3349	101.6

High Schools Columbia East Region

Need:
Some capacity exists in this region.

Strategy:
Consider using capacity to help accommodate Route 1 corridor growth.

Figure 4.13 High schools of the Columbia East Region



The Columbia East Region high school is Oakland Mills HS. Capacity exists at this school for the foreseeable future. Capacity may be utilized to relieve the Northeastern Region, which includes Long Reach HS and Howard HS. Long-term planning discussions are likely to be framed by future additions to the land bank.

Table 4.13 Five year high school utilization in the Columbia East Region

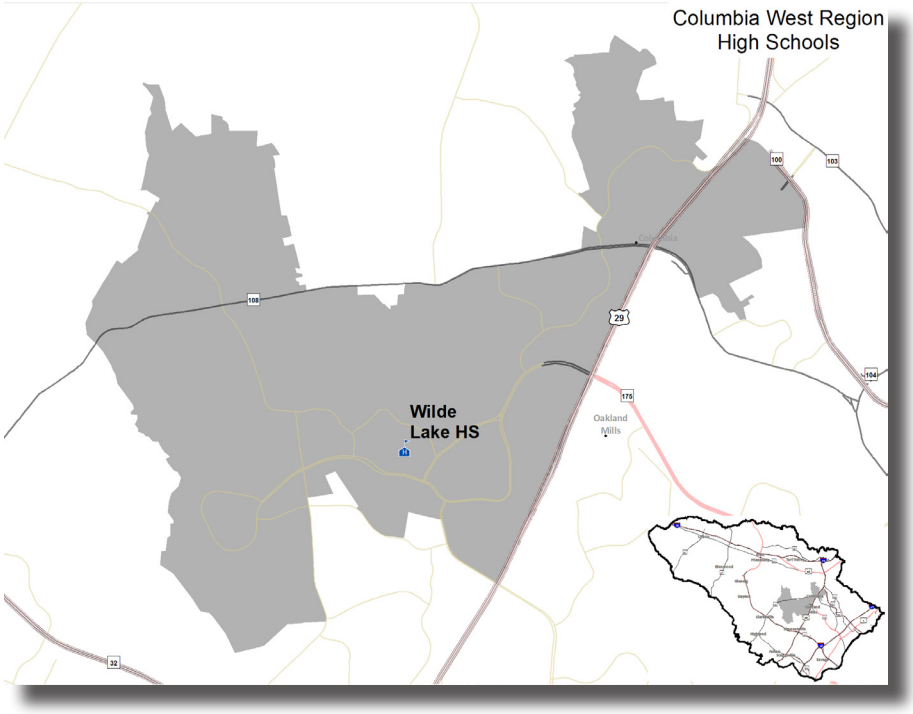
Columbia - East	2015			2020		
	Projected Pop.	Capacity	Projected Utilization	Projected Pop.	Capacity	Projected Utilization
Oakland Mills HS	1101	1400	78.6	1164	1400	83.1

High Schools Columbia West Region

Need:
Capacity utilization is below 110 percent for Wilde Lake HS until 2027.

Strategy:
Monitor projections.

Figure 4.14 High schools of the Columbia West Region



The Columbia West Region high school is Wilde Lake HS. The projection for this school remains between 90–110 percent utilization until 2027. With only a few classrooms of remaining capacity, plans to redistrict students into Wilde Lake HS should be avoided unless absolutely necessary. This projection models the effect of the Columbia Town Center development without the adjustment presented in the addendum. Adequate capacity exists to accommodate growth at Wilde Lake HS until 2027.

Table 4.14 Five year high school utilization in the Columbia West Region

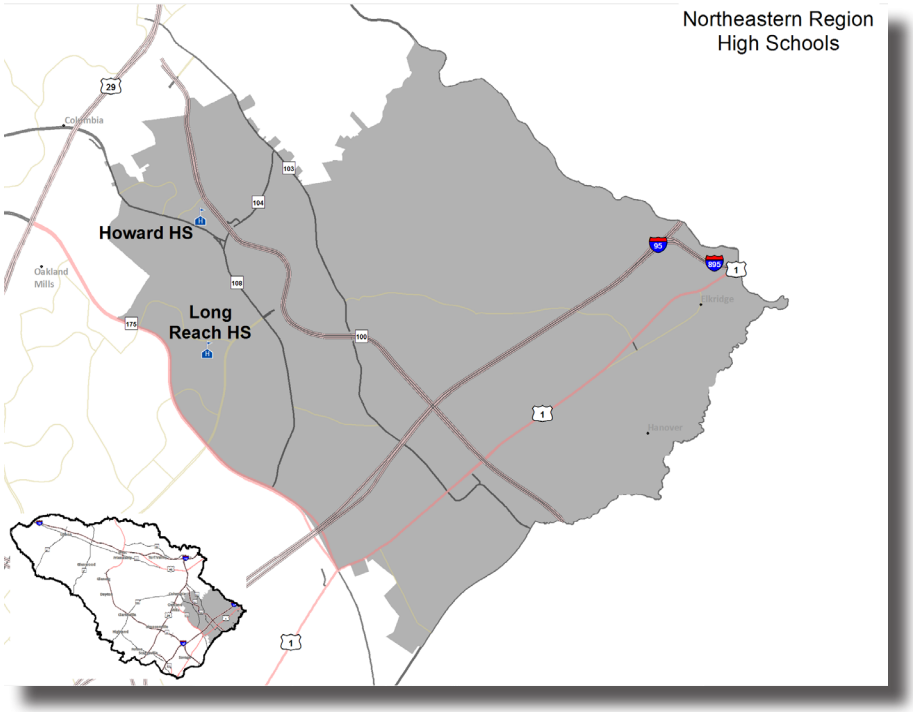
Columbia - West	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Wilde Lake HS	1279	1424	89.8	1526	1424	107.2

High Schools Northeastern Region

Need:
Significant enrollment growth is projected. Available capacity in this region is not sufficient to absorb long-term projected enrollment growth.

Strategy:
Evaluate capital planning options of additions and acquisition of a future school site.

Figure 4.15 High schools of the Northeastern Region



Howard HS and Long Reach HS serve the Northeastern Region. Howard HS already is exceeding 110 percent utilization. This fall the region will likely exceed 110 percent capacity utilization and the trend is expected to steadily worsen through the projection, exceeding 120 percent by 2017. The school system has added temporary capacity to both schools and the nine classroom modular building will be installed at Howard HS this summer. Movement of regional programs may be considered.

Projections indicate the eventual need for a new high school. For this reason, acquisition of a large school site to the land bank is necessary. A site should large enough for a high school. In the meantime, interim strategies such as redistricting and locations for regional programs and minor changes to school capacity should be revisited Measures to delay the need for a new high school will save capital resources for other projects.

Table 4.15 Five year high school utilization in the Northeastern Region

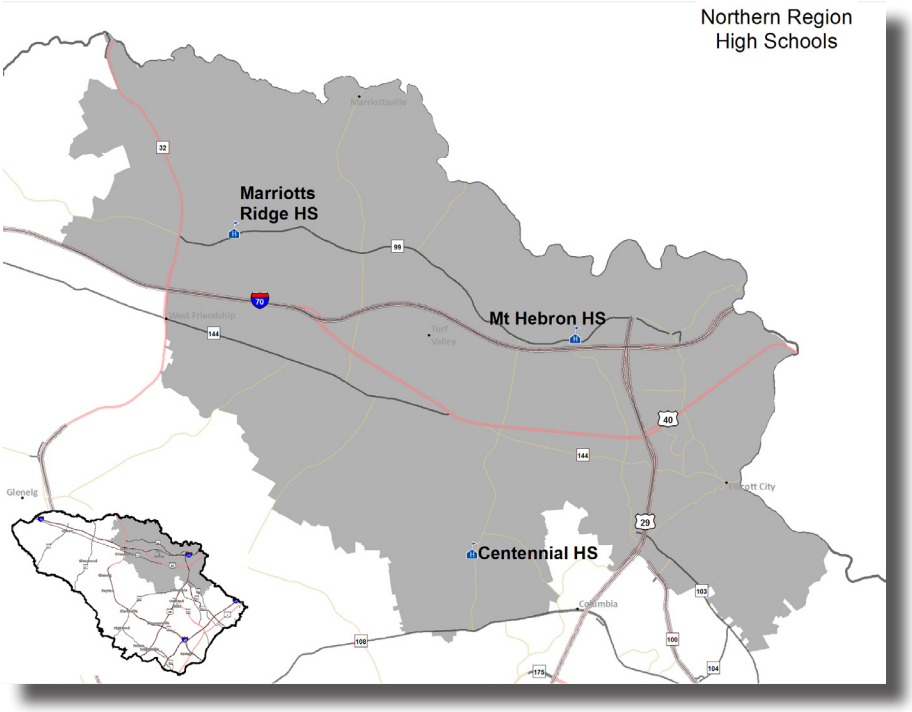
Northeastern	2015			2020		
	Projected Pop.	Capacity	Projected Utilization	Projected Pop.	Capacity	Projected Utilization
Howard HS	1751	1420	123.3	2015	1420	141.9
Long Reach HS	1522	1488	102.3	2047	1488	137.6
(Region HS Totals)	3273	2908	112.6	4062	2908	139.7

High Schools Northern Region

Need:
Capacity needs in the region have been addressed with the expansion of Mt. Hebron HS.

Strategy:
Monitor long-term needs.

Figure 4.16 High schools of the Northern Region



The Northern Region has balanced capacity utilization for most of the projection. Centennial HS and Mt. Hebron HS will need to be monitored given the projected utilization rises above 110 percent after 2017 and 2016. Capacity remains at Marriotts Ridge HS for this region and could potentially accomodate regional programs.

Table 4.16 Five year high school utilization in the Northern Region

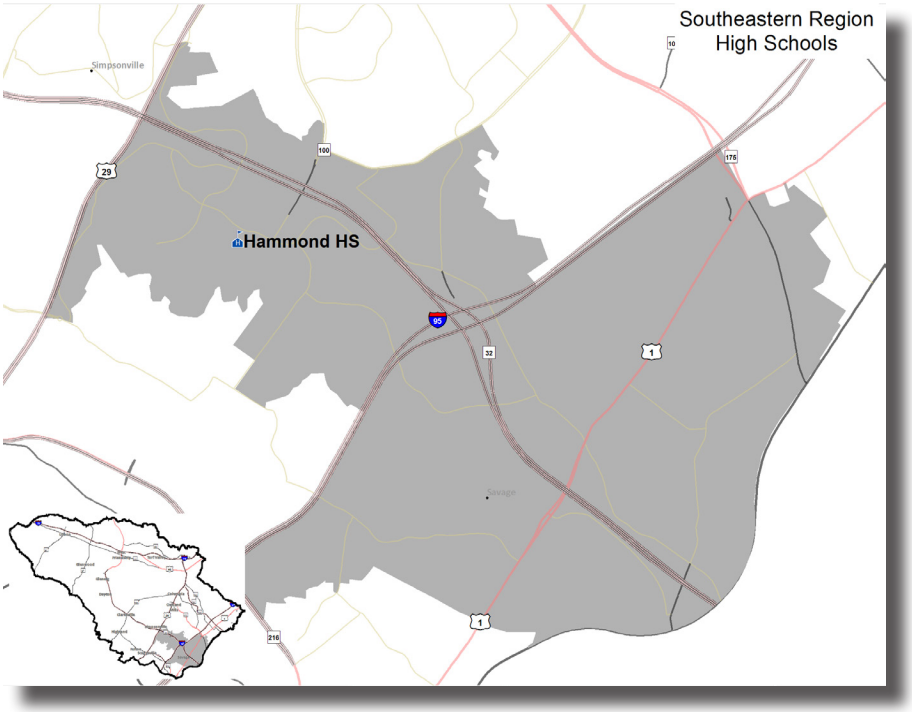
Northern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Centennial HS	1455	1360	107.0	1690	1360	124.3
Marriotts Ridge HS	1209	1615	74.9	1420	1615	87.9
Mt Hebron HS	1504	1400	107.4	1765	1400	126.1
(Region HS Totals)	4168	4375	95.3	4875	4375	111.4

High Schools Southeastern Region

Need:
Capacity is adequate through 2017.

Strategy:
Monitor long-term needs.

Figure 4.17 High schools of the Southeastern Region



The Southeastern Region exceeds 110 percent capacity utilization in 2017 and steadily increases later in the projection. Perhaps some capacity may be realized during the renovation of Hammond HS, but the existing facility is not matched to projected growth later in the long-range planning period. This future growth supports the recommendations of land banking a high school site and adding plans for a facility to the long-range plan. In the meantime, interim strategies like redistricting, considering alternative locations for regional programs, and minor changes to school capacity should be revisited. If any measures can delay the need for a new high school, capital resources can be saved for other projects .

Table 4.17 Five year high school utilization in the Southeastern Region

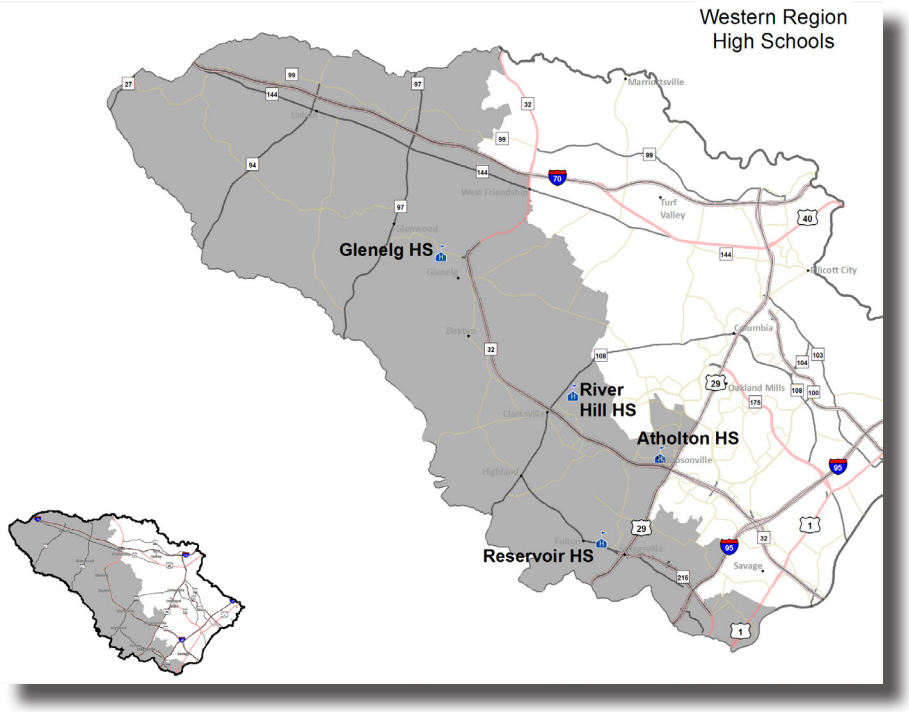
Southeastern	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Hammond HS	1299	1220	106.5	1550	1220	127.0

High Schools Western Region

Need:
Relief is needed at Reservoir HS after 2017.

Strategy:
Monitor long-term needs.

Figure 4.18 High schools of the Western Region



The Western Region does not exceed 110 percent capacity utilization until 2024, and no redistricting or major capital planning appears to be necessary through most of the decade. Reservoir HS and Atholton HS should be monitored because this projection indicates they will exceed 110 percent utilization in 2018 and 2017, respectively. Atholton HS capacity should also be re-evaluated at the end of the renovation this year. Some areas of the Reservoir HS attending area are part of the Route 1 corridor; eventually this growth may be addressed with a new high school.

Table 4.18 Five year high school utilization in the Western Region

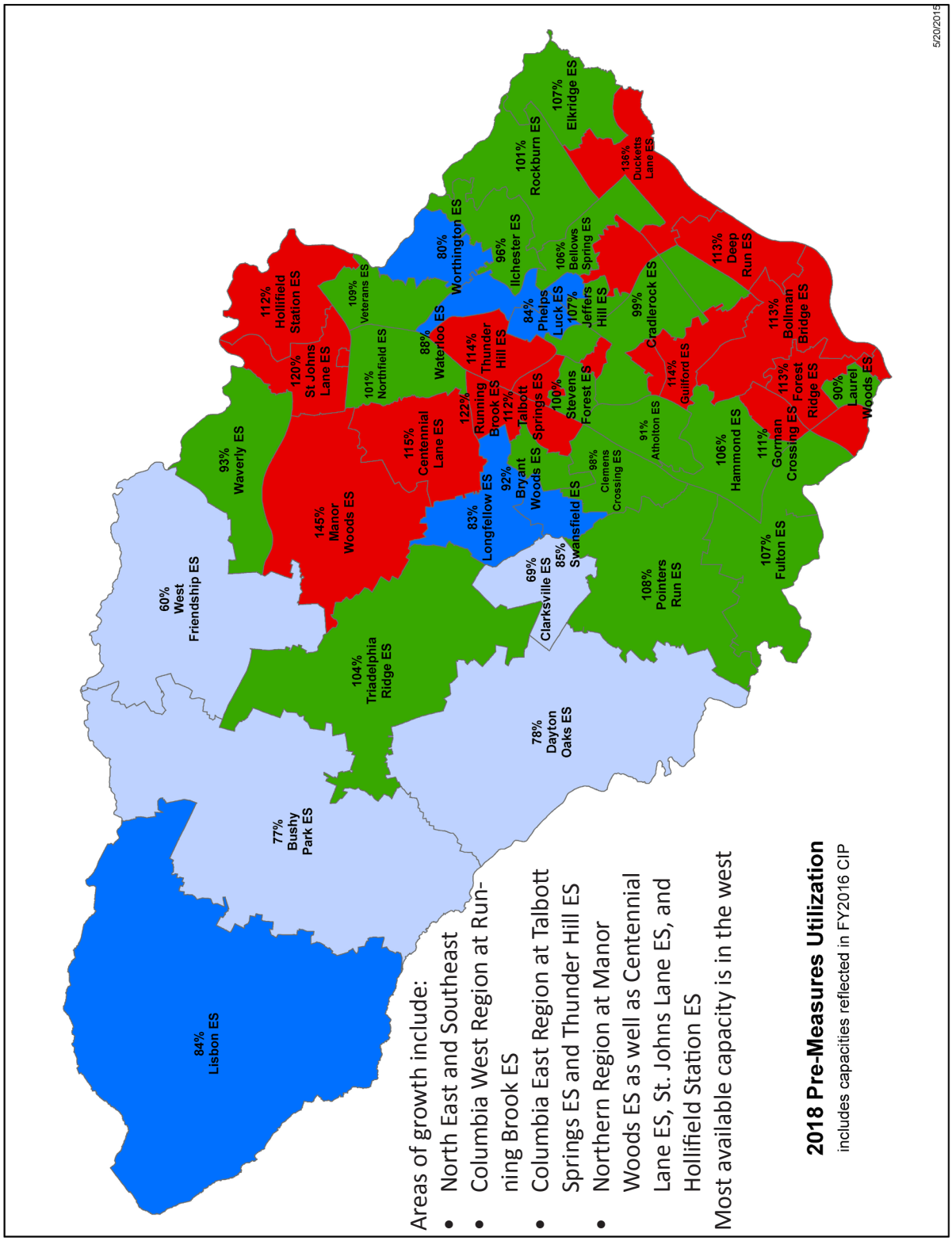
Western	2015 Projected Pop.	Capacity	2015 Projected Utilization	2020 Projected Pop.	Capacity	2020 Projected Utilization
Atholton HS	1447	1360	106.4	1623	1360	119.3
Glenelg HS	1268	1420	89.3	1277	1420	89.9
Reservoir HS	1510	1551	97.4	1894	1551	122.1
River Hill HS	1266	1488	85.1	1258	1488	84.5
(Region HS Totals)	5491	5819	94.4	6052	5819	104.0

Foreseeable Redistricting

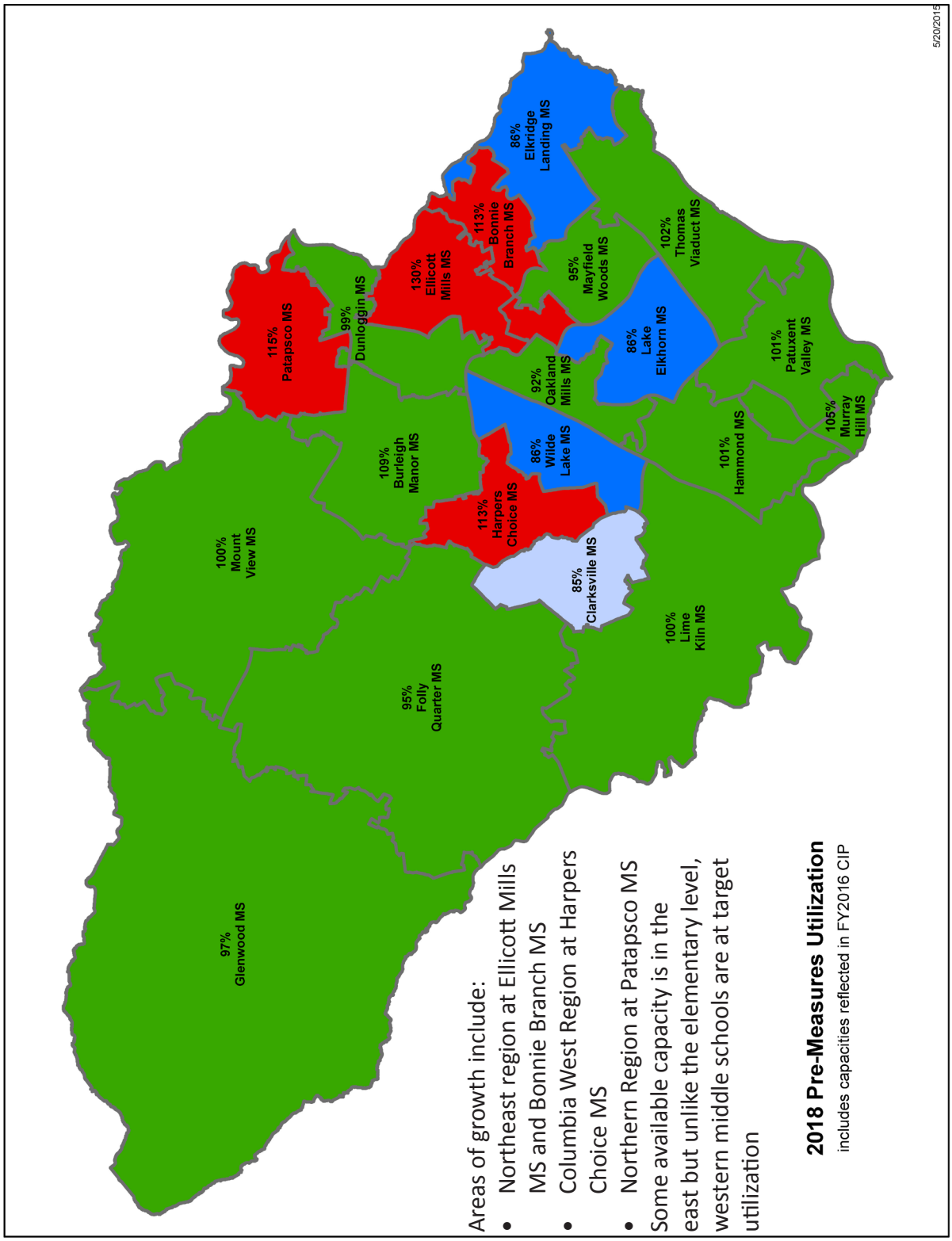
This report does not recommend any redistricting until 2017 when redistricting is needed to open ES #42. This would be conducted between June and November 2017 and take effect at the beginning of the 2018 school year.

June 2015

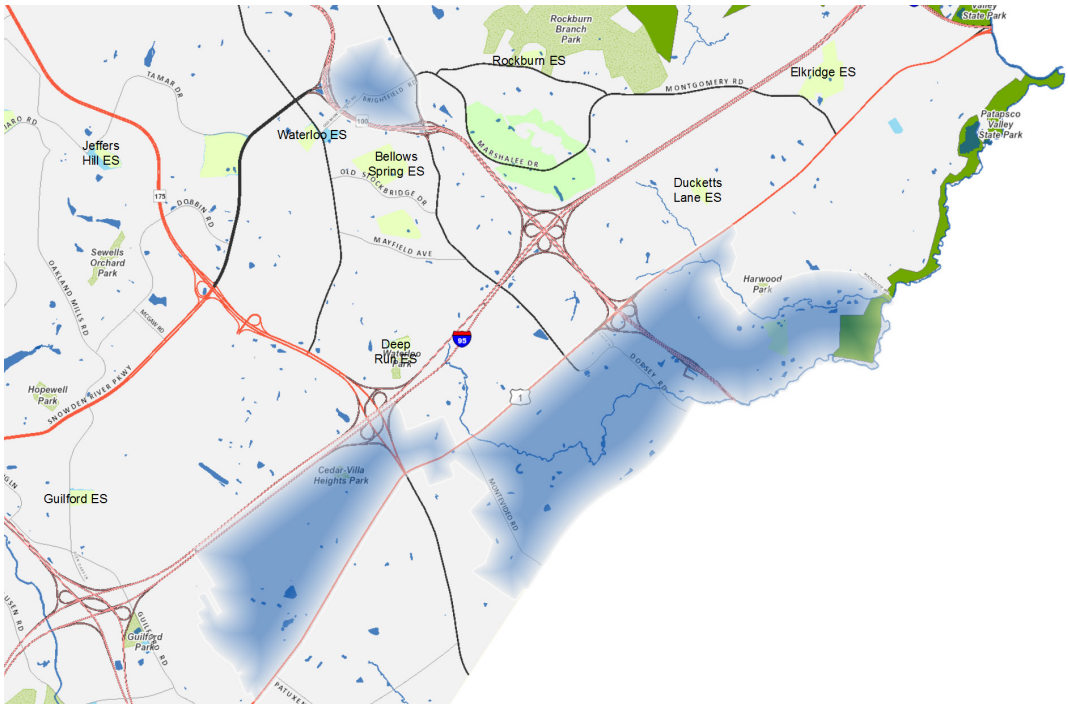
Foreseeable Elementary Redistricting



Foreseeable Middle Redistricting



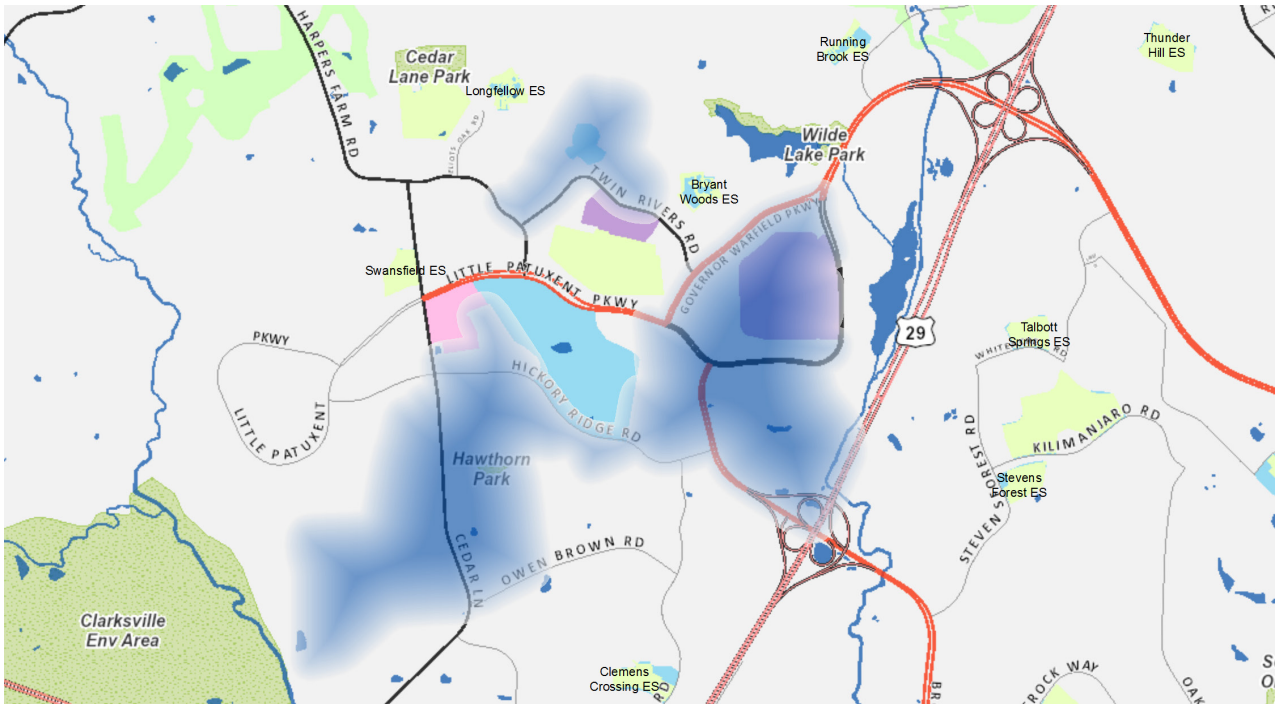
Elementary School Redistricting - ES # 42



Opening Elementary School #42 will allow relief of Ducketts Lane ES and other schools in the Northeast region. The school will be located adjacent to Thomas Viaduct MS. Any redistricting plan may involve a combination of schools including Bollman Bridge ES, Ducketts Lane ES, and Forest Ridge ES. Table 5.1 illustrates one possible scenario for testing purposes only. This plan was anticipated when the redistricting to open Ducketts Lane was planned, so most students come from Ducketts Lane ES. Ducketts Lane ES capacity utilization would be reduced from a projected 137 percent utilization to a projected 90 percent utilization, depending on regional program assignments. This plan considers neighborhoods like Oxford Square, Lennox Park, and Howard Square, as well as Cedars and Washington Manor for ES #42. Rockburn ES attending area has included a somewhat distant neighborhood, in the vicinity of Mission Road, which may also be considered for ES #42. This frees up Rockburn ES to receive the Brightfield area from Bellows Spring ES. Actual redistricting plans would be decided in the fall of 2017, allowing for further study of feasible redistricting in the June 2016 Feasibility Study.

Table 5.1	**ES #42 Redistricting**	
Sending	**Receiving**	**Appx. # Students**
Bellows Spring	Rockburn	73
Ducketts Lane	New ES #42	384
Rockburn	New ES 42	151
Total		**608**

Elementary School Redistricting - Columbia West



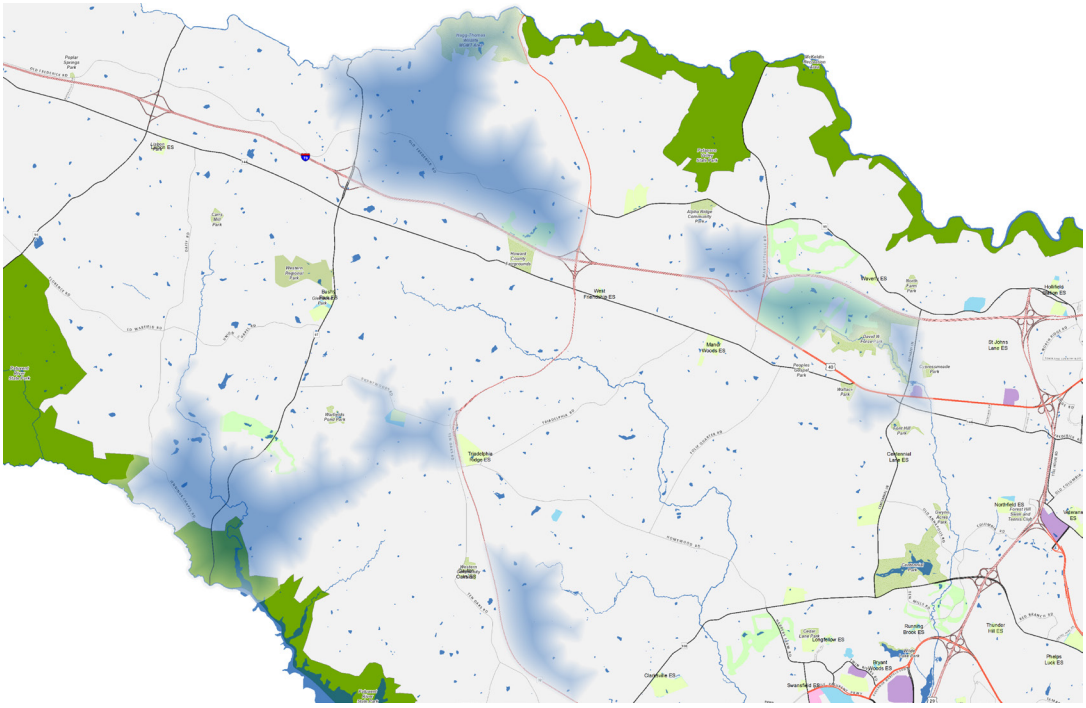
The FY 2016 Long-Range Master Plan indicated a new elementary school may serve this area in 2025 as ES #44. The Howard County Planning Board has suggested this area be served by ES #43, which is slated for opening in 2023 in the Long Range Plan. Either way, funding constraints are likely to dictate a later opening. The Columbia schools study attached to the 2014 Feasibility Study identified the best location for this school to be where the Faulkner Ridge Center building is presently located.

Since capacity is needed prior to any likely funding of this new school, an interim plan is needed. Interim Columbia West elementary school redistricting will take advantage of capacity in the region and is anticipated to occur in 2018, depending upon when the Swansfield addition opens. A recent addition at Running Brook ES is not sufficient to contain expected growth. Existing capacity at the other schools, including the addition at Swansfield ES, will facilitate redistricting within the region. Some small feeds are anticipated with interim redistricting, but they can be resolved when ES #44 opens.

Table 5.2. Interim Columbia West Elementary Redistricting

Sending	Receiving	Appx. # Students
Bryant Woods	Clemens Crossing	94
Bryant Woods	Longfellow	71
Clemens Crossing	Swansfield	110
Running Brook	Bryant Woods	148
Running Brook	Clemens Crossing	20
Total		**443**

Elementary School Redistricting - Northern and Western



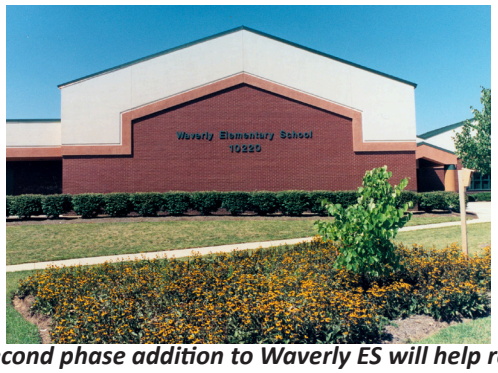
New development of Turf Valley is projected to add 2,000 homes by 2024 and yield nearly 700 new ES students. This development is presently in the Manor Woods ES attending area, which is projected to exceed 110 percent utilization in 2016, and cannot serve the anticipated growth. ES #45, a new elementary school in or near Turf Valley, is eventually needed. Much of the attending areas for existing schools in the Northern and Western regions will be bused regardless of the school assignment, but a Turf Valley school could have an assigned walk area. Capital funding challenges are likely to further delay ES #45 which is already shown in the FY 2016 Long Range Master Plan for funding beginning in FY 2023 and completion likely in 2026.

Future development is in the Manor Woods ES attending area which is projected to exceed 110% utilization in 2016.

West Friendship ES has approximately 135 open seats.

Since the FY 2017 Long Range Master Plan is expected to shift projects further into the future, interim measures are necessary. Nearby West Friendship ES and Bushy Park ES

Elementary School Redistricting - Northern and Western



The second phase addition to Waverly ES will help relieve crowding in the Northern Region.

Bushy Park ES could contain Northern Region growth with some adjustments to other western attending areas.

have capacity, and a 100 seat addition has been planned for Waverly ES in the coming years. A number of scenarios have been evaluated. Many would require West Friendship to take on higher enrollment. Such plans would probably necessitate investment in wastewater treatment capacity and temporary classrooms at West Friendship ES.

Another interim strategy may borrow from the approach used between ES #41 and ES #42. In that case, the Mission Road area was assigned to Rockburn ES temporarily until new capacity opens in 2018 at ES #42. Staff has modeled a similar idea, which, would send new Turf Valley neighborhoods to Bushy Park ES. Adjustments among other western schools could create enough space at Bushy Park to contain this growth. A particular benefit of this plan is that West Friendship ES capacity is used, but the school would not be overcrowded, avoiding temporary capacity or other investment. Chronic excess capacity further west at Bushy Park ES and Dayton Oaks ES is also used. Such a plan requires fewer students to be reassigned than a plan that avoids creating such attendance "islands."

Table 5.3. Northern and Western Elementary Redistricting

Sending	Receiving	Appx. # Students
Bushy Park	West Friendship	82
Bushy Park	Dayton Oaks	111
Dayton Oaks	Triadelphia Ridge	50
Manor Woods ES	Bushy Park	210
Manor Woods ES	Waverly ES	44
Manor Woods ES	West Friendship	83
Triadelphia Ridge	Dayton Oaks	99
Waverly	West Friendship	44
Total		**723**

Middle School Redistricting

Thomas Viaduct ES opened this school year.

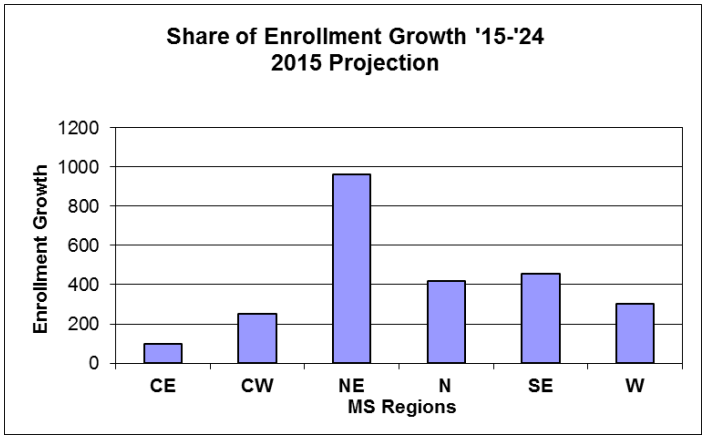


Figure 5.1 Middle school growth by region

The opening of Thomas Viaduct MS has eased the near term crowding concerns in the Route 1 corridor, particularly the Northeast Region. Future enrollment growth is expected. By 2024, the middle school level is projected to exceed 110 percent capacity utilization. The largest share of enrollment growth is in the northeast region, followed by the northern and southeast regions. By 2025, two of five middle schools in Northeast region will have significant overcrowding. The same will be true for two of the three Southeastern region middle schools. Site acquisition efforts are underway for MS #21, and an addition is planned for Ellicott Mills MS, but funding is not certain.

Feasible redistricting of approximately 600 students could bring more schools within target utilization for using only existing capacity. Small feeds could be reduced, especially if the redistricting is conducted with elementary redistricting to open ES #42. Such a plan does not suggest additions at Ellicott Mills MS and renovations at other schools are not necessary. Evaluation of plans will continue in future feasibility studies.

An addition is planned for Ellicott Mills MS in 2019. If deferred, some capacity exists in nearby regions.

High School Redistricting

Howard HS is in the region projected to receive the largest share of enrollment growth.

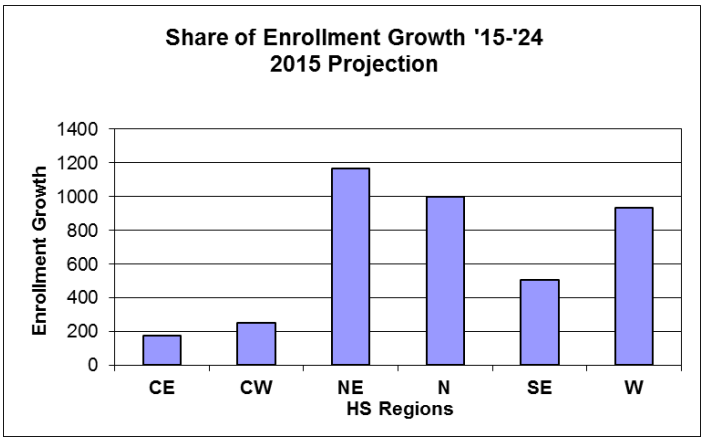


Figure 5.2 High school growth by region

Howard HS is experiencing overcrowding. Capacity needs are also projected for Long Reach HS and Hammond HS. The small amount of capacity at Oakland Mills HS is not sufficient to balance these needs. The trends eventually point to the need for a new high school. A land bank site is being sought for a high school, but even when a site is acquired it will be prudent to delay such a large capital investment until other options have been thoroughly vetted.

The long-range plan recommended is completion of HS #13 in 2027, but a funding delay is probable. As an interim measure, a nine classroom modular building will be installed at Howard HS. It is likely that the review of the current redistricting process may generate different options and alternatives. A broad evaluation of regional programming assignments or other measures could include consideration of existing capacity at four of the 12 high schools. Such a discussion does not mean a new high school is off the table, but it could bring relief from crowding much earlier than even the most optimistic HS #13 opening date.

Hammond HS serves the Southeast Region.

Atholton HS presently under renovation.

Pre- and Post-Measure Charts

The effects of some scenarios tested for this report on capacity utilization are depicted in tabular form on the following pages. The tables are presented for each organizational level (elementary, middle, and high) using a pre-/post-measures format. The pre-measures format shows the effect of projected enrollment without any redistricting. The pre-measures format also shows FY 2016 capital projects as approved.

The post-measures format shows the impact of projected enrollment with some redistricting plans discussed in this document. These plans include elementary redistricting and a middle school redistricting scenario that uses existing capacity. It is premature to provide specifics since changes may develop before the June 2017 Feasibility Study. The post-measures format includes capital projects recommended in this document for the FY 2017 Capital Budget as shown in Table 3.2 on page 9. If these projects are not approved, other plans must be developed.

June 2015

Pre-Measures

ELEMENTARY SCHOOLS - Data for Demonstrative Purposes Only

Capacity Utilization Rates with Board of Education's Approved FY 2016 Capital Budget Projects - Not Test for APFO

Chart reflects May 2015 Projections, Board of Education's FY 2016 approved capacities, and no redistricting.

		Capacity				2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27	
Columbia - East		2016	2017	2018	2019	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.
Cradlerock ES		398	398	398	398	416	104.5	392	98.5	395	99.2	369	92.7	386	97.0	383	96.2	379	95.2	395	99.2	406	102.0	422	106.0	436	109.5
Jeffers Hill ES		421	421	421	421	464	110.2	454	107.8	451	107.1	447	106.2	444	105.5	447	106.2	445	105.7	453	107.6	464	110.2	470	111.6	477	113.3
Phelps Luck ES		616	616	616	616	552	89.6	531	86.2	522	84.7	535	86.9	539	87.5	546	88.6	547	88.8	549	89.1	548	89.0	553	89.8	559	90.7
Stevens Forest ES		399	399	399	399	401	100.5	405	101.5	400	100.3	397	99.5	419	105.0	423	106.0	429	107.5	424	106.3	425	106.5	429	107.5	433	108.5
Talbott Springs ES		377	377	377	377	431	114.3	433	114.9	426	113.0	427	113.3	424	112.5	426	113.0	430	114.1	438	116.2 C	453	120.2 C	458	121.5 C	466	123.6 C
Thunder Hill ES		509	509	509	509	568	111.6	586	115.1 C	583	114.5	595	116.9 C	580	113.9	586	115.1 C	598	117.5 C	605	118.9 C	616	121.0 C	623	122.4 C	631	124.0 C
Region Totals		**2720**	**2720**	**2720**	**2720**	**2832**	**104.1**	**2801**	**103.0**	**2777**	**102.1**	**2770**	**101.8**	**2792**	**102.6**	**2811**	**103.3**	**2828**	**104.0**	**2864**	**105.3**	**2912**	**107.1**	**2955**	**108.6**	**3002**	**110.4**
Columbia - West																											
Bryant Woods ES		361	361	361	361	326	90.3	331	91.7	334	92.5	345	95.6	342	94.7	343	95.0	347	96.1	351	97.2	358	99.2	363	100.6	369	102.2
Clemens Crossing ES		521	521	521	521	500	96.0	501	96.2	515	98.8	520	99.8	530	101.7	526	101.0	523	100.4	519	99.6	504	96.7	504	96.7	506	97.1
Longfellow ES		512	512	512	512	430	84.0	418	81.6	428	83.6	432	84.4	436	85.2	439	85.7	438	85.5	447	87.3	457	89.3	464	90.6	469	91.6
Running Brook ES		515	515	515	515	568	110.3	590	114.6	629	122.1 C	674	130.9 C	735	142.7 C	807	156.7 C	878	170.5 C	938	182.1 C	995	193.2 C	1041	202.1 C	1077	209.1 C
Swansfield ES	A	521	621	621	621	534	102.5	520	83.7	531	85.5	514	82.8	519	83.6	516	83.1	524	84.4	529	85.2	526	84.7	534	86.0	541	87.1
Region Totals		**2430**	**2530**	**2530**	**2530**	**2358**	**97.0**	**2360**	**93.3**	**2437**	**96.3**	**2485**	**98.2**	**2562**	**101.3**	**2631**	**104.0**	**2710**	**107.1**	**2784**	**110.0**	**2840**	**112.3**	**2906**	**114.9**	**2962**	**117.1** C
Northeastern																											
Bellows Spring ES		751	751	751	751	688	91.6	733	97.6	801	106.7	844	112.4	886	118.0 C	915	121.8 C	918	122.2 C	905	120.5 C	885	117.8 C	874	116.4 C	843	112.3
Deep Run ES	A	772	772	772	772	773	100.1	831	107.6	879	113.9	884	114.5	903	117.0 C	911	118.0 C	905	117.2 C	895	115.9 C	898	116.3 C	906	117.4 C	917	118.8 C
Ducketts Lane ES		669	669	669	669	854	127.7 C	989	147.8 C	1121	167.6 C	1224	183.0 C	1354	202.4 C	1441	215.4 C	1531	228.8 C	1588	237.4 C	1601	239.3 C	1617	241.7 C	1627	243.2 C
Elkridge ES		760	760	760	760	815	107.2	817	107.5	816	107.4	833	109.6	840	110.5	854	112.4	866	113.9	883	116.2 C	914	120.3 C	930	122.4 C	964	126.8 C
Ilchester ES		653	653	653	653	682	104.4	655	100.3	633	96.9	624	95.6	618	94.6	624	95.6	630	96.5	659	100.9	699	107.0	720	110.3	731	111.9
Rockburn ES		672	672	672	672	595	88.5	592	88.1	578	86.0	580	86.3	600	89.3	639	95.1	683	101.6	712	106.0	739	110.0	788	117.3 C	830	123.5 C
Veterans ES		788	788	788	788	868	110.2	870	110.4	865	109.8	836	106.1	836	106.1	811	102.9	822	104.3	843	107.0	851	108.0	869	110.3	875	111.0
Waterloo ES		663	663	663	663	576	86.9	580	87.5	588	88.7	576	86.9	594	89.6	603	91.0	610	92.0	609	91.9	620	93.5	636	95.9	644	97.1
Worthington ES		590	590	590	590	524	88.8	502	85.1	477	80.8	472	80.0	473	80.2	475	80.5	497	84.2	510	86.4	525	89.0	524	88.8	519	88.0
Region Totals		**6318**	**6318**	**6318**	**6318**	**6375**	**100.9**	**6569**	**104.0**	**6758**	**107.0**	**6873**	**108.8**	**7104**	**112.4**	**7273**	**115.1** C	**7462**	**118.1** C	**7604**	**120.4** C	**7732**	**122.4** C	**7864**	**124.5** C	**7950**	**125.8** C
Northern																											
Centennial Lane ES		647	647	647	647	705	109.0	737	113.9	748	115.6 C	769	118.9 C	769	118.9 C	774	119.6 C	780	120.6 C	783	121.0 C	789	121.9 C	803	124.1 C	814	125.8 C
Hollifield Station ES		694	694	694	694	725	104.5	757	109.1	781	112.5	809	116.6 C	834	120.2 C	866	124.8 C	892	128.5 C	913	131.6 C	938	135.2 C	946	136.3 C	931	134.1 C
Manor Woods ES		681	681	681	681	761	111.7	854	125.4 C	989	145.2 C	1100	161.5 C	1257	184.6 C	1376	202.1 C	1475	216.6 C	1573	231.0 C	1597	234.5 C	1565	229.8 C	1508	221.4 C
Northfield ES		700	700	700	700	684	97.7	700	100.0	712	101.7	717	102.4	731	104.4	746	106.6	756	108.0	770	110.0	776	110.9	808	115.4 C	816	116.6 C
St Johns Lane ES		612	612	612	612	726	118.6 C	730	119.3 C	735	120.1 C	732	119.6 C	721	117.8 C	721	117.8 C	720	117.6 C	720	117.6 C	719	117.5 C	724	118.3 C	726	118.6 C
Waverly ES	A	638	638	738	738	664	104.1	620	97.2	599	81.2	586	79.4	572	77.5	575	77.9	584	79.1	595	80.6	602	81.6	612	82.9	633	85.8
Region Totals		**3972**	**3972**	**4072**	**4072**	**4265**	**107.4**	**4398**	**110.7**	**4564**	**112.1**	**4713**	**115.7** C	**4884**	**119.9** C	**5058**	**124.2** C	**5207**	**127.9** C	**5354**	**131.5** C	**5421**	**133.1** C	**5458**	**134.0** C	**5428**	**133.3** C
Southeastern																											
Atholton ES		424	424	424	424	380	89.6	397	93.6	389	91.7	396	93.4	399	94.1	405	95.5	406	95.8	412	97.2	420	99.1	426	100.5	433	102.1
Bollman Bridge ES		666	666	666	666	738	110.8	758	113.8	755	113.4	778	116.8 C	796	119.5 C	816	122.5 C	829	124.5 C	839	126.0 C	847	127.2 C	862	129.4 C	868	130.3 C
Forest Ridge ES		669	669	669	669	726	108.5	753	112.6	759	113.5	794	118.7 C	846	126.5 C	875	130.8 C	912	136.3 C	954	142.6 C	979	146.3 C	995	148.7 C	1001	149.6 C
Gorman Crossing ES		700	700	700	700	726	103.7	766	109.4	782	111.7	775	110.7	764	109.1	749	107.0	729	104.1	720	102.9	700	100.0	687	98.1	679	97.0
Guilford ES		465	465	465	465	506	108.8	523	112.5	532	114.4	557	119.8 C	553	118.9 C	556	119.6 C	563	121.1 C	567	121.9 C	573	123.2 C	574	123.4 C	580	124.7 C
Hammond ES		653	653	653	653	665	101.8	691	105.8	698	106.9	720	110.3	728	111.5	767	117.5 C	786	120.4 C	817	125.1 C	843	129.1 C	846	129.6 C	850	130.2 C
Laurel Woods ES	A	640	640	640	640	556	86.9	576	90.0	577	90.2	553	86.4	552	86.3	563	88.0	563	88.0	566	88.4	582	90.9	589	92.0	591	92.3
New ES #42	NS	0	0	0	669																						
Region Totals		**4217**	**4217**	**4217**	**4886**	**4297**	**101.9**	**4464**	**105.9**	**4492**	**106.5**	**4573**	**93.6**	**4638**	**94.9**	**4731**	**96.8**	**4788**	**98.0**	**4875**	**99.8**	**4944**	**101.2**	**4979**	**101.9**	**5002**	**102.4**
Western																											
Bushy Park ES		788	788	788	788	604	76.6	612	77.7	608	77.2	602	76.4	602	76.4	590	74.9	600	76.1	598	75.9	606	76.9	611	77.5	619	78.6
Clarksville ES		612	612	612	612	457	74.7	442	72.2	423	69.1	427	69.8	430	70.3	430	70.3	435	71.1	435	71.1	432	70.6	436	71.2	435	71.1
Dayton Oaks ES		788	788	788	788	606	76.9	607	77.0	619	78.6	605	76.8	591	75.0	578	73.4	578	73.4	566	71.8	567	72.0	566	71.8	566	71.8
Fulton ES		788	788	788	788	808	102.5	834	105.8	850	107.9	861	109.3	878	111.4	875	111.0	884	112.2	866	109.9	865	109.8	870	110.4	876	111.2
Lisbon ES		527	527	527	527	415	78.7	430	81.6	447	84.8	444	84.3	447	84.8	446	84.6	460	87.3	471	89.4	465	88.2	468	88.8	471	89.4
Pointers Run ES		744	744	744	744	738	99.2	764	102.7	808	108.6	826	111.0	855	114.9	898	120.7 C	923	124.1 C	918	123.4 C	904	121.5 C	891	119.8 C	864	116.1 C
Triadelphia Ridge ES		581	581	581	581	561	96.6	568	97.8	608	104.6	614	105.7	620	106.7	621	106.9	614	105.7	601	103.4	570	98.1	561	96.6	556	95.7
West Friendship ES		414	414	414	414	271	65.5	264	63.8	250	60.4	241	58.2	236	57.0	242	58.5	242	58.5	250	60.4	253	61.1	257	62.1	258	62.3
Region Totals		**5242**	**5242**	**5242**	**5242**	**4460**	**85.1**	**4521**	**86.2**	**4613**	**88.0**	**4620**	**88.1**	**4659**	**88.9**	**4680**	**89.3**	**4736**	**90.3**	**4705**	**89.8**	**4662**	**88.9**	**4660**	**88.9**	**4645**	**88.6**
Countywide Totals		24899	24999	25099	25768	24587	**98.7**	25113	**100.5**	25641	**102.2**	26034	**101.0**	26639	**103.4**	27184	**105.5**	27731	**107.6**	28186	**109.4**	28511	**110.6**	28822	**111.9**	28989	**112.5**

'A' includes additions as reflected in FY 2016 CIP for grades K-5

'NS' New School proposed in FY 2016 Capital Budget

Post-Measures

ELEMENTARY SCHOOLS - Data for Demonstrative Purposes Only

Aggregate Plan

Capacity Utilization Rates with Proposed FY 2017 Capital Budget Projects - Not Test for APFO

Chart reflects May 2015 Projections, Board of Education's FY 2017 Requested capacities and estimated redistricting.

		Capacity				2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27	
Columbia - East		**2016**	**2017**	**2018**	**2019**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**	**Proj**	**% Util.**
Cradlerock ES		398	398	398	398	416	104.5	392	98.5	395	99.2	369	92.7	386	97.0	383	96.2	379	95.2	395	99.2	406	102.0	422	106.0	436	109.5
Jeffers Hill ES		421	421	421	421	464	110.2	454	107.8	451	107.1	447	106.2	444	105.5	447	106.2	445	105.7	453	107.6	464	110.2	470	111.6	477	113.3
Phelps Luck ES		616	616	616	616	552	89.6	531	86.2	522	84.7	535	86.9	539	87.5	546	88.6	547	88.8	549	89.1	548	89.0	553	89.8	559	90.7
Stevens Forest ES		399	399	399	399	401	100.5	405	101.5	400	100.3	397	99.5	419	105.0	423	106.0	429	107.5	424	106.3	425	106.5	429	107.5	433	108.5
Talbott Springs ES		377	377	377	377	431	114.3	433	114.9	426	113.0	427	113.3	424	112.5	426	113.0	430	114.1	438	116.2 C	453	120.2 C	458	121.5 C	466	123.6 C
Thunder Hill ES		509	509	509	509	568	111.6	586	115.1 C	583	114.5	595	116.9 C	580	113.9	586	115.1 C	598	117.5 C	605	118.9 C	616	121.0 C	623	122.4 C	631	124.0 C
Region Totals		**2720**	**2720**	**2720**	**2720**	**2832**	**104.1**	**2801**	**103.0**	**2777**	**102.1**	**2770**	**101.8**	**2792**	**102.6**	**2811**	**103.3**	**2828**	**104.0**	**2864**	**105.3**	**2912**	**107.1**	**2955**	**108.6**	**3002**	**110.4**
Columbia - West																											
Bryant Woods ES		361	361	361	361	326	90.3	331	91.7	317	87.8	332	92.0	339	93.9	349	96.7	362	100.3	375	103.9	386	106.9	397	110.0	411	113.9
Clemens Crossing ES		521	521	521	521	500	96.0	501	96.2	519	99.6	548	105.2	581	111.5	603	115.7 C	631	121.1 C	658	126.3 C	675	129.6 C	698	134.0 C	705	135.3 C
Longfellow ES		512	512	512	512	430	84.0	418	81.6	499	97.5	503	98.2	507	99.0	512	100.0	512	100.0	521	101.8	533	104.1	540	105.5	547	106.8
New ES #44	NS	0	0	0	0																						
Running Brook ES		515	515	515	515	568	110.3	590	114.6	461	89.5	480	93.2	508	98.6	543	105.4	575	111.7	597	115.9 C	619	120.2 C	636	123.5 C	657	127.6 C
Swansfield ES	A	521	621	621	621	534	102.5	520	83.7	641	103.2	622	100.2	627	101.0	624	100.5	630	101.4	633	101.9	627	101.0	635	102.3	642	103.4
Region Totals		**2430**	**2530**	**2530**	**2530**	**2358**	**97.0**	**2360**	**93.3**	**2437**	**96.3**	**2485**	**98.2**	**2562**	**101.3**	**2631**	**104.0**	**2710**	**107.1**	**2784**	**110.0**	**2840**	**112.3**	**2906**	**90.8**	**2962**	**92.6**
Northeastern																											
Bellows Spring ES		751	751	751	751	688	91.6	733	97.6	728	96.9	772	102.8	813	108.3	840	111.9	841	112.0	829	110.4	809	107.7	794	105.7	764	101.7
Deep Run ES		772	772	772	772	773	100.1	831	107.6	879	113.9	884	114.5	903	117.0 C	911	118.0 C	905	117.2 C	895	115.9 C	898	116.3 C	906	117.4 C	917	118.8 C
Ducketts Lane ES		669	669	669	669	854	127.7 C	989	147.8 C	737	110.2	779	116.4 C	836	125.0 C	871	130.2 C	907	135.6 C	928	138.7 C	930	139.0 C	931	139.2 C	927	138.6 C
Elkridge ES		760	760	760	760	815	107.2	817	107.5	816	107.4	833	109.6	840	110.5	854	112.4	866	113.9	883	116.2 C	914	120.3 C	930	122.4 C	964	126.8 C
Ilchester ES		653	653	653	653	682	104.4	655	100.3	633	96.9	624	95.6	618	94.6	624	95.6	630	96.5	659	100.9	699	107.0	720	110.3	731	111.9
New ES #42	NS	0	0	788	788					535	67.9	592	75.1	686	87.1	766	97.2	846	107.4	903	114.6	931	118.1 C	977	124.0 C	1020	129.4 C
Rockburn ES		672	672	672	672	595	88.5	592	88.1	500	74.4	505	75.1	505	75.1	518	77.1	538	80.1	545	81.1	555	82.6	577	85.9	589	87.6
Veterans ES		788	788	788	788	868	110.2	870	110.4	865	109.8	836	106.1	836	106.1	811	102.9	822	104.3	843	107.0	851	108.0	869	110.3	875	111.0
Waterloo ES		663	663	663	663	576	86.9	580	87.5	588	88.7	576	86.9	594	89.6	603	91.0	610	92.0	609	91.9	620	93.5	636	95.9	644	97.1
Worthington ES		590	590	590	590	524	88.8	502	85.1	477	80.8	472	80.0	473	80.2	475	80.5	497	84.2	510	86.4	525	89.0	524	88.8	519	88.0
Region Totals		**6318**	**6318**	**7106**	**7106**	**6375**	**100.9**	**6569**	**104.0**	**6758**	**95.1**	**6873**	**96.7**	**7104**	**100.0**	**7273**	**102.4**	**7462**	**105.0**	**7604**	**107.0**	**7732**	**108.8**	**7864**	**110.7**	**7950**	**111.9**
Northern																											
Centennial Lane ES		647	647	647	647	705	109.0	737	113.9	748	115.6 C	769	118.9 C	769	118.9 C	774	119.6 C	780	120.6 C	783	121.0 C	789	121.9 C	803	124.1 C	814	125.8 C
Hollifield Station ES		694	694	694	694	725	104.5	757	109.1	781	112.5	809	116.6 C	834	120.2 C	866	124.8 C	892	128.5 C	913	131.6 C	938	135.2 C	946	136.3 C	931	134.1 C
Manor Woods ES		681	681	681	681	761	111.7	854	125.4 C	652	95.7	682	100.1	732	107.5	777	114.1	811	119.1 C	847	124.4 C	867	127.3 C	852	125.1 C	822	120.7 C
New ES #45	NS	0	0	0	0																						
Northfield ES		700	700	700	700	684	97.7	700	100.0	712	101.7	717	102.4	731	104.4	746	106.6	756	108.0	770	110.0	776	110.9	808	115.4 C	816	116.6 C
St Johns Lane ES		612	612	612	612	726	118.6 C	730	119.3 C	735	120.1 C	732	119.6 C	721	117.8 C	721	117.8 C	720	117.6 C	719	117.5 C	724	118.3 C	726	118.6 C		
Waverly ES	A	638	638	738	738	664	104.1	620	97.2	643	87.1	630	85.4	618	83.7	622	84.3	631	85.5	641	86.9	654	88.6	664	90.0	682	92.4
Region Totals		**3972**	**3972**	**4072**	**4072**	**4265**	**107.4**	**4398**	**110.7**	**4271**	**104.9**	**4339**	**106.6**	**4405**	**108.2**	**4506**	**110.7**	**4590**	**112.7**	**4674**	**114.8**	**4743**	**116.5 C**	**4797**	**117.8 C**	**4791**	**101.1**
Southeastern																											
Atholton ES		424	424	424	424	380	89.6	397	93.6	389	91.7	396	93.4	399	94.1	405	95.5	406	95.8	412	97.2	420	99.1	426	100.5	433	102.1
Bollman Bridge ES		666	666	666	666	738	110.8	758	113.8	755	113.4	778	116.8 C	796	119.5 C	816	122.5 C	829	124.5 C	839	126.0 C	847	127.2 C	862	129.4 C	868	130.3 C
Forest Ridge ES		669	669	669	669	726	108.5	753	112.6	759	113.5	794	118.7 C	846	126.5 C	875	130.8 C	912	136.3 C	954	142.6 C	979	146.3 C	995	148.7 C	1001	149.6 C
Gorman Crossing ES		700	700	700	700	726	103.7	766	109.4	782	111.7	786	112.3	793	113.3	810	115.7 C	808	115.4 C	841	120.1 C	856	122.3 C	859	122.7 C	867	123.9 C
Guilford ES		465	465	465	465	506	108.8	523	112.5	532	114.4	557	119.8 C	553	118.9 C	556	119.6 C	563	121.1 C	567	121.9 C	573	123.2 C	574	123.4 C	580	124.7 C
Hammond ES		653	653	653	653	665	101.8	691	105.8	698	106.9	709	108.6	699	107.0	706	108.1	707	108.3	696	106.6	687	105.2	674	103.2	662	101.4
Laurel Woods ES		640	640	640	640	556	86.9	576	90.0	577	90.2	553	86.4	552	86.3	563	88.0	563	88.0	566	88.4	582	90.9	589	92.0	591	92.3
New ES #43	NS	0	0	0	0																						
Region Totals		**4217**	**4217**	**4217**	**4217**	**4297**	**101.9**	**4464**	**105.9**	**4492**	**106.5**	**4573**	**108.4**	**4638**	**110.0**	**4731**	**112.2**	**4788**	**113.5**	**4875**	**99.8**	**4944**	**101.2**	**4979**	**101.9**	**5002**	**102.4**
Western																											
Bushy Park ES		788	788	788	788	604	76.6	612	77.7	625	79.3	702	89.1	790	100.3	839	106.5	893	113.3	945	119.9 C	941	119.4 C	927	117.6 C	917	116.4 C
Clarksville ES		612	612	612	612	457	74.7	442	72.2	423	69.1	427	69.8	430	70.3	430	70.3	435	71.1	435	71.1	432	70.6	436	71.2	435	71.1
Dayton Oaks ES		788	788	788	788	606	76.9	607	77.0	779	98.9	764	97.0	749	95.1	734	93.1	737	93.5	721	91.5	718	91.1	718	91.1	718	91.1
Fulton ES		788	788	788	788	808	102.5	834	105.8	850	107.9	861	109.3	878	111.4	875	111.0	884	112.2	866	109.9	865	109.8	870	110.4	876	111.2
Lisbon ES		527	527	527	527	415	78.7	430	81.6	447	84.8	444	84.3	447	84.8	446	84.6	460	87.3	471	89.4	465	88.2	468	88.8	471	89.4
Pointers Run ES		744	744	744	744	738	99.2	764	102.7	808	108.6	826	111.0	855	114.9	898	120.7 C	923	124.1 C	918	123.4 C	904	121.5 C	891	119.8 C	864	116.1 C
Triadelphia Ridge ES		581	581	581	581	561	96.6	568	97.8	586	100.9	593	102.1	598	102.9	599	103.1	594	102.2	585	100.7	559	96.2	551	94.8	547	94.1
West Friendship ES		414	414	414	414	271	65.5	264	63.8	388	93.7	377	91.1	391	94.4	411	99.3	427	103.1	444	107.2	456	110.1	460	111.1	454	109.7
Region Totals		**5242**	**5242**	**5242**	**5242**	**4460**	**85.1**	**4521**	**86.2**	**4906**	**93.6**	**4994**	**95.3**	**5138**	**98.0**	**5232**	**99.8**	**5353**	**102.1**	**5385**	**102.7**	**5340**	**101.9**	**5321**	**101.5**	**5282**	**100.8**
Countywide Totals		24899	24999	25887	25887	24587	**98.7**	25113	**100.5**	25641	**99.0**	26034	**100.6**	26639	**102.9**	27184	**105.0**	27731	**107.1**	28186	**106.1**	28511	**107.4**	28822	**105.9**	28989	**103.9**

'A' includes additions as reflected in FY 2017 CIP for grades K-5

'NS' New School proposed in FY 2017 Capital Budget

Pre-Measures

MIDDLE SCHOOLS - Data for Demonstrative Purposes Only

Capacity Utilization Rates with Board of Education's Approved FY 2016 Capital Budget Projects - Not Test for APFO

Chart reflects May 2015 Projections, Board of Education's FY 2016 approved capacities, and no redistricting

			Capacity			2016-17			2017-18			2018-19			2019-20			2020-21			2021-22			2022-23			2023-24			2024-25			2025-26			2026-27		
Columbia - East	**2016**	**2017**	**2018**	**2019**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**		**Proj**	**% Util.**	
Lake Elkhorn MS	643	643	643	643		503	78.2		548	85.2		553	86.0		564	87.7		557	86.6		572	89.0		563	87.6		557	86.6		549	85.4		548	85.2		568	88.3	
Oakland Mills MS	506	506	506	506		434	85.8		438	86.6		469	92.7		474	93.7		489	96.6		477	94.3		472	93.3		478	94.5		478	94.5		484	95.7		482	95.3	
Region MS Totals	1149	1149	1149	1149		937	81.5		986	85.8		1022	88.9		1038	90.3		1046	91.0		1049	91.3		1035	90.1		1035	90.1		1027	89.4		1032	89.8		1050	91.4	
Columbia - West																																						
Harpers Choice MS	506	506	506	506		574	113.4		595	117.6	C	573	113.2		574	113.4		542	107.1		566	111.9		549	108.5		549	108.5		553	109.3		555	109.7		564	111.5	
Wilde Lake MS	R 467	760	760	760		599	128.3	C	648	85.3		661	87.0		705	92.8		692	91.1		697	91.7		710	93.4		763	100.4		819	107.8		869	114.3		888	116.8	C
Region MS Totals	973	1266	1266	1266		1173	120.6	C	1243	98.2		1234	97.5		1279	101.0		1234	97.5		1263	99.8		1259	99.4		1312	103.6		1372	108.4		1424	112.5		1452	114.7	
Northeastern																																						
Bonnie Branch MS	662	662	662	662		696	105.1		726	109.7		753	113.7		734	110.9		690	104.2		652	98.5		657	99.2		663	100.2		681	102.9		686	103.6		696	105.1	
Elkridge Landing MS	779	779	779	779		691	88.7		684	87.8		673	86.4		677	86.9		672	86.3		685	87.9		697	89.5		714	91.7		712	91.4		731	93.8		743	95.4	
Ellicott Mills MS	662	662	662	818		789	119.2	C	832	125.7	C	862	130.2	C	909	111.1		904	110.5		899	109.9		861	105.3		856	104.6		826	101.0		851	104.0		867	106.0	
Mayfield Woods MS	798	798	798	798		712	89.2		748	93.7		765	95.9		827	103.6		858	107.5		906	113.5		920	115.3	C	968	121.3	C	1000	125.3	C	993	124.4	C	981	122.9	C
Thomas Viaduct MS	NS 701	701	701	701		604	86.2		676	96.4		720	102.7		806	115.0		865	123.4	C	959	136.8	C	998	142.4	C	1088	155.2	C	1170	166.9	C	1253	178.7	C	1307	186.4	C
Region MS Totals	3602	3602	3602	3758		3492	96.9		3666	101.8		3773	104.7		3953	105.2		3989	106.1		4101	109.1		4133	110.0		4289	114.1		4389	116.8	C	4514	120.1	C	4594	122.2	C
Northern																																						
Burleigh Manor MS	779	779	779	779		812	104.2		837	107.4		851	109.2		860	110.4		868	111.4		899	115.4	C	953	122.3	C	997	128.0	C	1059	135.9	C	1092	140.2	C	1106	142.0	C
Dunloggin MS	A 565	565	662	662		644	114.0		649	114.9		656	99.1		656	99.1		660	99.7		672	101.5		678	102.4		679	102.6		687	103.8		683	103.2		697	105.3	
Patapsco MS	643	643	643	643		723	112.4		744	115.7	C	744	115.7	C	738	114.8		756	117.6	C	779	121.2	C	784	121.9	C	781	121.5	C	778	121.0	C	789	122.7	C	804	125.0	C
Region MS Totals	1987	1987	2084	2084		2179	109.7		2230	112.2		2251	108.0		2254	108.2		2284	109.6		2350	112.8		2415	115.9	C	2457	117.9	C	2524	121.1	C	2564	123.0	C	2607	125.1	C
Southeastern																																						
Hammond MS	604	604	604	604		603	99.8		581	96.2		611	101.2		648	107.3		710	117.5	C	717	118.7	C	743	123.0	C	759	125.7	C	804	133.1	C	814	134.8	C	829	137.3	C
Murray Hill MS	662	662	662	662		673	101.7		700	105.7		700	105.7		760	114.8		792	119.6	C	811	122.5	C	770	116.3	C	768	116.0	C	769	116.2	C	771	116.5	C	761	115.0	
Patuxent Valley MS	760	760	760	760		737	97.0		707	93.0		769	101.2		735	96.7		757	99.6		726	95.5		736	96.8		753	99.1		766	100.8		790	103.9		829	109.1	
Region MS Totals	2026	2026	2026	2026		2013	99.4		1988	98.1		2080	102.7		2143	105.8		2259	111.5		2254	111.3		2249	111.0		2280	112.5		2339	115.4	C	2375	117.2	C	2419	119.4	C
Western																																						
Clarksville MS	643	643	643	643		606	94.2		565	87.9		547	85.1		562	87.4		562	87.4		552	85.8		548	85.2		552	85.8		572	89.0		584	90.8		590	91.8	
Folly Quarter MS	662	662	662	662		604	91.2		633	95.6		629	95.0		678	102.4		675	102.0		684	103.3		673	101.7		686	103.6		710	107.3		707	106.8		688	103.9	
Glenwood MS	545	545	545	545		561	102.9		561	102.9		532	97.6		559	102.6		578	106.1		590	108.3		559	102.6		567	104.0		570	104.6		596	109.4		590	108.3	
Lime Kiln MS	701	701	701	701		728	103.9		717	102.3		702	100.1		754	107.6		765	109.1		783	111.7		787	112.3		805	114.8		814	116.1	C	807	115.1	C	799	114.0	
Mount View MS	798	798	798	798		757	94.9		779	97.6		798	100.0		824	103.3		823	103.1		820	102.8		833	104.4		858	107.5		910	114.0		938	117.5	C	984	123.3	C
Region MS Totals	3349	3349	3349	3349		3256	97.2		3255	97.2		3208	95.8		3377	100.8		3403	101.6		3429	102.4		3400	101.5		3468	103.6		3576	106.8		3632	108.5		3651	109.0	
Countywide Totals	13086	13379	13476	13632		13050	99.7		13368	99.9		13568	100.7		14044	103.0		14215	104.3		14446	106.0		14491	106.3		14841	108.9		15227	111.7		15541	114.0		15773	115.7	

'A' includes additions as reflected in FY 2016 CIP for grades 6-8

'R' = Replacement school scheduled to open August 2017

'NS' = New middle school (Thomas Viduct Middle School) underconstruction to open August 2014

Post-Measures

MIDDLE SCHOOLS - Data for Demonstrative Purposes Only

Aggregate Plan

Capacity Utilization Rates with Proposed FY 2017 Capital Budget Projects - Not Test for APFO

Chart reflects May 2015 Projections, Board of Education's FY 2017 Requested capacities and estimated redistricting.

		Capacity				2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27	
Columbia - East		2016	2017	2018	2019	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.
Lake Elkhorn MS		643	643	643	643	503	78.2	548	85.2	690	107.3	708	110.1	702	109.2	720	112.0	708	110.1	705	109.6	698	108.6	696	108.2	717	111.5
Oakland Mills MS		506	506	506	506	434	85.8	438	86.6	559	110.5	573	113.2	592	117.0 C	580	114.6	576	113.8	580	114.6	579	114.4	585	115.6 C	584	115.4 C
Region MS Totals		1149	1149	1149	1149	937	81.5	986	85.8	1249	108.7	1281	111.5	1294	112.6	1300	113.1	1284	111.7	1285	111.8	1277	111.1	1281	111.5	1301	113.2
Columbia - West																											
Harpers Choice MS		506	506	506	506	574	113.4	595	117.6 C	573	113.2	576	113.8	542	107.1	568	112.3	549	108.5	549	108.5	553	109.3	555	109.7	565	111.7
Wilde Lake MS	R	467	760	760	760	599	128.3 C	648	85.3	661	87.0	705	92.8	692	91.1	698	91.8	710	93.4	763	100.4	819	107.8	870	114.5	888	116.8 C
Region MS Totals		973	1266	1266	1266	1173	120.6 C	1243	98.2	1234	97.5	1281	101.2	1234	97.5	1266	100.0	1259	99.4	1312	103.6	1372	108.4	1425	112.6	1453	114.8
Northeastern																											
Bonnie Branch MS		662	662	662	662	696	105.1	726	109.7	702	106.0	684	103.3	639	96.5	604	91.2	609	92.0	614	92.7	630	95.2	635	95.9	645	97.4
Elkridge Landing MS		779	779	779	779	691	88.7	684	87.8	744	95.5	752	96.5	750	96.3	764	98.1	774	99.4	795	102.1	799	102.6	815	104.6	832	106.8
Ellicott Mills MS		662	662	662	662	789	119.2 C	832	125.7 C	708	106.9	742	112.1	734	110.9	730	110.3	700	105.7	695	105.0	672	101.5	693	104.7	708	106.9
Mayfield Woods MS		798	798	798	798	712	89.2	748	93.7	771	96.6	840	105.3	880	110.3	931	116.7 C	953	119.4 C	1010	126.6 C	1044	130.8 C	1050	131.6 C	1042	130.6 C
Thomas Viaduct MS		701	701	701	701	604	86.2	676	96.4	614	87.6	685	97.7	733	104.6	814	116.1 C	848	121.0 C	924	131.8 C	1000	142.7 C	1072	152.9 C	1121	159.9 C
Region MS Totals		3602	3602	3602	3602	3492	96.9	3666	101.8	3539	98.3	3703	102.8	3736	103.7	3843	106.7	3884	107.8	4038	112.1	4145	115.1 C	4265	118.4 C	4348	120.7 C
Northern																											
Burleigh Manor MS		779	779	779	779	812	104.2	837	107.4	852	109.4	863	110.8	869	111.6	901	115.7 C	953	122.3 C	997	128.0 C	1059	135.9 C	1092	140.2 C	1106	142.0 C
Dunloggin MS	A	565	565	565	662	644	114.0	649	114.9	709	125.5 C	712	107.6	718	108.5	729	110.1	735	111.0	733	110.7	740	111.8	739	111.6	751	113.4
Patapsco MS		643	643	643	643	723	112.4	744	115.7 C	667	103.7	663	103.1	681	105.9	704	109.5	708	110.1	709	110.3	707	110.0	717	111.5	731	113.7
Region MS Totals		1987	1987	1987	2084	2179	109.7	2230	112.2	2228	112.1	2238	107.4	2268	108.8	2334	112.0	2396	115.0	2439	117.0 C	2506	120.2 C	2548	122.3 C	2588	124.2 C
Southeastern																											
Hammond MS		604	604	604	604	603	99.8	581	96.2	569	94.2	603	99.8	662	109.6	669	110.8	693	114.7	709	117.4 C	755	125.0 C	762	126.2 C	777	128.6 C
Murray Hill MS		662	662	662	662	673	101.7	700	105.7	665	100.5	721	108.9	752	113.6	770	116.3 C	731	110.4	730	110.3	730	110.3	734	110.9	722	109.1
Patuxent Valley MS		760	760	760	760	737	97.0	707	93.0	808	106.3	775	102.0	799	105.1	768	101.1	778	102.4	793	104.3	806	106.1	830	109.2	868	114.2
Region MS Totals		2026	2026	2026	2026	2013	99.4	1988	98.1	2042	100.8	2099	103.6	2213	109.2	2207	108.9	2202	108.7	2232	110.2	2291	113.1	2326	114.8	2367	116.8 C
Western																											
Clarksville MS		643	643	643	643	606	94.2	565	87.9	549	85.4	563	87.6	564	87.7	554	86.2	548	85.2	552	85.8	572	89.0	584	90.8	590	91.8
Folly Quarter MS		662	662	662	662	604	91.2	633	95.6	629	95.0	679	102.6	676	102.1	685	103.5	673	101.7	686	103.6	713	107.7	710	107.3	688	103.9
Glenwood MS		545	545	545	545	561	102.9	561	102.9	533	97.8	559	102.6	578	106.1	590	108.3	559	102.6	567	104.0	570	104.6	596	109.4	592	108.6
Lime Kiln MS		701	701	701	701	728	103.9	717	102.3	702	100.1	756	107.8	770	109.8	786	112.1	792	113.0	806	115.0	814	116.1 C	810	115.5 C	799	114.0
Mount View MS		798	798	798	798	757	94.9	779	97.6	877	109.9	899	112.7	900	112.8	896	112.3	912	114.3	933	116.9 C	982	123.1 C	1010	126.6 C	1058	132.6 C
Region MS Totals		3349	3349	3349	3349	3256	97.2	3255	97.2	3290	98.2	3456	103.2	3488	104.2	3511	104.8	3484	104.0	3544	105.8	3651	109.0	3710	110.8	3727	111.3
Countywide Totals		13086	13379	13379	13476	13050	99.7	13368	99.9	13582	101.5	14058	104.3	14233	105.6	14461	107.3	14509	107.7	14850	110.2	15242	113.1	15555	115.4	15784	117.1

'A' includes additions as reflected in FY 2017 CIP for grades 6-8

'R' = Replacement school scheduled to open August 2017

Pre-Measures

HIGH SCHOOLS - Data for Demonstrative Purposes Only

Capacity Utilization Rates with Board of Education's Approved FY 2016 Capital Budget Projects - Not Test for APFO

Chart reflects May 2015 Projections, Board of Education's FY 2016 approved capacities, and no redistricting.

		Capacity				2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27	
Columbia - East		2016	2017	2018	2019	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.
Oakland Mills HS		1400	1400	1400	1400	1153	82.4	1132	80.9	1114	79.6	1170	83.6	1164	83.1	1219	87.1	1277	91.2	1263	90.2	1274	91.0	1285	91.8	1263	90.2
Columbia - West																											
Wilde Lake HS		1424	1424	1424	1424	1297	91.1	1352	94.9	1399	98.2	1445	101.5	1526	107.2	1531	107.5	1554	109.1	1549	108.8	1528	107.3	1547	108.6	1534	107.7
Northeastern																											
Howard HS		1420	1420	1420	1420	1803	127.0	1885	132.7	1907	134.3	1977	139.2	2015	141.9	2029	142.9	2036	143.4	2036	143.4	1999	140.8	1991	140.2	2013	141.8
Long Reach HS		1488	1488	1488	1488	1626	109.3	1756	118.0	1828	122.8	1939	130.3	2047	137.6	2110	141.8	2259	151.8	2350	157.9	2440	164.0	2582	173.5	2681	180.2
New HS #13	NS	0	0	0	0																						
Region HS Totals		2908	2908	2908	2908	3429	117.9	3641	125.2	3735	128.4	3916	134.7	4062	139.7	4139	142.3	4295	147.7	4386	150.8	4439	152.6	4573	157.3	4694	103.8
Northern																											
Centennial HS		1360	1360	1360	1360	1480	108.8	1555	114.3	1604	117.9	1633	120.1	1690	124.3	1722	126.6	1746	128.4	1779	130.8	1817	133.6	1854	136.3	1886	138.7
Marriotts Ridge HS		1615	1615	1615	1615	1231	76.2	1285	79.6	1341	83.0	1366	84.6	1420	87.9	1445	89.5	1481	91.7	1492	92.4	1487	92.1	1513	93.7	1524	94.4
Mt Hebron HS		1400	1400	1400	1400	1599	114.2	1649	117.8	1698	121.3	1760	125.7	1765	126.1	1803	128.8	1828	130.6	1843	131.6	1863	133.1	1875	133.9	1880	134.3
Region HS Totals		4375	4375	4375	4375	4310	98.5	4489	102.6	4643	106.1	4759	108.8	4875	111.4	4970	113.6	5055	115.5	5114	116.9	5167	118.1	5242	119.8	5290	120.9
Southeastern																											
Hammond HS		1220	1220	1220	1220	1319	108.1	1387	113.7	1420	116.4	1512	123.9	1550	127.0	1624	133.1	1712	140.3	1726	141.5	1805	148.0	1831	150.1	1874	153.6
Western																											
Atholton HS		1360	1360	1360	1360	1439	105.8	1503	110.5	1557	114.5	1563	114.9	1623	119.3	1645	121.0	1674	123.1	1730	127.2	1751	128.8	1776	130.6	1802	132.5
Glenelg HS		1420	1420	1420	1420	1221	86.0	1211	85.3	1281	90.2	1268	89.3	1277	89.9	1296	91.3	1290	90.8	1333	93.9	1356	95.5	1346	94.8	1346	94.8
Reservoir HS		1551	1551	1551	1551	1546	99.7	1629	105.0	1765	113.8	1839	118.6	1894	122.1	1910	123.1	1974	127.3	2007	129.4	2056	132.6	2086	134.5	2078	134.0
River Hill HS		1488	1488	1488	1488	1224	82.3	1252	84.1	1257	84.5	1243	83.5	1258	84.5	1240	83.3	1237	83.1	1265	85.0	1263	84.9	1268	85.2	1270	85.3
Region HS Totals		5819	5819	5819	5819	5430	93.3	5595	96.2	5860	100.7	5913	101.6	6052	104.0	6091	104.7	6175	106.1	6335	108.9	6426	110.4	6476	111.3	6496	111.6
Countywide Totals		17146	17146	17146	17146	16938	98.8	17596	102.6	18171	106.0	18715	109.2	19229	112.1	19574	114.2	20068	117.0	20373	118.8	20639	120.4	20954	122.2	21151	112.7

'NS' New School proposed in FY 2016 Capital Budget

Post-Measures

HIGH SCHOOLS - Data for Demonstrative Purposes Only

Aggregate Plan Capacity Utilization Rates with Proposed FY 2017 Capital Budget Projects - Not Test for APFO

Chart reflects May 2015 Projections, Board of Education's FY 2017 Requested capacities and estimated redistricting

		Capacity			2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27	
	2016	2017	2018	2019	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.	Proj	% Util.
Columbia - East																										
Oakland Mills HS	1400	1400	1400	1400	1153	82.4	1132	80.9	1114	79.6	1170	83.6	1164	83.1	1219	87.1	1277	91.2	1263	90.2	1274	91.0	1285	91.8	1263	90.2
Columbia - West																										
Wilde Lake HS	1424	1424	1424	1424	1297	91.1	1352	94.9	1399	98.2	1445	101.5	1526	107.2	1531	107.5	1554	109.1	1549	108.8	1528	107.3	1547	108.6	1534	107.7
Northeastern																										
Howard HS	1420	1420	1420	1420	1803	127.0	1885	132.7	1907	134.3	1977	139.2	2015	141.9	2029	142.9	2036	143.4	2036	143.4	1999	140.8	1991	140.2	2013	141.8
Long Reach HS	1488	1488	1488	1488	1626	109.3	1756	118.0	1828	122.8	1939	130.3	2047	137.6	2110	141.8	2259	151.8	2350	157.9	2440	164.0	2582	173.5	2681	180.2
NS New HS #13	0	0	0	0																						
Region HS Totals	2908	2908	2908	2908	3429	117.9	3641	125.2	3735	128.4	3916	134.7	4062	139.7	4139	142.3	4295	147.7	4386	150.8	4439	152.6	4573	157.3	4694	161.4
Northern																										
Centennial HS	1360	1360	1360	1360	1480	108.8	1555	114.3	1604	117.9	1633	120.1	1690	124.3	1722	126.6	1746	128.4	1779	130.8	1817	133.6	1854	136.3	1886	138.7
Marriotts Ridge HS	1615	1615	1615	1615	1231	76.2	1285	79.6	1341	83.0	1366	84.6	1420	87.9	1445	89.5	1481	91.7	1492	92.4	1487	92.1	1513	93.7	1524	94.4
Mt Hebron HS	1400	1400	1400	1400	1599	114.2	1649	117.8	1698	121.3	1760	125.7	1765	126.1	1803	128.8	1828	130.6	1843	131.6	1863	133.1	1875	133.9	1880	134.3
Region HS Totals	4375	4375	4375	4375	4310	98.5	4489	102.6	4643	106.1	4759	108.8	4875	111.4	4970	113.6	5055	115.5	5114	116.9	5167	118.1	5242	119.8	5290	120.9
Southeastern																										
Hammond HS	1220	1220	1220	1220	1319	108.1	1387	113.7	1420	116.4	1512	123.9	1550	127.0	1624	133.1	1712	140.3	1726	141.5	1805	148.0	1831	150.1	1874	153.6
Western																										
Atholton HS	1360	1360	1360	1360	1439	105.8	1503	110.5	1557	114.5	1563	114.9	1623	119.3	1645	121.0	1674	123.1	1730	127.2	1751	128.8	1776	130.6	1802	132.5
Glenelg HS	1420	1420	1420	1420	1221	86.0	1211	85.3	1281	90.2	1268	89.3	1277	89.9	1296	91.3	1290	90.8	1333	93.9	1356	95.5	1346	94.8	1346	94.8
Reservoir HS	1551	1551	1551	1551	1546	99.7	1629	105.0	1765	113.8	1839	118.6	1894	122.1	1910	123.1	1974	127.3	2007	129.4	2056	132.6	2086	134.5	2078	134.0
River Hill HS	1488	1488	1488	1488	1224	82.3	1252	84.1	1257	84.5	1243	83.5	1258	84.5	1240	83.3	1237	83.1	1265	85.0	1263	84.9	1268	85.2	1270	85.3
Region HS Totals	5819	5819	5819	5819	5430	93.3	5595	96.2	5860	100.7	5913	101.6	6052	104.0	6091	104.7	6175	106.1	6335	108.9	6426	110.4	6476	111.3	6496	111.6
Countywide Totals	17146	17146	17146	17146	16938	98.8	17596	102.6	18171	106.0	18715	109.2	19229	112.1	19574	114.2	20068	117.0	20373	118.8	20639	120.4	20954	122.2	21151	123.4

'NS' New School proposed in FY 2017 Capital Budget

HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

Planning Process Study

June 4, 2015

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*Capacity, Redistricting, Feeder System, and Evaluation of Income Disparity sections will be included in the final report.

Acknowledgements

On behalf of DeJONG-RICHTER, we would like to extend our appreciation to the Howard County Public School System for the opportunity to assist them in developing this Planning Process Study Report. As a planning team, we hope that this document will serve the Howard County Public School System for years to come.

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Executive Summary

In January 2015, DeJONG-RICHTER was contracted by the Howard County Public School System [HCPSS] to provide an evaluation of several components of the District's school facility planning process, including:

- Enrollment projection methodology
- Evaluation of school capacity
- Redistricting scenario testing
- Adjustment to feeder system
- Evaluate income disparity among schools

On April 27-28, 2015, members of the DeJONG-RICHTER team met with members of the District's planning department to review current studies, tools, and methodologies as they relate to the District's facility planning process.

Findings:

- Overall, the current HCPSS enrolment projection model yields more accurate results than utilizing a straight cohort model (p. 12) and in comparison to enrollment projections of surrounding districts (p. 11).
- The overarching recommendation of DeJONG-RICHTER in the analysis of the HCPSS enrollment projection process and methodology is for the District to consider obtaining a new enrollment projection tool / software that will enable the HCPSS to develop preliminary enrollment projection in the fall for operating budget and staff planning as well as continuing to develop refined enrollment projections beginning in January with more detailed data as it becomes available for use in facility and boundary planning.
- The HCPSS should provide a report accompanying the preliminary enrollment projections outlining data and methodology used in the development of the preliminary enrollment projections. This report should also outline limitations of the preliminary enrollment projections along with a date for the final (refined) enrollment projections and additional considerations which will be taken into account.
- The HCPSS should provide a report accompanying the final (refined) enrollment projections outlining all data considered in the development of the final enrollment projections. It should also contained an analysis of deviations from the preliminary projection as well as the prior year's projection and possible reasons for differences and the remedies taken if applicable.

Enrollment Projections

When projecting future enrollment, it is vital to track the number of live births, the amount of new housing activity, and the change in household composition. In addition, any of the following factors could cause a significant change in projected student enrollment:

- Boundary adjustments
- New school openings
- Changes / additions in program offerings
- Preschool programs
- Change in grade configuration
- Interest rates / unemployment shifts
- Magnet school
- Charter / Private school opening or closure
- Open enrollment
- Zoning changes
- Unplanned new housing activity
- Planned, but not built, housing
- School voucher programs

Obviously, certain factors can be gauged and planned for far better than others. For instance, it may be relatively straightforward to gather housing data from local builders regarding the total number of lots in a planned subdivision and calculate the potential student yield. However, planning for changes in the unemployment rate, and how these may either boost or reduce public school enrollment, proves more difficult. In any case, it is essential to gather a wide variety of information in preparation for producing enrollment projections.

When looking ahead at a school system's enrollment over the next two, five, or ten years, it is helpful to approach the process from a global perspective. For example: How many new homes have been constructed each year? How many births have occurred each year in relation to the resident population? Is housing experiencing a turnover—if so, what is the composition of families moving in / out? Are more or less students attending private school or being home-schooled? What has the unemployment rate trend been over the past ten years? What new educational policies are in place now that could affect student enrollment figures?

In developing enrollment projections, it is helpful to approach the process from a global perspective. There are five methodologies that have been developed to project student enrollment. They are summarized on the following pages.

Enrollment Projection Methodologies

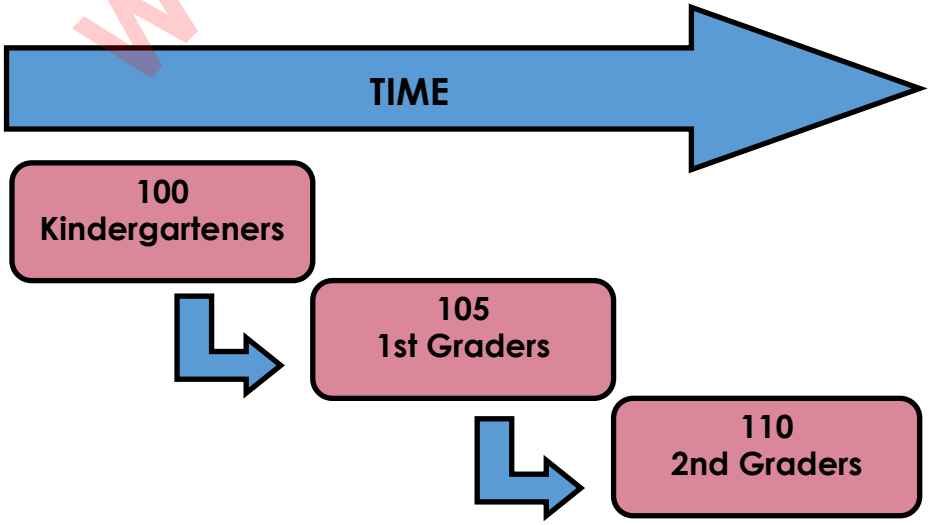
Cohort Survival Method

A cohort is a group of persons [in this case, students]. The cohort survival enrollment projection methodology uses historic live birth data and historic student enrollment to "age" a known population or cohort throughout the school grades. For instance, a cohort begins when a group of kindergarteners enrolls in grade K and moves to first grade the following year, second grade the next year, and so on.

A "survival ratio" is developed to track how this group of students increased or decreased in number as they moved through the grade levels. By developing survival ratios for each grade transition [i.e. 2nd to 3rd grade] over a ten year period of time, patterns emerge and can be folded into projections by using the survival ratio as a multiplier.

For example, if student enrollment has consistently increased from the 8th to the 9th grade over the past ten years, the survival ratio would be greater than 100% and could be multiplied by the current 8th grade to develop a projection for next year's 9th grade. This methodology can be carried through to develop ten years of projection figures. Because there is not a grade cohort to follow for students coming into kindergarten, live birth counts are used to develop a survival ratio. Babies born five years previous to the kindergarten class are compared in number, and a ratio can be developed to project future kindergarten enrollments.

The cohort survival method is useful in areas where population is stable [relatively flat, growing steadily, or declining steadily], and where there have been no significant fluctuations in enrollment, births, and housing patterns from year to year.



Housing Method

Enrollment projections can be determined by analyzing the housing data for areas that make up a school district. Yield factors can be established by comparing the historic change in enrollment from year to year divided by the total number of building or occupancy permits issued. For example, if student enrollment has increased by approximately 100 students each year and approximately 200 building permits have been issued each year for the past ten years, then the yield factor would be approximately .5 students per building permit.

Once yield factors are established, the number of new students per year can be estimated by multiplying the yield factor by the number of projected new housing units. This method is effective when the rate of student enrollment far exceed the number of live births.

In using this methodology, housing demolitions in the district must be examined. For instance, if housing demolitions have increased rapidly over recent years while new housing starts have remained relatively constant over many years, the conclusion may be that some of the new housing starts will simply be replacements for the families displaced by the demolitions. Housing value and household composition would also need to be analyzed to confirm that this is indeed the case. It is possible that enrollment may remain flat, or even decline, although there is new housing occurring in the area.

Land-Saturation Analysis

Housing data also drives the land-saturation analysis enrollment methodology. In areas where there is a high rate of development and the future development patterns in the area are clear, a "build-out" scenario can be developed. The scenario takes into consideration the remaining acreage to be developed, planned rate of completion, zoning policies, density per acre, type of housing, and ratios of school-age children per household type. This method is particularly useful in areas experiencing rapid growth.

Regression-Based Forecasting Methods

There are several regression-based forecasting methods that may be used in conjunction with the cohort survival method to increase the accuracy of projections. In forecasting, it is useful to study the neighborhoods to determine if they are growing, stable, or declining in numbers of school-age children. Many variables may affect the environmental condition of a school district, including live births, building and occupancy permits, transportation plans, and land use plans. Analyzing the relationship between variables such as neighborhood turnover, new housing and school enrollment are some examples of regression-based concepts.

Migration / Change in Household Composition

The change in household composition over time is one of the most difficult factors to predict. Neighborhoods often go through cycles of newer homes housing younger families. As the families remain in the neighborhood, students become older and eventually the home becomes an "empty nest." At some point, the housing unit is sold and a new family moves in. As simple as it may seem, it is extremely complex to track who lives in each household.

Geographic Information Systems

While not a methodology, the need for better tools and easier manipulation of data has led to a new industry standard in planning—Geographic Information Systems [GIS]. GIS technology allows school districts to quickly analyze countless data sets including birth data, housing information, and enrollment statistics.

When paired with enrollment projections, GIS becomes an invaluable information-management and decision-making tool. Often, county or city offices are already implementing GIS technology and data can be shared and expanded among these organizations in the district.

In conclusion, most projections include some combination or variation of each of the methods listed above. However, unforeseen variables and circumstances can and will change student enrollment. The presence of these variables suggest that projections be used as a guide and not an absolute.

HCPSS Methodology

The Howard County Public School System enrollment projection model is based primarily on the cohort survival method, using the September 30 student head counts. However, students who can be attributed to housing transactions such as apartment turnover, re-sales of existing homes, first-time sales of newly-constructed homes, as well as out-of-district and preschool students who have moved into existing homes have been removed from the total population. They are projected separately based on different methodologies appropriate to each category.

Enrollment projections are produced by school, by grade. These projections are then summed to determine a System-wide enrollment projection. This allows for consideration to be given to trends specific to school boundaries such as live birth counts, programmatic changes, and housing development.

HCPSS has access to data not typically available to most school systems throughout the country. This wealth of information greatly enhances the enrollment projections produced by HCPSS.

- Live birth counts by elementary boundary provided by the Maryland Department of Health and Mental Hygiene
- Projected County-wide live birth counts from the Maryland Department of Planning in five-year increments
- Existing and projected housing units, by type of unit (single-family, detached; single-family, attached; apartment; mobile home; and unknown), by boundary
- Student yields from re-sales of existing homes as well as new housing units constructed over the past ten years by type of unit
- Feed rates

While it is recommended that HCPSS continue to primarily use the cohort survival method, consideration should be given to utilizing different methodologies where appropriate.

Maryland Department of Planning Comparison

The Maryland Department of Planning produced enrollment projections for public school districts in the State. Below is a comparison of enrollment projections produced during the 2010-11 school year for 2011-12 and beyond. It should be noted that the actual enrollment data used by the Maryland Department of Planning for the 2010-11 school year differs by approximately 0.2% from the data used by HCPSS. Actual enrollment data that is used in this comparison is from HCPSS.

	HCPSS Acutal					HCPSS 2010 Projection					Maryland Department of Planning 2010 Projection				
Grade	2010-11	2011-12	2012-13	2013-14	2014-15	2010-11 Actual	2011-12	2012-13	2013-14	2014-15	2010-11 Actual*	2011-12	2012-13	2013-14	2014-15
K	3,385	3,497	3,508	3,728	3,622	3,385	3,267	3,342	3,472	3,329	3,393	3,180	3,220	3,360	3,110
1	3,643	3,627	3,751	3,785	3,995	3,643	3,666	3,527	3,631	3,768	3,648	3,410	3,380	3,420	3,570
2	3,716	3,770	3,777	3,921	3,953	3,716	3,805	3,821	3,692	3,802	3,723	3,790	3,550	3,520	3,570
3	3,695	3,809	3,890	3,867	3,994	3,695	3,846	3,926	3,958	3,832	3,702	3,880	3,890	3,650	3,620
4	3,648	3,795	3,900	4,018	3,997	3,648	3,824	3,976	4,064	4,106	3,653	3,860	3,980	4,000	3,750
5	3,726	3,750	3,904	4,008	4,128	3,726	3,742	3,924	4,087	4,178	3,732	3,780	3,950	4,080	4,090
6	3,646	3,788	3,854	4,021	4,153	3,646	3,830	3,843	4,042	4,201	3,648	3,880	3,870	4,040	4,170
7	3,943	3,720	3,865	3,937	4,117	3,943	3,726	3,907	3,939	4,138	3,949	3,710	3,940	3,940	4,110
8	3,883	3,988	3,744	3,929	3,985	3,883	4,011	3,811	3,999	4,036	3,887	4,040	3,760	4,000	3,990
9	4,304	4,234	4,280	4,204	4,329	4,304	4,278	4,407	4,205	4,415	4,315	4,280	4,440	4,130	4,390
10	4,376	4,130	4,062	4,136	3,979	4,376	4,126	4,091	4,218	4,029	4,379	4,110	4,020	4,170	3,880
11	3,907	4,192	3,984	3,941	3,960	3,907	4,234	3,992	3,963	4,086	3,916	4,270	3,950	3,860	4,010
12	4,028	3,955	4,231	4,053	4,041	4,028	3,923	4,239	4,003	3,971	4,046	3,970	4,170	3,860	3,770
Total	**49,900**	**50,255**	**50,750**	**51,548**	**52,253**	**49,900**	**50,278**	**50,806**	**51,273**	**51,891**	**49,991**	**50,160**	**50,120**	**50,030**	**50,030**
K-5 Total	21,813	22,248	22,730	23,327	23,689	21,813	22,150	22,516	22,904	23,015	21,851	21,900	21,970	22,030	21,710
6-8 Total	11,472	11,496	11,463	11,887	12,255	11,472	11,567	11,561	11,980	12,375	11,484	11,630	11,570	11,980	12,270
9-12 Total	16,615	16,511	16,557	16,334	16,309	16,615	16,561	16,729	16,389	16,501	16,656	16,630	16,580	16,020	16,050
PROJECTION DELTA FROM ACTUAL															
K						0	230	166	256	293	-8	317	288	368	512
1						0	-39	224	154	227	-5	217	371	365	425
2						0	-35	-44	229	151	-7	-20	227	401	383
3						0	-37	-36	-91	162	-7	-71	0	217	374
4						0	-29	-76	-46	-109	-5	-65	-80	18	247
5						0	8	-20	-79	-50	-6	-30	-46	-72	38
6						0	-42	11	-21	-48	-2	-92	-16	-19	-17
7						0	-6	-42	-2	-21	-6	10	-75	-3	7
8						0	-23	-67	-70	-51	-4	-52	-16	-71	-5
9						0	-44	-127	-1	-86	-11	-46	-160	74	-61
10						0	4	-29	-82	-50	-3	20	42	-34	99
11						0	-42	-8	-22	-126	-9	-78	34	81	-50
12						0	32	-8	50	70	-18	-15	61	193	271
Total						**0**	**-23**	**-56**	**275**	**362**	**-91**	**95**	**630**	**1,518**	**2,223**
K-5 Total						0	98	214	423	674	-38	348	760	1,297	1,979
6-8 Total						0	-71	-98	-93	-120	-12	-134	-107	-93	-15
9-12 Total						0	-50	-172	-55	-192	-41	-119	-23	314	259
PERCENTAGE FROM ACTUAL															
K						0	6.6%	4.7%	6.9%	8.1%	0.2%	9.1%	8.2%	9.9%	14.1%
1						0	1.1%	6.0%	4.1%	5.7%	0.1%	6.0%	9.9%	9.6%	10.6%
2						0	0.9%	1.2%	5.8%	3.8%	0.2%	0.5%	6.0%	10.2%	9.7%
3						0	1.0%	0.9%	2.4%	4.1%	0.2%	1.9%	0.0%	5.6%	9.4%
4						0	0.8%	1.9%	1.1%	2.7%	0.1%	1.7%	2.1%	0.4%	6.2%
5						0	0.2%	0.5%	2.0%	1.2%	0.2%	0.8%	1.2%	1.8%	0.9%
6						0	1.1%	0.3%	0.5%	1.2%	0.1%	2.4%	0.4%	0.5%	0.4%
7						0	0.2%	1.1%	0.1%	0.5%	0.2%	0.3%	1.9%	0.1%	0.2%
8						0	0.6%	1.8%	1.8%	1.3%	0.1%	1.3%	0.4%	1.8%	0.1%
9						0	1.0%	3.0%	0.0%	2.0%	0.3%	1.1%	3.7%	1.8%	1.4%
10						0	0.1%	0.7%	2.0%	1.3%	0.1%	0.5%	1.0%	0.8%	2.5%
11						0	1.0%	0.2%	0.6%	3.2%	0.2%	1.9%	0.9%	2.1%	1.3%
12						0	0.8%	0.2%	1.2%	1.7%	0.4%	0.4%	1.4%	4.8%	6.7%
Total						**0.00%**	**0.05%**	**0.11%**	**0.53%**	**0.69%**	**0.18%**	**0.19%**	**1.24%**	**2.94%**	**4.25%**
K-5 Total						0	0.4%	0.9%	1.8%	2.8%	0.2%	1.6%	3.3%	5.6%	8.4%
6-8 Total						0	0.6%	0.9%	0.8%	1.0%	0.1%	1.2%	0.9%	0.8%	0.1%
9-12 Total						0	0.3%	1.0%	0.3%	1.2%	0.2%	0.7%	0.1%	1.9%	1.6%

Below is a comparison of enrollment projections produced in the 2013-14 school year for 2014-15 and beyond. It should be noted that the actual enrollment data used by the Maryland Department of Planning for the 2013-14 school year differs by approximately 0.26% from the data used by HCPSS. Actual enrollment data that is used in this comparison is from HCPSS.

	HCPSS Actual		HCPSS 2014 Projection		MDP 2010 Projection	
Grade	2013-14	2014-15	2013-14 Actual	2014-15	2013-14 Actual*	2014-15
K	3,728	3,622	3,728	3,569	3,732	3,440
1	3,785	3,995	3,785	4,043	3,792	4,010
2	3,921	3,953	3,921	3,958	3,924	3,940
3	3,867	3,994	3,867	4,086	3,872	4,090
4	4,018	3,997	4,018	4,022	4,020	4,040
5	4,008	4,128	4,008	4,150	4,015	4,160
6	4,021	4,153	4,021	4,173	4,026	4,170
7	3,937	4,117	3,937	4,114	3,944	4,090
8	3,929	3,985	3,929	4,049	3,939	4,030
9	4,204	4,329	4,204	4,375	4,208	4,330
10	4,136	3,979	4,136	4,071	4,185	4,010
11	3,941	3,960	3,941	4,045	3,946	4,080
12	4,053	4,041	4,053	4,036	4,078	4,000
Total	**51,548**	**52,253**	**51,548**	**52,691**	**51,681**	**52,390**
K-5 Total	23,327	23,689	23,327	23,828	23,355	23,680
6-8 Total	11,887	12,255	11,887	12,336	11,909	12,290
9-12 Total	16,334	16,309	16,334	16,527	16,417	16,420
PROJECTION DELTA FROM ACTUAL						
K			0	53	-4	182
1			0	-48	-7	-15
2			0	-5	-3	13
3			0	-92	-5	-96
4			0	-25	-2	-43
5			0	-22	-7	-32
6			0	-20	-5	-17
7			0	3	-7	27
8			0	-64	-10	-45
9			0	-46	-4	-1
10			0	-92	-49	-31
11			0	-85	-5	-120
12			0	5	-25	41
Total			**0**	**-438**	**-133**	**-137**
K-5 Total			0	-139	-28	9
6-8 Total			0	-81	-22	-35
9-12 Total			0	-218	-83	-111
PERCENTAGE FROM ACTUAL						
K			0.0%	1.5%	0.1%	5.0%
1			0.0%	1.2%	0.2%	0.4%
2			0.0%	0.1%	0.1%	0.3%
3			0.0%	2.3%	0.1%	2.4%
4			0.0%	0.6%	0.0%	1.1%
5			0.0%	0.5%	0.2%	0.8%
6			0.0%	0.5%	0.1%	0.4%
7			0.0%	0.1%	0.2%	0.7%
8			0.0%	1.6%	0.3%	1.1%
9			0.0%	1.1%	0.1%	0.0%
10			0.0%	2.3%	1.2%	0.8%
11			0.0%	2.1%	0.1%	3.0%
12			0.0%	0.1%	0.6%	1.0%
Total			**0.00%**	**0.84%**	**0.26%**	**0.26%**
K-5 Total			0.0%	0.6%	0.1%	0.0%
6-8 Total			0.0%	0.7%	0.2%	0.3%
9-12 Total			0.0%	1.3%	0.5%	0.7%

Some factors which may contribute to the differences between the Maryland Department of Planning and the HCPSS projections include:

- *Actual enrollment data used by Maryland Department of Planning differs from that used by the HCPSS
- Maryland Department of Planning uses a birth to 1st grade survival ratio (HCPSS uses a kindergarten to 1st grade survival ratio)
- Institutional knowledge
- Differences in methodology

Benchmarking

The Maryland Department of Planning compiled enrollment projection data for 17 school districts in Maryland in addition to Howard County Public School System. The enrollment projections were produced in 2009 and were analyzed for accuracy/error for five years. The table below illustrates this information.

Forecasts made in 2009 by 17 LEAs *

Forecast Year	Mean Absolute Error	Standard Deviation	Mean Absolute Percent Error	Standard Deviation
2010	218	257	0.9%	0.6%
2011	465	588	1.5%	1.0%
2012	860	1,026	2.7%	1.9%
2013	1,132	1,421	3.5%	2.5%
2014	1,536	1,887	4.7%	3.4%

Source: Maryland Department of Planning

*does not include HCPSS

Forecasts made in 2009 by HCPSS

Forecast Year	Mean Absolute Error	Mean Absolute Percent Error
2010	138	0.3%
2011	525	1.1%
2012	495	1.0%
2013	819	1.6%
2014	1,072	2.1%

Source: Maryland Department of Planning

Methodology Comparison

A blind study was conducted comparing the HCPSS methodology to straight cohort models with a 3 year average survival ratio and a 5 year average survival ratio for each grade by school boundary. In order to provide the most "like" comparison, only students living within their school boundaries were included in the study. Studies of enrollment projections produced in 2010-11 for 2011-12 and beyond; and 2013-14 for 2014-15 and beyond. In both studies the HCPSS model produced more accurate results. It should be noted that the straight cohort models did not take into consideration institutional knowledge that would likely be incorporated into a typical cohort model. In addition, the straight cohort models did not incorporate the same method for projected feeders as the HCPSS model due to differences in software utilized in the projections.

Some important points to consider, however, include the amount of manpower utilized to produce the HCPSS enrollment projections based on the current methodology. An estimated 340 hours are dedicated annually to the development of enrollment projections, by school, by grade. The enrollment projections process begins around January (due to availability of all data) and takes approximately 11 weeks. The straight cohort model would likely take approximately 10% of the time HCPSS currently spends on the current methodology.

The table below illustrates the comparison of the projections produced in 2010-11 for 2011-12 and beyond.

	HCPSS Actual				HCPSS Projection				Projection Using 3 Year Average Survival Ratios				Projection Using 5 Year Average Survival Ratios			
Grade	2011-12	2012-13	2013-14	2014-15	2011-12	2012-13	2013-14	2014-15	2011-12	2012-13	2013-14	2014-15	2011-12	2012-13	2013-14	2014-15
K	3,491	3,503	3,717	3,609	3,268	3,344	3,472	3,329	3,215	3,279	3,366	3,108	3,102	3,154	3,241	2,984
1	3,625	3,745	3,780	3,989	3,665	3,527	3,629	3,768	3,631	3,461	3,529	3,626	3,702	3,410	3,464	3,562
2	3,768	3,768	3,905	3,952	3,804	3,820	3,694	3,804	3,784	3,772	3,595	3,668	3,794	3,860	3,555	3,612
3	3,814	3,876	3,860	3,985	3,845	3,925	3,959	3,828	3,862	3,923	3,910	3,720	3,847	3,929	3,992	3,668
4	3,796	3,889	4,003	3,993	3,826	3,974	4,065	4,105	3,834	4,000	4,065	4,050	3,828	3,979	4,061	4,126
5	3,750	3,894	3,998	4,119	3,743	3,923	4,084	4,180	3,764	3,962	4,131	4,201	3,746	3,928	4,091	4,169
6	3,782	3,838	4,017	4,153	3,829	3,843	4,042	4,201	3,834	3,873	4,069	4,245	3,826	3,850	4,031	4,197
7	3,720	3,862	3,922	4,111	3,726	3,907	3,938	4,136	3,711	3,900	3,946	4,142	3,710	3,894	3,925	4,104
8	3,996	3,735	3,922	3,997	4,010	3,811	4,000	4,036	4,004	3,772	3,961	4,011	4,003	3,766	3,952	3,986
9	4,262	4,295	4,186	4,360	4,279	4,408	4,207	4,415	4,247	4,375	4,126	4,332	4,268	4,392	4,137	4,343
10	4,166	4,074	4,164	4,005	4,127	4,091	4,220	4,030	4,116	4,056	4,180	3,941	4,094	4,055	4,174	3,932
11	4,211	3,988	3,929	3,994	4,232	3,993	3,962	4,087	4,206	3,967	3,908	4,026	4,216	3,953	3,911	4,028
12	3,998	4,251	4,055	4,080	3,922	4,239	4,001	3,970	3,926	4,218	3,979	3,916	3,884	4,181	3,921	3,878
Total	**50,379**	**50,718**	**51,458**	**52,347**	**50,275**	**50,804**	**51,273**	**51,889**	**50,134**	**50,558**	**50,765**	**50,986**	**50,020**	**50,351**	**50,455**	**50,589**
PROJECTION DELTA FROM ACTUAL																
K					223	159	245	280	276	224	351	501	389	349	476	625
1					-40	218	151	221	-6	284	251	363	-77	335	316	427
2					-36	-52	211	148	-16	-4	310	284	-26	-92	350	340
3					-31	-49	-99	157	-48	-47	-50	265	-33	-53	-132	317
4					-30	-85	-62	-112	-38	-111	-62	-57	-32	-90	-58	-133
5					7	-29	-86	-61	-14	-68	-133	-82	4	-34	-93	-50
6					-47	-5	-25	-48	-52	-35	-52	-92	-44	-12	-14	-44
7					-6	-45	-16	-25	9	-38	-24	-31	10	-32	-3	7
8					-14	-76	-78	-39	-8	-37	-39	-14	-7	-31	-30	11
9					-17	-113	-21	-55	15	-80	60	28	-6	-97	49	17
10					39	-17	-56	-25	50	18	-16	64	72	19	-10	73
11					-21	-5	-33	-93	5	21	21	-32	-5	35	18	-34
12					76	12	54	110	72	33	76	164	114	70	134	202
Total					**104**	**-86**	**185**	**458**	**245**	**160**	**693**	**1,361**	**359**	**367**	**1,003**	**1,758**
PERCENTAGE FROM ACTUAL																
K					6.4%	4.5%	6.6%	7.8%	7.9%	6.4%	9.4%	13.9%	11.1%	10.0%	12.8%	17.3%
1					1.1%	5.8%	4.0%	5.5%	0.2%	7.6%	6.6%	9.1%	2.1%	8.9%	8.4%	10.7%
2					1.0%	1.4%	5.4%	3.7%	0.4%	0.1%	7.9%	7.2%	0.7%	2.4%	9.0%	8.6%
3					0.8%	1.3%	2.6%	3.9%	1.3%	1.2%	1.3%	6.6%	0.9%	1.4%	3.4%	8.0%
4					0.8%	2.2%	1.5%	2.8%	1.0%	2.9%	1.5%	1.4%	0.8%	2.3%	1.4%	3.3%
5					0.2%	0.7%	2.2%	1.5%	0.4%	1.7%	3.3%	2.0%	0.1%	0.9%	2.3%	1.2%
6					1.2%	0.1%	0.6%	1.2%	1.4%	0.9%	1.3%	2.2%	1.2%	0.3%	0.3%	1.1%
7					0.2%	1.2%	0.4%	0.6%	0.2%	1.0%	0.6%	0.8%	0.3%	0.8%	0.1%	0.2%
8					0.3%	2.0%	2.0%	1.0%	0.2%	1.0%	1.0%	0.4%	0.2%	0.8%	0.8%	0.3%
9					0.4%	2.6%	0.5%	1.3%	0.4%	1.9%	1.4%	0.6%	0.1%	2.3%	1.2%	0.4%
10					0.9%	0.4%	1.3%	0.6%	1.2%	0.4%	0.4%	1.6%	1.7%	0.5%	0.2%	1.8%
11					0.5%	0.1%	0.8%	2.3%	0.1%	0.5%	0.5%	0.8%	0.1%	0.9%	0.5%	0.9%
12					1.9%	0.3%	1.3%	2.7%	1.8%	0.8%	1.9%	4.0%	2.9%	1.6%	3.3%	5.0%
Total					**0.2%**	**0.2%**	**0.4%**	**0.9%**	**0.5%**	**0.3%**	**1.3%**	**2.6%**	**0.7%**	**0.7%**	**1.9%**	**3.4%**

The table below illustrates the comparison produced in 2013-14 for 2014-15 and beyond.

Grade	HCPSS Actual 2014-15	HCPSS Projection 2014-15	Projection Using 3 Year Average Survival Ratios 2014-15	Projection Using 5 Year Average Survival Ratios 2014-15
K	3,609	3,573	3,426	3,352
1	3,989	4,044	4,020	4,027
2	3,952	3,960	3,944	3,935
3	3,985	4,082	4,015	4,028
4	3,993	4,026	3,970	3,985
5	4,119	4,151	4,124	4,130
6	4,153	4,175	4,092	4,111
7	4,111	4,117	4,106	4,096
8	3,997	4,047	3,972	3,978
9	4,360	4,376	4,306	4,304
10	4,005	4,071	4,035	4,023
11	3,994	4,045	4,007	4,016
12	4,080	4,032	3,986	3,972
Total	**52,347**	**52,698**	**52,003**	**51,957**
PROJECTION DELTA FROM ACTUAL				
K		36	183	257
1		-55	-31	-38
2		-8	8	17
3		-97	-30	-43
4		-33	23	8
5		-32	-5	-11
6		-22	61	42
7		-6	5	15
8		-50	25	19
9		-16	54	56
10		-66	-30	-18
11		-51	-13	-22
12		48	94	108
Total		**-351**	**344**	**390**
PERCENTAGE FROM ACTUAL				
K		1.0%	5.1%	7.1%
1		1.4%	0.8%	1.0%
2		0.2%	0.2%	0.4%
3		2.4%	0.8%	1.1%
4		0.8%	0.6%	0.2%
5		0.8%	0.1%	0.3%
6		0.5%	1.5%	1.0%
7		0.2%	0.1%	0.4%
8		1.3%	0.6%	0.5%
9		0.4%	1.2%	1.3%
10		1.6%	0.7%	0.4%
11		1.3%	0.3%	0.6%
12		1.2%	2.3%	2.6%
Total		**0.67%**	**0.66%**	**0.75%**

Recommendation

HCPSS should continue to use their current methodology however, it is strongly suggested the current software be updated to streamline the process, allow for flexibility in modifying the methodology (i.e. straight cohort *and* current HCPSS methodology); provide quality control measures, etc. See Enrollment Projection Tool / Methodology section of this report.

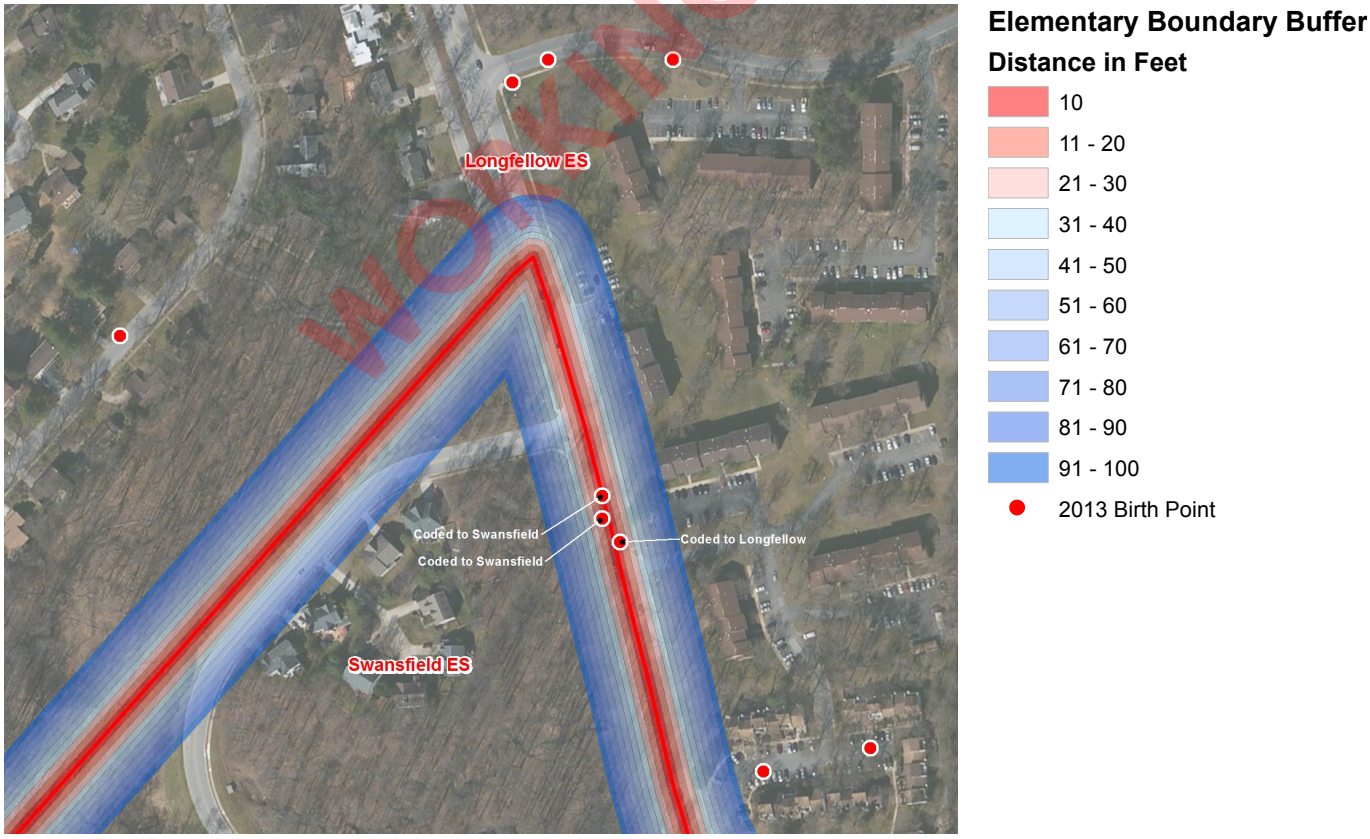
Birth Data

HCPSS currently receives point level birth data from the Maryland Department of Health and Mental Hygiene. Detailed attribute information such as address and geocoding accuracy is not provided. The provided attributes are: birthdate, latitude and longitude. The data appears to be geocoded using a road centerline as its source data with a very small side offset.

This level of birth data is much more granular than many other districts are able to get and can enhance projection accuracy at the individual school level. However, due to the nature of the data, there is minor error present.

Error Factors Due to Offset

The map below illustrates a possible issue associated with the side offset of the birth data. The three points called out are associated with the multi-family housing units to the east of the boundary line. Due to the close proximity to the boundary line, two of the three points have been coded to Swansfield ES and the other has been coded to Longfellow ES. Since the data is not provided with address information, it is not possible to confirm exactly which school boundary the point actually belongs.



The table to the right illustrates the extent of the issue by identifying the number of births by year and their proximity to the elementary boundaries. As the distance from the boundary line increases, the risk of error decreases. On average, 94.97% of the births are coded to a point greater than 100 feet from the boundary lines.

	Percentage of Births by Distance in feet from Elementary Boundary Lines										
Birth Year	**0-10**	**11-20**	**21-30**	**31-40**	**41-50**	**51-60**	**61-70**	**71-80**	**81-90**	**91-100**	**>100**
2002	1.54%	1.29%	0.60%	0.14%	0.14%	0.34%	0.17%	0.17%	0.17%	0.11%	95.31%
2003	1.74%	1.04%	0.84%	0.28%	0.31%	0.28%	0.14%	0.22%	0.22%	0.08%	94.84%
2004	1.53%	1.27%	0.49%	0.20%	0.35%	0.12%	0.29%	0.32%	0.06%	0.29%	95.10%
2005	1.63%	1.09%	0.27%	0.12%	0.12%	0.12%	0.15%	0.24%	0.24%	0.24%	95.77%
2006	2.37%	1.25%	0.36%	0.15%	0.30%	0.21%	0.39%	0.15%	0.15%	0.12%	94.57%
2007	1.92%	1.29%	0.43%	0.14%	0.37%	0.03%	0.29%	0.26%	0.11%	0.11%	95.04%
2008	1.50%	1.26%	0.41%	0.23%	0.26%	0.12%	0.32%	0.23%	0.03%	0.18%	95.45%
2009	1.61%	1.24%	0.52%	0.18%	0.18%	0.21%	0.42%	0.18%	0.09%	0.27%	95.09%
2010	1.69%	1.34%	0.30%	0.36%	0.21%	0.12%	0.27%	0.21%	0.18%	0.12%	95.22%
2011	1.69%	1.78%	0.56%	0.38%	0.41%	0.03%	0.36%	0.18%	0.03%	0.27%	94.32%
2012	2.12%	1.45%	0.76%	0.12%	0.49%	0.12%	0.32%	0.15%	0.06%	0.26%	94.15%
2013	1.61%	1.22%	0.56%	0.21%	0.24%	0.18%	0.54%	0.36%	0.15%	0.18%	94.77%
Total	**1.75%**	**1.29%**	**0.51%**	**0.21%**	**0.28%**	**0.16%**	**0.30%**	**0.22%**	**0.12%**	**0.19%**	**94.97%**

Recommendation

In general, point level birth data is a much more detailed level of information than most districts are able to obtain. In an enrollment projection, the birth data is used to calculate a survival ratio from birth to kindergarten and possibly first grade.

Most districts can only get birth data at the county, municipality, or the zip code level. This can result in decreased accuracy at the school level when projecting kindergarten and first grade.

The observed error due to the geocoding offset is not significant enough to negate the advantages of using the point level data versus a more aggregated source like county level.

Areas for Improvement

- Work with the Maryland Department of Health and Mental Hygiene to either provide the raw address data for HCPSS to geocode, or try to see if the data can be geocoded with a larger side offset.

Enrollment Projection Tool / Software

The Howard County Public School System enrollment projection tool / software is a FoxPro based software developed by a former employee, who has retired from the HCPSS. The FoxPro software interacts with database files for the input. The output of this tool is a number of Excel spreadsheets which contain information relative to historical enrollment, live birth counts, housing, preschool, and out-of-district students.

Some challenges with the current enrollment projection tool / software include:

- HCPSS currently uses FoxPro 2.6a, which is no longer supported by Microsoft and has compatibility issues with current Windows operating systems.
- The current FoxPro system does not provide a system for quality control to ensure the data used in the projections is accurate and the system is operating correctly (e.g. the current system does not notify the user if the input data is not formatted properly).

Recommendation

A software update would provide the HCPSS an opportunity to document and simplify input and output tables. There are output tables developed from the current tool / software that are not documented clearly and the current planning staff are unable to explain the table's purpose. In order to maximize long-term usability, the software should provide maximum flexibility, not only in the use of the cohort survival method, but the ability to incorporate other methodologies as desired.

It should be noted that the current FoxPro applications are running on Windows 7 based computers using Microsoft XP compatibility mode. Windows XP support from Microsoft ended in 2014. There is no guarantee that the XP mode functionally will be maintained in Windows 7 updates or new operating systems as they are released.

If the HCPSS decides to outsource the development of a new enrollment projection tool / software, a user manual as well as a technical manual should be developed upon launch of the tool / software. This will be highly beneficial in the event of staffing turnover on either the part of HCPSS staff or the developer of the tool / software.

Reporting

The Howard County Public School System publishes the enrollment projections in the Feasibility Study presented to the Board of Education in June of each year. This study also presents capital planning options and redistricting scenarios.

Recommendation

It would be beneficial to provide a separate, stand alone enrollment projections report for review which clearly illustrate methodology, data used in the analysis and development of enrollment projections, as well as enrollment projections by school, by grade and System-wide, by grade. An overview of the accuracy of the previous enrollment projections should be provided. Any areas of concern should be addressed with an explanation of how they were remedied for the current enrollment projections.

The enrollment projections should include clear tables and graphs outlining all data used in the development of the enrollment projections. These data sets include, but are not limited to:

- Historical enrollment, by school, by grade
- Historical enrollment, System-wide, by grade
- Comparison and accuracy of previous enrollment projections, by grade, by school; and System-wide, by grade
- Live birth counts by elementary school boundary and County-wide
- Housing information to the level of detail analyzed in the development of the enrollment projections
- U.S. Census data
- Available maps illustrating historical and / or projected growth throughout the County
- Projected enrollment, by school, by grade
- Projected enrollment, System-wide, by grade

It should be noted that enrollment projections are both a science and an art. The science is knowing which information to gather and how to use the forecasting methodologies. The art is in analyzing output and knowing when and how to use the information. For example, not all data used in the development of enrollment projections is included in a formula (science), but may be used in the determination of projection ratios and methodologies (art).

Conclusion

DeJONG-RICHTER is pleased to have had the opportunity to provide the Howard County Public School System with this planning process study. We hope this document will provide the necessary information to make informed decisions about the future of the Howard County Public School System.