Montgomery County Public Schools

Districtwide Boundary Analysis

WXY

Final Report

Public Engagement associates

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Districtwide Boundary Analysis Final Report

Commissioned by
Montgomery County Public Schools

Prepared by
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Public Engagement Associates

Authors & Acknowledgments

The Districtwide Boundary Analysis interim report was developed by WXY architecture + urban design, in collaboration with Public Engagement Associates. The report is based on data and geographic analysis, independent research, data collected via survey on the Interactive Boundary Analysis website, and areawide and targeted public meetings, conducted virtually. The report was produced in partnership with Montgomery County Public Schools.

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Abbreviations

BOE	Board of Education
COSA	Change of School Assignment
COVID-19	Coronavirus Disease 2019
DCC	Downcounty Consortium
ES	Elementary School
ESOL	English for Speakers of Other Languages
HS	High School
IBE	Interactive Boundary Explorer
FRL	Free and Reduced-price Lunch
FARMS	Free and Reduced-price Meals System
LMI	Low-to-moderate Income
MI	Miles
MCPS	Montgomery County Public Schools
MCR	Montgomery County Regional SGA
MS	Middle School
MSMC	Middle School Magnet Consortium
M-NCPPC	Maryland-National Capital Park and Planning Commission
NEC	Northeast Consortium
NSLP	National School Lunch Program
PEA	Public Engagement Associates
PP	Percentage points
PSCP	Public School Construction Program
SMOB	Student Member of the Board of Education

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Report Overview

The Districtwide Boundary Analysis seeks to understand the degree to which current school boundaries in Montgomery County further MCPS's objectives to facilitate equitable and optimal outcomes in facility use, student diversity within schools, student proximity to schools, and stability of student assignments. The study furthers MCPS's engagement efforts from Spring 2019 and continues to involve community members to understand the spectrum of challenges towards creating more meaningfully integrated, diverse, accessible, and culturally responsive schools within the district.

This report builds off of the analysis and engagement conducted during Phase 1 of the Districtwide Boundary Analysis, which is documented in the **Interim Report** published in March 2020.

The Districtwide Boundary Analysis

In light of increasing enrollment and demographic shifts in recent years, the MCPS Board of Education (BOE) adopted a resolution in January 2019 directing the Superintendent to review existing school boundaries.[1] Following a period of public engagement led by MCPS in the spring of 2019, the Districtwide Boundary Analysis began in the fall of 2019, led by the WXY consultant team.

The need for this analysis is underpinned by changing conditions in the school system and the county. Some of the key reasons MCPS initiated this study include:

- **Overcrowded schools:** Over half of all MCPS schools are overutilized, meaning student enrollment exceeds program capacity. Enrollment is expected to continue to increase in coming years.
- **Changing demographics:** MCPS's student body as a whole is increasingly diverse. The school system has seen an increase in the proportion of Hispanic, Asian American, and African American students in the last 20 years. However, neither racial nor socio-economic diversity are evenly distributed across the district.
- **Challenges related to school proximity:** Variations in geography and transportation networks across the county foster complex conditions with regard to school proximity. Excluding enrollment in magnet schools and choice programs, approximately 45% of students districtwide do not attend the school closest to them.
- **Shifting programming needs:** As demographics change and total enrollment grows, the district's programmatic needs also change. For example, increasing enrollment of students whose first language is not English raises the need for ESOL (English for Speakers of Other Languages) programming. Other impacted programs include Special Education, Pre-K/Head Start, and Class-size Reduction (CSR) elementary schools.

Guided by the four factors—referred to as lenses throughout this report— outlined in Policy FAA (utilization, diversity, proximity, and assignment stability), this analysis has sought to provide the BOE with insights and findings to address these and other challenges in future planning related to school boundaries in MCPS.

1 Note: after an upward trend since the 2007-2008 school year, enrollment declined for the 2020-2021 school year due to COVID-19.

Phase 1 Overview

Spanning fall 2019 through spring 2020, Phase 1 included data analysis, benchmarking, and public engagement, and culminated in March 2020 with the publishing of the Districtwide Boundary Analysis Interim Report. Over 2,200 community members took part in a combination of area-wide public meetings, small group meetings with underrepresented groups, and stakeholder interviews.

A broad range of insights emerged from the Phase 1 analysis, including:

- Each school level presents unique challenges and opportunities in terms of school boundaries. MCPS middle schools have particular challenges with student proximity, high schools are projected to face dramatic overutilization by 2026, and elementary schools present the most disparity within the four lenses of analysis.
- Geography (including population density and proximity to key traffic corridors like Interstate 270) is an essential component of school boundaries with impacts on a variety of metrics throughout the MCPS District.
- The district's two consortia present unique planning considerations, including high rates of racial and socio-economic dissimilarity in the Downcounty Consortium (DCC), and greater challenges with proximity within the Northeast Consortium (NEC).[1]
- The shape and structure of attendance areas in MCPS play important roles in the consideration of school boundaries. For example, Cluster boundaries may contribute to racial and socio-economic isolation, and island assignments tend to decrease racial/socio-economic isolation while increasing distances traveled to school.

Additionally, through benchmarking, the analysis compared MCPS to six other districts across the country: Charlotte-Mecklenburg Schools (CMS), Duval County Public Schools (DCPS), Fairfax County Public Schools (FCPS), Gwinnett County Public Schools (GCPS), Houston Independent School District (HISD), and Wake County Public Schools (WCPS).

Many insights also came out of Phase 1 Engagement, which have informed our approach to engagement and analysis during Phase 2. These include:

- There were conflicting views about the importance of this study, and the priorities MCPS should follow in adjusting school boundaries in the future.

1 Dissimilarity is a statistical measure of how unlike a school is from a group of its peers (i.e. 3 closest schools). Dissimilarity is expressed as a value between 0 and 1 – where 1 is the most dissimilar. For a full explanation of dissimilarity and its use in this analysis, please see the Interim Report (page 136, 207).

- Due to challenges reaching underrepresented groups, broader engagement insights are not fully reflective of the demographics of the district. Small group meetings to engage underrepresented communities often resulted in quite different priorities or key themes than those raised in areawide public meetings.
- One recurring theme across the community engagement process was the importance of proximity to schools. Many parents' emphasis on this lens has informed the modeling approach in the Phase 2 analysis which limits the modeling to analyzing only boundary changes based on contiguous school zones and does not model new island assignments.
- There were conflicting views on the role diversity should play in school boundaries, as well as a range of assumptions about the trade-offs between diversity, proximity, and assignment stability. These interrelationships were further explored during Phase 2 analysis.

For a full summary of the insights from Phase 1 analysis and community engagement, please see the Phase 1 Overview of Insights. Readers are encouraged to browse the insights from Phase 1 for context to complement their understanding of this report.

Participants in a table discussion at a regional public meeting at Gaithersburg High School on December 4, 2019 (photo credit: Rodrick Campbell)

Phase 2 Overview

Phase 2 of the Boundary Analysis builds off the analysis and engagement conducted during Phase 1.

Analysis

The analysis of each of the four lenses during Phase 1, paired with insights gained through public engagement and guidance from MCPS, informed our approach to analysis in this phase. Building off the individual analysis of each of the four lenses during Phase 1, this phase focuses on the intersections between utilization, diversity, proximity, and student assignment stability.

To understand these interrelationships, we built models that test the impacts of balancing utilization, diversity, and proximity by simulating hypothetical school boundaries. The models help us understand and attach impact estimates to questions like:

- What kinds of improvements are possible to achieve (within certain parameters)?
- Can MCPS improve multiple factors at once (e.g. reduce distance to school and improve utilization; or improve utilization while reducing socio-economic and racial dissimilarity between nearby schools)?
- How many students would be impacted through boundary changes while making these improvements?

Using models as tools to analyze these questions, we can better estimate the effects between utilization, assignment stability, proximity, and diversity measures in MCPS. The five models examined in this report are:

- **Utilization A:** Improving Utilization Within Existing Cluster Boundaries
- **Utilization B:** Improving Utilization Between Neighboring Schools (does not adhere to existing cluster boundaries)
- **Diversity:** Calibrating Demographic Dissimilarities While Reducing Utilization
- **Proximity A:** Prioritizing Distances to School While Reducing Utilization
- **Proximity B:** Optimizing Distance to School Then Calibrating Utilization

The models demonstrate that it is possible to produce boundary plans that result in improvements to multiple critical indicators while maintaining existing proximity to school, and current assignment policies, and programs.

Section 2: School Boundary Models outlines our methodology, explains in depth what a model is and how it works, and shares key findings from this analysis.

Engagement

The Phase 2 Engagement process was shaped both by public input during Phase 1 and the constraints of the COVID-19 pandemic. At the center of the process was the Interactive Boundary Explorer (IBE), an online platform allowing users to learn about the Boundary Analysis and its key lenses, and explore the data themselves through maps, tables, and other data visualizations. The IBE was used as a catalyst for virtual engagement, and as a tool for collecting public input directly through a survey on the website.

Many participants during Phase 1 engagement stressed the importance of data access and transparency in this process. Some requested the ability to interact with the data themselves in order to pair higher-level district trends shared in our Phase 1 analysis with concrete statistics about their schools and other schools in the district. In response to this, the IBE was modified to allow users to easily look up the statistics for any school in the district, and then compare those statistics to Cluster and districtwide averages; and to integrate data layers used in the Districtwide Boundary Analysis, so that stakeholders can test their own assumptions about current boundaries in MCPS and relate their lived experiences to the data.

In addition to ongoing engagement with the IBE by individual users, the Phase 2 engagement process included:

- Two public webinars (October 20 and 22)
- One areawide virtual community discussion (October 28)
- Five small group meetings with underrepresented groups
- Student engagement: three short engagements, and two virtual discussion events

The COVID-19 pandemic posed both constraints and challenges during this phase of engagement. The virtual nature of the interactive tool lent itself to engaging participants safely and without physical contact. It was developed to provide a more robust set of resources and a survey instrument so that it could exist as a self-contained engagement platform, rather than a tool designed for use in live meetings with the support of a facilitator. Features were added such as help videos, guided exercises, and a digital survey for collecting user input.

While the design of the interactive tool could be adapted for the constraints of promoting health and safety amid COVID-19, the pandemic presented challenges to the dissemination of the tool and the engagement of underrepresented groups. This engagement process presented barriers for community members with less access to technology, and/or less comfort with or skills to navigate data and engage in online platforms.

Some community groups who we partnered with as part of the targeted engagement process in Phase 1 reported that the residents they work with (including low-income families, immigrant communities, and racial minorities) were overwhelmed with the many challenges and stressors of COVID-19, including virtual learning and the reopening of schools. This likely contributed to low turnout at small group sessions targeted toward these groups during this phase.

The survey data from the IBE provides an interesting set of insights about participants' priorities related to school boundaries, and their insights about where exist the greatest challenges and opportunities to improve boundaries. The IBE resources were well-utilized: thousands of users watched help videos on the website, over 700 attended or watched webinar orientations to the tool, and we received over 2,100 survey responses, as of December 1. However, survey data show that tool users were not fully representative of the county's population. Approximately 54% of respondents reside in the southwest region of the county (Bethesda, Chevy Chase, and Potomac), 40% identify as White/Caucasian (another 29% chose not to identify their race), and the great majority of respondents were parents of past, present, or future MCPS students (64%).

Despite challenges with recruitment, this process of engagement yielded many interesting insights, including comments from areawide and small group discussion-based events, and the input of over 400 student participants who took part in virtual student engagement activities and provided feedback through a combination of virtual discussions and the IBE surveys.

An overview of engagement activities and insights can be found in **Section 3: Community Engagement.**

Key Findings: Analysis

Outlined below is a set of key findings that emerged from the five models analyzed in the Districtwide Boundary Analysis. These findings, and the assumptions that shaped the models, are explored in further detail in Section 2 of this report: **School Boundary Models**.

1. Significant improvements to utilization are possible by making targeted boundary changes across the district.

- These improvements are achievable while redistricting fewer than 10% of students, a benchmark for large-scale redistricting plans. *(See Modeling Approach, page 29*). Model 2 (Utilization B) is able to completely eliminate underutilized schools and highly overutilized schools.
- The CIP identifies thresholds for addressing overutilization, based on number of students enrolled in excess of a school's capacity. Models 1-4 all find boundary plans that reduce the number of schools requiring capital action if 7.5-10% of students are redistricted. Models 2-4 eliminate the need for capital action in all middle and high schools. The analysis in the Interim Report showed that based on 2019-2020 data, three middle schools and eight high schools required capital action based on MCPS metrics. These improvements are summarized in the appendix on page 166.
- In Models 1-4, these utilization benefits are possible by increasing average distances to school by a maximum of an eighth of a mile for elementary and middle schools, and less than a quarter of a mile for high schools. For most models, the change in distances is far less, close to zero.
- No models had negative impacts on school diversity. In fact, most models were able to make the demographics of the most socioeconomically and racially isolated schools more similar to their three nearest neighboring schools by about one to two or more percentage points on average, a modest improvement.

2. Cluster boundaries are an impediment to addressing capacity challenges, especially in the most overcrowded schools.

- When Cluster boundaries are maintained (Model 2. Utilization B), the share of elementary schools that are either highly overutilized or underutilized is 6%, compared to zero when Cluster boundaries are removed. The figure is 8% for middle schools and 4% for high schools.
- Both utilization models have nearly identical impacts to distances to school, suggesting that Cluster boundaries do not help maintain short distances to school. In fact, Model 4 (Proximity A) suggests that existing cluster boundaries may be an impediment to distances to school.

3. It is possible to improve school utilization and diversity at the same time when adjusting boundaries between neighboring schools.

- Model 3 (Diversity) is able to make the demographics of the most socioeconomically and racially isolated schools, representing about two in five schools, more similar to their three nearest neighboring schools by about two to four percentage points on average.
- This benefit can be achieved while also increasing the number of elementary schools in the target utilization range from only 32% of schools to 43% of schools. At the middle and high school levels, Model 3 is able to completely remove underutilized and highly overutilized schools.
- These benefits are achieved when rezoning between 7.5 and 10% of students and with modest impacts to distance to school. On average, distances to school in Model 3 (Diversity) increased by an eighth of a mile for elementary schools, a tenth of a mile for middle schools, and a quarter mile for high schools.

4. Based on the results of all five models, it is challenging to improve distances to school while improving other metrics, particularly utilization. Across school levels, we observe minimal increases to the districtwide average distance to school up to a quarter mile, though generally increases to the districtwide average were less than an eighth of a mile. This suggests that existing school boundaries may be minimizing distances to school at the expense of other lenses.

- Significant improvements to utilization and diversity metrics are possible while only slightly increasing average distances to school. These improvements can be achieved between adjacent schools without reliance on any new island assignments and without increased reliance on district transportation.
- While localized decreases in distance to school are possible, at the district scale, the average distance to school increases slightly or stays the same across almost all model runs. This is in part due to the objective of rezoning fewer than 10% of students across any model run.
- There is insufficient capacity to allow for each student to attend their closest school. Rezoning all students to their closest school would result in approximately 18.6% of elementary students being rezoned, 25.0% of middle school students being rezoned, and 23.8% of high school students being rezoned (Model 5. Proximity B). Even after rezoning this large quantity of students, minimal improvements to both utilization and proximity across the district are only possible at the middle school level.

5. Based on the analysis of benefits and impacts to diversity metrics across all five models, existing middle and high school boundaries create more demographic disparities than boundaries based on distance alone. At these school levels, there exist opportunities to improve distances to school while improving diversity metrics, though at the expense of assignment stability.

- Model 5 (Proximity B) examines the effects of redrawing school boundaries based only on distance, with the exception of island assignments which are preserved in part. When this change is made, the socioeconomic and racial dissimilarity of schools compared to their neighboring schools decreases by 4-6 percentage points for the most isolated middle and high schools.
- These improvements to diversity metrics at the middle and high school levels are larger than those achieved by Model 3 (Diversity), which explicity prioritizes diversity metrics. Model 3 found improvements of 2 and 3 percentage points on average for the most isolated middle and high schools, respectively.
- Significantly, Model 5 (Proximity B) has significant negative impacts to utilization and assignment stability. As such, the model is not likely the best choice to pursue. However, the model does highlight the existence of opportunities to improve distance to school while improving diversity metrics.

6. Based on the analysis of Models 1-4, changes at a comprehensive, districtwide scale can achieve much greater improvements than small localized changes.

- Since 2012, up to 2.5% of students per school level have been redistricted in any given year. Most years between 2012 and today, fewer than 1% of students are redistricted. While desirable from the perspective of assignment stability, this incremental and localized approach may not be able to adequately respond to rapid shifts in enrollment and considerable utilization challenges.
- Models 1-4 produce hypothetical boundary plans that address challenges across the district and show significant opportunity to improve utilization, while redistricting no more than 10% of students.

Comparing the Models

Table 1 summarizes the key statistics that emerged from the five models analyzed in the Districtwide Boundary Analysis.

Table 1 — Model Benefits and Impacts

Model	Utilization	Diversity	Proximity	Assignment Stability
1. Utilization A	**✚ Moderately better** School utilization range • ES: 80-130% • MS: 74-120% • HS: 82-122%	**⭘ Minimal change** Racial dissimilarity change of most isolated schools • ES: -2 pp • MS: No change • HS: No change	**⭘ Minimal change** Change in average distance to school • ES: +1/10 mi • MS: No change • HS: No change	**∽ Moderately worse** Up to 10% change across school levels
2. Utilization B	**★ Significantly better** School utilization range • ES: 82-119% • MS: 92-103% • HS: 100-106%	**⭘ Minimal change** Racial dissimilarity change of most isolated schools • ES: -1 pp • MS: -1 pp • HS: -1 pp	**⭘ Minimal change** Change in average distance to school • ES: +1/16 mi • MS: No change • HS: No change	**∽ Moderately worse** Up to 10% change across school levels
3. Diversity	**★ Significantly better** School utilization range • ES: 80-120% • MS: 89-106% • HS: 97-108%	**★ Significantly better** Racial dissimilarity change of most isolated schools • ES: -4 pp • MS: -2 pp • HS: -3 pp	**∽ Moderately worse** Change in average distance to school • ES: +1/8 mi • MS: +1/10 mi • HS: +1/4 mi	**∽ Moderately worse** Up to 10% change across school levels
4. Proximity A	**★ Significantly better** School utilization range • ES: 90-120% • MS: 94-108% • HS: 99-107%	**✚ Moderately better** Racial dissimilarity change of most isolated schools • ES: -2 pp • MS: -2 pp • HS: -1 pp	**⭘ Minimal change** Change in average distance to school • ES: +1/10 mi • MS: +1/32 mi • HS: +1/10 mi	**∽ Moderately worse** Up to 10% change across school levels
5. Proximity B	**━ Significantly worse** School utilization range • ES: 46-158% • MS: 76-120% • HS: 61-142%	**★ Significantly better** Racial dissimilarity change of most isolated schools • ES: -2 pp • MS: -5 pp • HS: -4 pp	**✚ Moderately better** Change in average distance to school • ES: -1/32 mi • MS: -1/8 mi • HS: -1/4 mi	**━ Significantly worse** Assignment change varies by school level • ES: 17-18% • MS: 23-24% • HS: 22-23%

pp = percentage points

We use five descriptive categories to compare the models:

1. ★ **Significantly better**
2. ✚ **Moderately better**
3. ⭘ **Minimal change**
4. ∽ **Moderately worse**
5. ━ **Significantly worse**

These categories should be understood as relative to existing conditions and the other models' results, rather than as judgements on the importance of the lenses. We do not weigh whether one lens is more important than another and the model comparison table is not presented here nor intended as a scoring matrix.

Key Findings: Engagement

Outlined below is a set of key findings that emerged from engagement activities during Phase 1 and Phase 2 .These findings are explored in further detail in Section 3 of this report: **Community Engagement**.

1. Access to data and transparency are strongly valued by participants.

- During Phase 1, requests for greater access to the data used in this analysis and suggestions to create an interactive online tool informed our development of the Interactive Boundary Explorer (IBE).
- Digital and data tools (and the constraints of COVID-19) present challenges to reaching underrepresented groups, including mobile compatibility, data literacy/comfort, and a lack of localized engagement.

2. Underrepresented groups are challenging to reach in MCPS, and their priorities may vary from more highly represented groups.

- The majority of participants in areawide meetings and the IBE survey were White, residents of the Southwest of the district, and parents of MCPS students.
- Targeted engagement showed key differences in priorities among underrepresented groups (i.e. Latino/a communities, immigrant groups, African American, low- and moderate-income families, and those living in less represented regions of the county).
- Key differences in underrepresented groups include greater support for the regular review of school boundaries, a greater emphasis on the impacts of over- and underutilization, and greater emphasis on the importance of diversity.[1]
- MCPS should conduct further targeted engagement in boundary planning, keeping in mind that broader areawide engagement may leave out the perspectives of large groups of stakeholders.

1 See Phase 1 Engagement Addendum Report for detailed comments and themes from small group meetings in Phase 1.

3. Proximity and assignment stability are the highest priorities for the majority of Phase 2 participants. The models presented in this report suggest that it is difficult to improve proximity to school while adhering to reasonable parameters for assignment stability.

- 87% of respondents to the IBE survey rate proximity to schools as "extremely important." Assignment stability is another priority for survey respondents, with approximately 82% rating minimizing the number of students impacted by boundary changes as "extremely important" *(see full survey results starting on page 99).*
- The models in this report suggest a strong trade-off between assignment stability and improving proximity: decreasing distances to school districtwide is not possible without rezoning a sizable amount of students (approximately 20%).

4. Many participants associate improved diversity outcomes with large increases in distance traveled to school. The models presented in this report suggest it is possible to improve diversity between nearby schools, without significant impacts to proximity.

- Among IBE survey respondents--40% of whom identify as White and 54% of whom reside in the Southwest of the county--diversity was the only measure that a significant proportion of respondents rated "very unimportant" (about 36%). Comments throughout engagement and other trends within the survey suggest this may relate in part to a perceived trade-off with proximity and assignment stability *(see full survey results starting on page 99).*
- The models in this report indicate that improvements to utilization and diversity can be made without major impacts to existing proximity and within reasonable parameters for student assignment stability.
- Notably, Model 3 suggests that diversity and utilization can be improved together, with minimal increases in distance traveled to school.

5. Student engagement revealed the importance of student voice in school boundary planning in MCPS, and elicited key findings about students' priorities and experiences.

- Student engagement was emphasized as a central part of Phase 2 engagement, with many students and student groups expressing a strong desire in Phase 1 and Phase 2 to participate in this process, and have their perspectives taken into account.
- Student discussion at virtual discussion events revealed a unique set of themes as compared to broader engagement in this process, including an emphasis on disparities between nearby schools and across the district and a greater emphasis on utilization and diversity as priorities.
- Students offered many insights about the unique challenges and opportunities at each school level, highlighting the ES level often as the level with the greatest challenges related to utilization and diversity, and the level where these lenses are particularly important. At the MS and HS level, students emphasized challenges with proximity, which can especially impact students living farther from school with fewer resources.

6. IBE survey results suggest key differences in priorities across the district's geographic regions.

- The priorities of respondents in the Southeast (Colesville, Fairland, and Burtonsville) and South (Silver Spring, Takoma Park, Wheaton, and White Oak) tended to vary the most from those in other regions, with a higher proportion of respondents rating "Balance diversity among nearby schools" as important or extremely important than the district as a whole, fewer rating proximity priorities as extremely important, and a greater proportion emphasizing utilization as important.
- Of survey results to date, region appears to be a greater factor in respondents' priorities than other demographic factors including race/ethnicity and role/relationship to MCPS.
- Given the relatively small sample size of respondents residing in areas outside of the Southwest, further research and outreach is recommended to understand variations in community priorities throughout the district.

2. School Boundary Models

Introduction

This section explores the benefits and impacts of changing school attendance area boundaries. We provide numerical estimates for questions like:

- What improvements to school utilization can be achieved?
- What are the impacts on students of changing attendance area boundaries? How many students would change base schools and where?
- Can we improve school utilization while improving student distances to school?
- Can we improve utilization while reducing socioeconomic and racial dissimilarities between adjacent schools?

To do this, we have built five models that can generate thousands of different school boundary maps. None of these maps will be presented in this report or to MCPS. By analyzing these school boundary maps, we can estimate impacts to utilization, proximity, diversity, and assignment stability.

What is presented in the following pages are aggregated statistics, calculated based on many maps and not any one boundary plan. This is an important distinction: this analysis is not a school boundary proposal but rather a set of findings based on examination of models developed following our Phase 1 analysis and engagement. **This provides a framework for understanding what may be possible through a comprehensive districtwide boundary plan.**

Key Definitions

Three "Lenses"

The Interim Report, released in March 2020, examined MCPS schools through three primary lenses, utilization, diversity, and proximity.

Utilization

Diversity

Proximity

The Interim Report did not, however, address the relationships between these lenses. This report tests five models, each with different emphases, that produce results that show how the lenses interrelate and reveal the differing impacts on the lenses. As such, this report addresses questions critically important to MCPS's boundary planning efforts: How are utilization and diversity related? How are utilization and proximity related? Can we improve multiple lenses at once?

Assignment Stability

Improving any of the key lenses above – utilization, diversity, proximity – requires changing school boundaries. As such, achieving any improvement to one or more of the lenses has a cost in terms of how many students would need to change schools.

In this report, we use the share of students per school level living in a rezoned area as an estimate for the number of students that would change schools in a hypothetical future boundary plan. In practice, because of grandfathering policies which prevent some students from changing schools, the number of students that would change schools is less.

Utilization

School districts across the United States, including MCPS, estimate if their schools are overcrowded, adequately used, or have too few students, using a measure called Facility Utilization. MCPS calculates Facility Utilization – or utilization for short – by dividing the total number of students at a school by that school's estimated capacity. MCPS uses a sophisticated formula for calculating school capacities defined by the Maryland State PSCP Administrative Regulations, Long-range Educational Facilities Planning Policy (FAA), Long-range Educational Facilities Planning Regulation (FAA-RA), and Capital Improvements Program/Master Plan (CIP).

Utilization is an important measure for MCPS in order to maintain reasonable class sizes and accommodate growth. To these ends, MCPS aims for schools to be utilized between 80% and 100% of school capacity. MCPS categorizes schools in four groups to examine school utilizations at a glance, as below. For more information on utilization, please see pages 98-102 of the Interim Report.

- **Within the target range:** 80-100% utilization
- **Underutilized:** <80% utilization
- **Somewhat overutilized:** 100-120% utilization
- **Highly overutilized**: >120% utilization

Dissimilarity

Throughout this report, we will use a measure called the dissimilarity index. The dissimilarity index allows us to look at how different the overall demographic make-up of one school is to another school, or to a shared standard (such as a cluster or districtwide average). On the most basic level, high dissimilarity shows a greater difference between the two things being compared. A low dissimilarity shows a lesser difference between the two things being compared. For a full definition of dissimilarity, please see pages 209 and 210 of the Interim Report.

Articulation Patterns

Most MCPS students attend the school they are assigned, based on their residential address and the school district's attendance areas. This school is referred to as the student's base school, or home school.

MCPS uses a feeder system. From their elementary school, most students "articulate" to the same middle school as their elementary school classmates, and the same high school as their middle school classmates. This pattern, from elementary to middle to high school is called an articulation pattern. 26 elementary schools and six middle schools in the county have "split articulations." In these cases, students at an elementary school or middle school do not all attend the same secondary school. Together, MCPS's system of school attendance areas create an articulation pattern from kindergarten to 12th grade for every student.

Island Assignments

While school assignment areas generally consist of geographically contiguous (or uninterrupted) areas, MCPS also contains "island assignments." An island assignment is a geographically non-contiguous school attendance area. MCPS has drawn non-contiguous school attendance areas for a variety of reasons over the course of its history. Recent boundary studies have striven to minimize island

assignments and create contiguous boundaries. However, a significant number of schools in MCPS have non-contiguous school attendance areas. As of the start of the 2019-2020 school year, 58 MCPS schools have non-contiguous school attendance areas, or island assignments. This equates to about 29% of schools. For more definitions relating to MCPS school assignment mechanisms, please reference the Interim Report pages 46 to 49.

Capital Action Threshold

The CIP identifies thresholds for addressing overutilization, based on number of students enrolled in excess of a school's capacity. This threshold is one way to understand how imbalances in utilization affect the school system.

When an elementary school is more than 92 students overutilized, the school is considered for an addition. The threshold for middle schools is 150 students. For high schools, the threshold is 200 students.

Capital Action Thresholds are described in more depth on page 116-117 of the Interim Report.

Modeling Approach

What is a model?

A model is a set of mathematical operations that transforms some input data into something new. In this case, our models transform MCPS's current school boundaries into a new set of school boundaries. In this section we explore five models that do this, all in slightly different ways in order to target different criteria.

Many models are set up to minimize a specific metric. Some try to minimize this metric as much as possible, whereas others try only to meet a certain target threshold for the metric before stopping. All five of the models we explore are set up this way. Each, in slightly different ways, tries to minimize the utilizations of MCPS schools. These models are described in greater detail in the following pages.

"Running" the Model, Model "Runs"

The five models presented in this section are designed to start in one place and stop in another. This process of starting then stopping the model is called "running" the model. Each time a model is "run" it will produce an output, also called a "run." We run each these models many times thereby creating a large batch of "runs," as described below.

Five Models, Thousands of Runs

Some models are designed to take different data and apply the same mathematical steps every time. If you put the same data into a model like this, the model would produce exactly the same outputs. The five models presented in this section are *not* designed this way. Instead, they are designed to be run more than once – the more times the better. Each of our models uses randomness to generate slightly different outputs every time the model is run, even when the input data is the same.

This analysis is interested in exploring what MCPS could theoretically do with today's boundaries as a starting point. No model starts from scratch. As such, we have designed models that all start from the same point, but explore thousands of different paths to see what is possible. The number of boundary maps that MCPS could implement is so vast that introducing even a little randomness into the models allows them to explore many possibilities if they are run many times over.

We have designed these models in this way in order to probe the central question of this analysis: what are the impacts of changing attendance area boundaries, in terms of utilization, proximity to schools, diversity, and students assignment stability?

Model Sensitivity

Each time we run these five models, we are using the same data as inputs. However, since we are interested in exploring many possible boundary plans, each model run will aim for a more or less ambitious target. Some model runs will target marginal improvements to utilization, while others seek to make substantial improvements. As such, our modeling approach is sensitive to the relationships between the utilization, diversity, and proximity.

How did we select our five models?

Two Utilization Models

1. **Utilization A**: Improving Utilization Within Existing Cluster Boundaries
2. **Utilization B**: Improving Utilization Between Neighboring Schools

The first two models have utilization as their primary focus. Based on the Interim Report (see Section 2.2.C starting page 123 of the Interim Report), we found clear impacts of Cluster boundaries on school utilization. Therefore, we felt it critical to include one model using current Cluster boundaries and one that looked at the potential effects of removing those Cluster boundaries. The model that uses the existing Cluster boundaries is the Utilization A Model; the Utilization B Model is the same as the Utilization A Model but does not use Cluster boundaries.

Though we examine the effects of changing Cluster boundaries, it is important to understand that the results at each school level are independent of one another. Hypothetically, if a boundary plan at the elementary school level were implemented based on the Utilization B Model, this would not mean that a boundary plan would need to be implemented at the middle or high school level using the same model. In this hypothetical, some elementary schools may have students go to multiple different middle or high schools where previously they only would go to one middle or high school, but any resident of an existing Cluster would not live in a new Cluster.

A Diversity Model

3. **Diversity**: Calibrating Demographic Dissimilarities While Improving Utilization

The third model has utilization as its primary focus, but seeks to make improvements to diversity as well. The Interim Report highlighted large socioeconomic and racial dissimilarities between neighboring schools. Further, in the community engagement conducted as part of this work we heard both skepticism of and support of reducing demographic dissimilarities between schools. To investigate these claims and the potential to reduce demographic isolation in the district, we felt it critical to examine the potential to simultaneously improve utilization and diversity.

While demographic disparities exist between MCPS schools, our benchmarking analysis in the Interim Report revealed that MCPS is relatively more socioeconomically and racially integrated than many peer school districts. As such, we have designed this model to focus on the most demographically isolated schools in MCPS.

Due to the constraints posed by Clusters on diversity analyzed in the Interim Report, we designed the Diversity Model to remove Cluster boundaries, like the Utilization B Model.

Two Proximity Models

4. **Proximity A**: Prioritizing Distances to School While Improving Utilization
5. **Proximity B:** Optimizing Distance to School Then Calibrating Utilization

The fourth model we study in this report has utilization as its target as well, but seeks to make improvements to proximity, and distances to school in particular. Proximity has been a major focal point for the community in our engagement efforts. As such, we felt is critical to examine the potential improvements to proximity than can be achieved while simultaneously improving utilization.

The Interim Report highlighted that many existing Cluster boundaries have highly irregular shapes, which impact proximity. As a result, we designed the Proximity Model to remove Cluster boundaries, like the Utilization B and Diversity Models.

While the Proximity A Model targets utilization and prioritizes proximity, we have designed a second model that optimizing this lens specifically, the Proximity B Model. The Proximity B Model makes more sweeping changes to school boundaries, and is the only model to consider scenarios that rezone more than 10% of students. We felt it critical to include a model that optimizes proximity, rather than simply prioritizing the lens, due to public appetite for improving distances to school.

What are the models measuring?

Four of five of the models presented in this report have utilization as their critical target. However, each model is designed to have different priorities, optimizing for utilization in different ways. These priorities are detailed in the table below. The utilization models prioritize assignment stability. The diversity and proximity measures prioritize their respective lenses. The fifth model targets proximity and prioritizes utilization. We measure the impacts of each model on all lenses and assignment stability.

Table 2 — Model Targets and Priorities

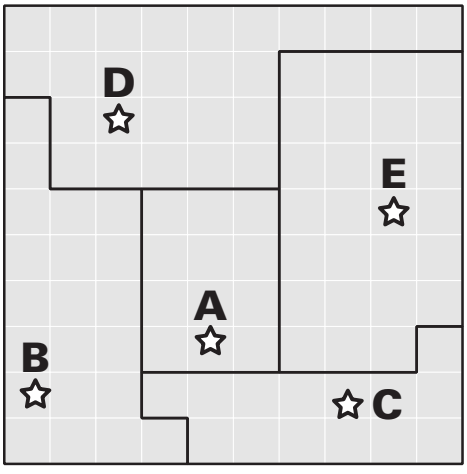
Model	Within Cluster Boundaries	Utilization	Diversity	Proximity	Assignment Stability
1. Utilization A	Yes	Target	Measures Impacts	Measures Impacts	Limit to 10% change
2. Utilization B	No	Target	Measures Impacts	Measures Impacts	Limit to 10% change
3. Diversity	No	Target	Priority	Measures Impacts	Limit to 10% change
4. Proximity A	No	Target	Measures Impacts	Priority	Limit to 10% change
5. Proximity B	No	Target	Measures Impacts	Priority	No limit to change

How do the models work?

Planning Blocks

School attendance areas are made up of small pieces called planning blocks. School planners use these planning blocks to help draw new boundaries and analyze data. In the diagram below, each small gray square is one planning block. In this fictional school district there are five schools, A, B, C, D, and E.

Figure 1 — Planning Blocks

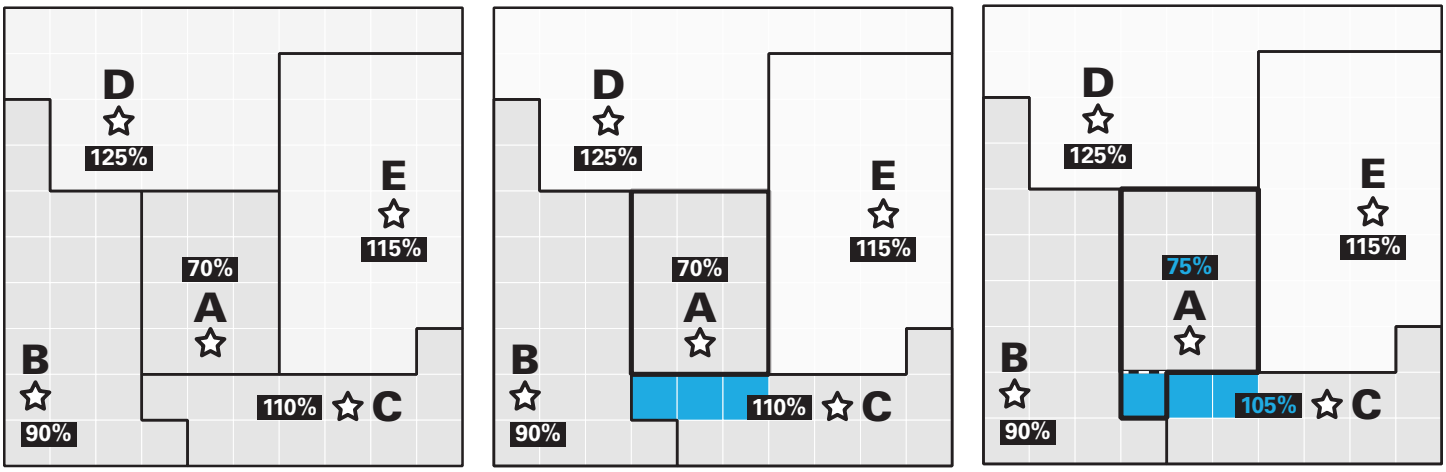


1. Utilization A Model

These five schools are organized into two clusters. One cluster has three schools, A, B, and C. The other has two schools, E and D. Each school has a different utilization, as shown in the black labels.

Let's say we wanted to bring all schools under 110% utilization, if possible. This is our **utilization target**. In this fictional school district three of five schools are already utilized at or below our utilization target. Two of the five are utilized above 110%.

Figure 2 — Utilization A Model Design



Starting in the cluster with schools A, B, and C, we'll select the school that is most over- or under- utilized, relative to the district average utilization of 100%. That school is school A, since its difference in utilization from the district average is 30 percentage points.

If we wanted to make a boundary change between school A and another school, in order to meet the target utilization, we could swap one of the blue planning blocks from C to A, improving both schools' utilizations. The second diagram in the figure above illustrates this situation.

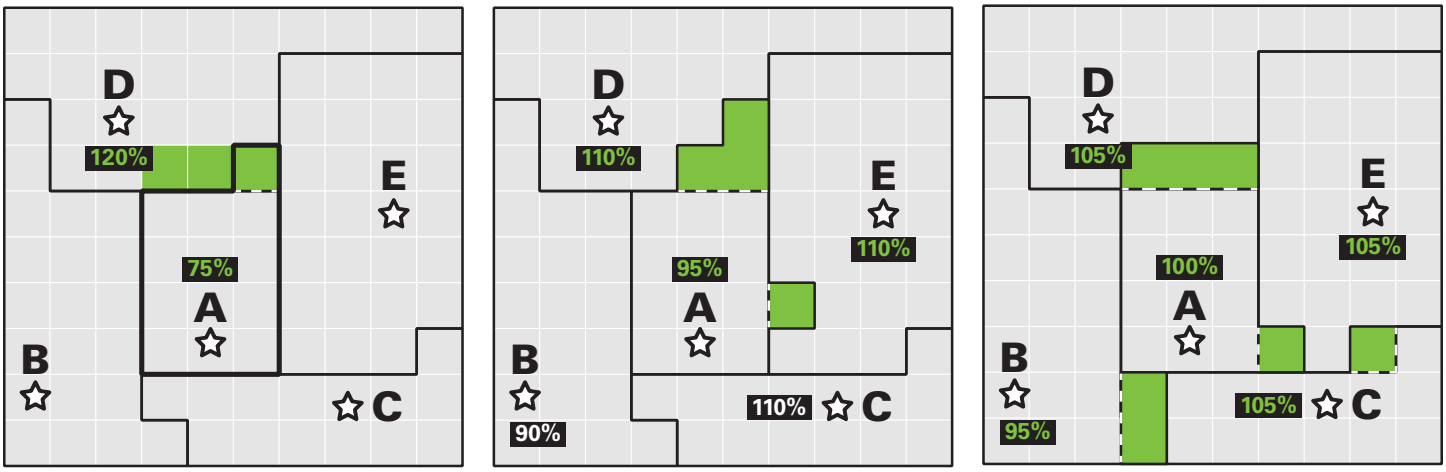
Swapping between School A and C is optimal because they have the largest difference in utilization. The Utilization A Model will choose to make a swap between C and A for this reason, randomly selecting one of the three blue planning blocks to swap. The third diagram in the figure above illustrates this situation, Now, both schools have improved utilizations, shown in blue.

This is how the Utilization A Model works, going cluster by cluster trying to meet a target utilization in all clusters. Note that in the cluster with schools D and E, it will be impossible to achieve this target since both schools have utilizations greater than 110%. In this case, the model will try to improve the utilizations of D and E, but neither will improve beyond the utilization target of 110%.

2. Utilization B Model

The Utilization B Model works the same way as the Utilization A Model, except it ignores cluster boundaries. Now, we could make a swap between D and A. Moving any of the three green planning blocks from school D to A will improve both schools' utilizations. Like the Utilization A Model, the Utilization B Model will randomly swap one of these planning blocks between the schools. Doing so randomly allows the models to explore more possibilities. This is shown in the first diagram in the figure below.

Figure 3 — Utilization B Model Design



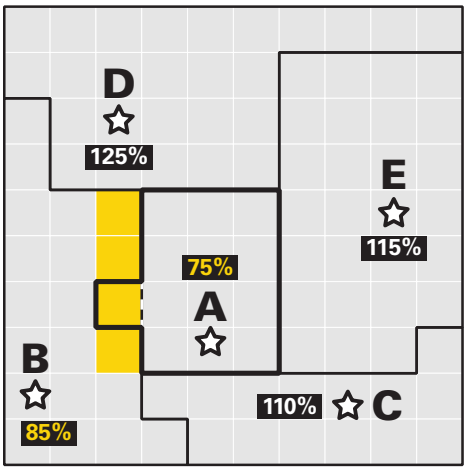
Let's say that we are running the Utilization B Model, with a utilization target of 110%. Each time we run the model, it will arrive at a slightly different solution. The second diagram in the figure above shows one solution in which we swap four planning blocks, redistricting four percent of students. Now, all schools are utilized at or below 110%.

Let's try running the Utilization B Model, with a more ambitious utilization target of 105%. Running the model, we find that this is possible by swapping seven planning blocks, redistricting seven percent of students. Now, all schools are utilized at or below 105%. Choosing a more ambitious utilization target requires redistricting more students.

3. Diversity Model

The Diversity Model works similarly to the Utilization B Model, with one important difference. Let's say our utilization target is 110%. The Diversity Model will start by focusing on School A, since its utilization is the most different from the district average of 100%. But now, instead of swapping a planning block from School D to A, the model will go another direction. That is because the Diversity Model is designed to use FARMS dissimilarity when deciding which school to swap to or from.

Figure 4 — Diversity Model Design



FARMS Rates
- A: 10%
- B: 75%
- C: 60%
- D: 25%
- E: 30%

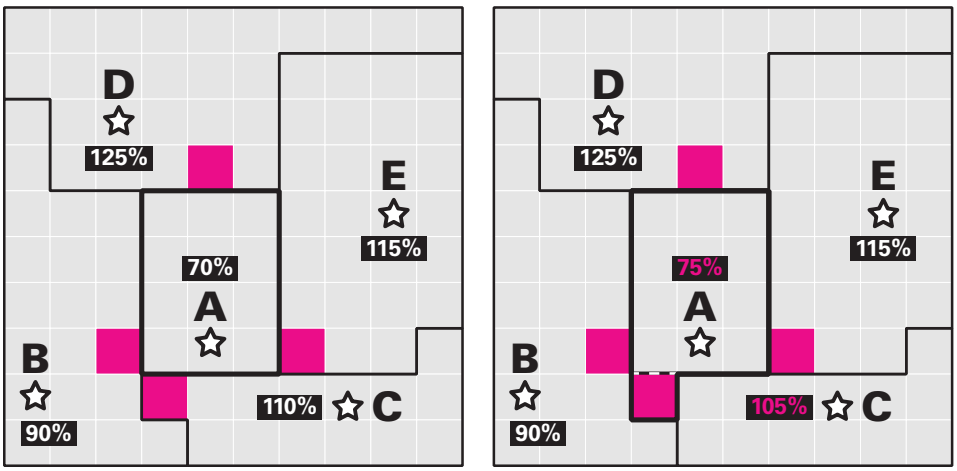
FARMS difference to A:
- B: 65 percentage points (pp)
- C: 50 pp
- D: 15 pp
- E: 20 pp

In this hypothetical, School B has a FARMS rate of 75%, compared to only 10% in School A. This is the largest difference in FARMS rates between A's FARMS rate and any of its neighboring schools in our hypothetical. By swapping a yellow planning block from B to A, we are able to improve A's utilization and dissimilarity to its neighboring schools at the same time.

4. Proximity A Model

The Proximity A Model works similarly to the Utilization B Model, with one important difference. Let's say our utilization target is 110%. The Proximity A Model will start by focusing on School A, since its utilization is the most different from the district average of 100%. But now, instead of swapping a planning block from School D to A, the model will go another direction. That is because the Proximity A Model is designed to randomly select one neighboring school with which to exchange, then select a planning block that results in the best distances to school for both schools.

Figure 5 — Proximity A Model Design



In this hypothetical, swapping one of the pink planning blocks results in the best improvements to distance to school for both schools while improving utilization.

5. Proximity B Model

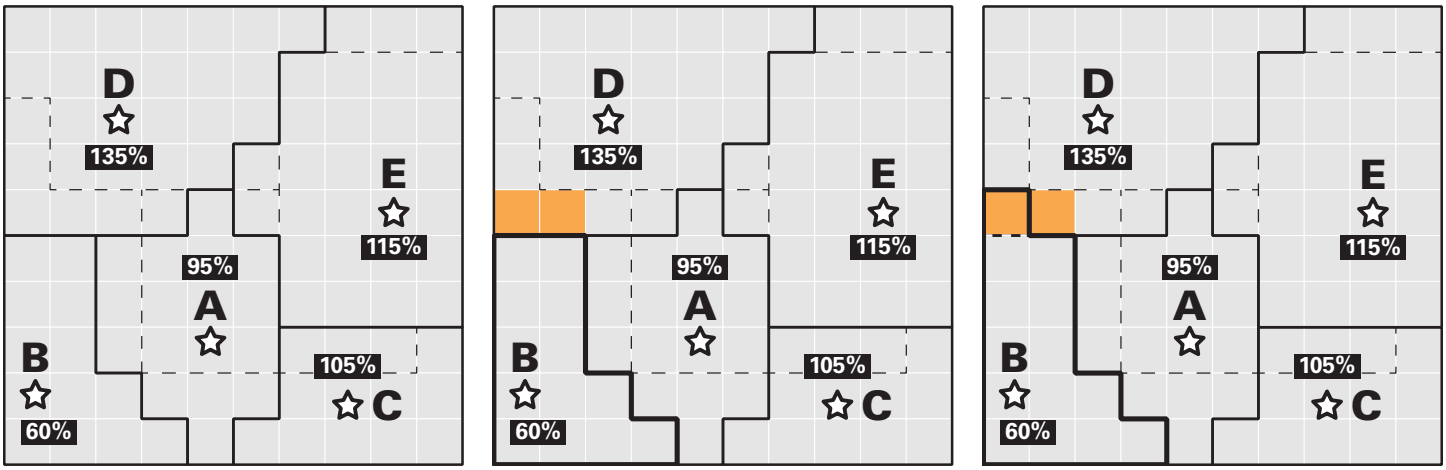
Instead of starting with current boundaries like the other four models, the Proximity B Model takes a more ambitious approach, allowing more than 10% of students to be rezoned to a new base school.

The Proximity A Model opperates in two steps.

Step One

Instead of starting with the current school boundaries, the Proximity B Model starts with boundaries that are optimal for distance to school. These proximity-optimal boundaries are shown in the first diagram in the figure below. The current school boundaries are shown in a dashed line for reference. Of course, this approach changes school's utilizations, as reflected on the diagram.

Figure 6 — Proximity B Model Design



Step Two

From this point, we can run the Utilization B Model starting from the distance-optimized boundaries. Now, School B is furthest from the District utilization average of 100%, so the model will make a boundary change between B and one of its neighbors. In this case, School D has the biggest utilization difference relative to B than any of B's neighbors, so the Proximity Model will swap one of the orange planning blocks from D to B. These steps are shown in the diagrams above.

Why take a districtwide approach to modeling school boundaries?

All five of these models have been designed to make improvements at the scale of the entire district but with a focus on local schools. This means that our models take a slightly different approach than traditional redistricting as implemented by MCPS and are not restricted by cohort stability (with the exception of Model 1).

Instead of making large boundary changes between neighboring schools in a small, predefined area, our models make small boundary changes between neighboring schools in many places across the district. As such, instead of rezoning a large area between two fictional schools, School A and School B, our models might make a small change between School A and School B, then a small change between School B and School C. In this way, our models are able to distribute impacts on students across the district. To achieve this benefit, changes to boundaries must be made at a large geographic scale.

We chose to design these models to work at a districtwide scale, ignoring exiting cluster boundaries and cohort stability, to better understand the opportunities that exist in the district but so far may have not been considered due to these constraints. This design choice was informed by the Interim Report, which suggested that cluster boundaries are a constraint on utiliztion and diversity. As such, Model 1 (Utilization A) – the only model to maintain existing cluster boundaries and cohort stability – provides an important counterpoint to models 2-5 and should be thought of as a baseline approach.

What parameters were put in place to consider modeling boundaries?

Contiguity and Island Assignments

All of the models are based on making incremental boundary changes between contiguous, neighboring school zones. Additionally, none of these models add or remove island assignments, and only expand or reduce the size of island assignments in a small share of model runs. This means that the models do not ever test students traveling across other school zones to get to a school beyond existing island assignments. We acknowledge that a future model or multiple models could test this. We have we taken this approach because the engagement highlighted significant concern around issues of proximity and contiguity of school zones.

Assignment Stability Ceiling of 10%

We established an assignment stability approach that limited student assignment changes to a maximum of 10% of the overall student body. The model impacts are measured based on equal intervals – assignment changes to 2.5%, 5%, 7.5% and 10% of students.

Why have we taken this approach? First, we heard in our engagement that there is little appetite for changes to assignment stability. Second, MCPS's approach in recent years has resulted in a maximum 2.5% of changes to student assignment at any one school level, though generally these efforts are related to a single school opening. Going beyond 10% would require a greater lift than the district has undertaken in recent years. Additional models could test greater than 10% changes to student assignments and achieve greater benefits; four potential models that would do so are described on page 31.

Frozen Areas

In our models, some areas are "frozen," meaning they cannot be reassigned to a different school attendance area. Frozen areas were selected manually. All areas immediately surrounding a school location, and within the school's walk zone, are frozen. Frozen areas are different for each school level.

Freezing areas at the core of each school attendance area prevents the models from exploring nonsensical possibilities, generally keeping the shapes of boundaries similar to their current boundaries. This approach implicitly maximizes assigned stability by design.

Additional Parameters

- Data for School Year 2019-20 used. Current capital planning projects and other boundary changes implemented since 2019 are not factored into the models.
- Paired schools are maintained. Paired schools are treated as having a single shared attendance area boundary, total capacity, and total enrollment.

Potential Alternative Models

The models in this report were designed to only redistrict 10% of students at most and make swaps between neighboring schools only. However, it is possible to push these models further. The following models represent avenues for future research and could shed light on more ambitious boundary planning scenarios.

Optimal Utilization Benefits

The five models presented in this section all are designed to stop before assigning more than 10% of students at any school level to a new base school. This decision is based on the importance of assignment stability emphasized by community members in our engagement. However, there is the opportunity to dramatically improve utilizations by changing boundaries if more than 10% of students are rezoned to a new base school. Future work could explore the extent of this opportunity. What is the optimal utilization benefit achievable only with boundary changes?

Greater Socioeconomic and Racial Integration

The Diversity Model presented in this report seeks first to make improvements to school utilization, improving diversity in the process. A possible avenue for future work would explore the extent to which the diversity lens can be improved if less of an emphasis is placed on proximity and assignment stability.

Proximity and Diversity

All of the models presented in this report either target or prioritize two lenses at most, and utilization is always one of them. What would it look like if instead of focusing on utilization, we targeted two of the other lenses and measured impacts on utilization. One such model might target proximity and diversity at the same time.

Three Target Lenses

As noted above, all of the models presented in this report either target or prioritize two lenses at most. However, it might be possible to target or prioritize three lenses at once. What would it look like if we targeted utilization while prioritizing diversity and proximity all at once? Different parts of the district require balancing multiple priorities. This potential model would establish clear priorities for different planning areas and investigate the countywide benefits of balancing these priorities.

1. Utilization A

Improving Utilization Within Existing Cluster Boundaries

Key Questions

If we optimize utilization within existing Cluster boundaries, where should boundary changes be focused? Which changes are likely to be most impactful and with the fewest changes to assignment stability?

Can we achieve broad improvements to utilization while maintaining Cluster boundaries?

What are the model targets? What is it measuring?

Maximize number of schools near their Cluster-wide utilization average. At the MS and HS levels, where some Clusters have only one school, no models are run. Overutilization is treated the same as under-utilization.

The model explicitly prioritizes swaps between overutilized schools neighboring underutilized schools within the same Cluster. As such, the model minimizes utilization dissimilarity between neighboring schools, though this measure is not explicitly minimized.

Please see the section Modeling Assumptions for more information about this sections modeling approach and assumptions shared across the five models.

What isn't the model measuring?

Though the model does not explicitly target assignment stability, it does try to improve utilization in the fewest number of changes, thereby implicitly considering assignment stability.

We do not target diversity or proximity measures with this model, we simply measure the impacts on these lenses.

Utilization A Findings

After running the Utilization A Model 2,000 times at each school level, we found the following:

1. **Elementary School Utilization**
   By rezoning less than 10% of students, it is possible to reduce the share of elementary schools that are either underutilized or highly overutilized from a combined 28% to only 6% of all schools. In doing so, the number of schools in the target range increases modestly, from 32% to 39% of all schools. As such, to achieve these benefits the number of somewhat overutilized schools increases from 40% to 55% of schools.

2. **Middle School Utilization**
   It is possible to greatly increase the number of middle schools in the target utilization range, from 55% of schools to over 70% of schools, by rezoning less than 10% of students. However, it is more challenging to improve the utilizations of outliers at the middle school level. By rezoning less than 10% of students, the share of schools that are either underutilized or highly overutilized is reduced from a combined 13% to 8%.

3. **High School Utilization**
   Since we do not change Cluster boundaries, we find only very modest improvements in utilization for Consortia high schools.

4. **Diminishing Returns**
   At the elementary and middle school levels, we find diminishing utilization improvements when changing school boundaries after 5 - 8% of students are rezoned.

5. **Capital Projects**
   Capital Projects are necessary to fully alleviate overcrowding challenges at all three school levels even when applying this redistricting model. By rezoning 7.5 - 10% of students, 12 elementary schools would be above the capital action threshold, compared to 27 in School Year 2019-20. Two middle and seven high schools meet this threshold compared to three and eight in 2019, respectively. More information on capital action thresholds can be found on page 166 in the Appendix.

6. **Distance to School**
   These utilization benefits are possible by increasing distances to school by no more than a eighth of mile for elementary schools, on average. An eighth of a mile is 660 feet, less than two football fields. At the middle and high school levels, changes in distance to school on average are negligibly small.

7. **Diversity**
   The Utilization A Model found few impacts on the Diversity lens at all three school levels. On average, the demographics of socioeconomically or racially isolated schools grew more similar to their neighboring schools by about one to two percentage points on average when 7.5-10% of students are reassigned. Though very modest, these changes are positive.

Utilization and Assignment Stability

The Utilization A Model was designed to understand the potential utilization benefits and impacts to assignment stability of redistricting if existing Cluster boundaries and articulation patterns are maintained. Together with the Utilization B Model, which removes Cluster boundaries, we can better quantify the constraint on utilization posed by Cluster boundaries on utilization.

Improvements in utilization were found across all Utilization A Model runs at the elementary and middle school levels. Very few improvements were found at the high school level.

Figure 7 — Elementary School Utilization by Percent of Students Rezoned to New Base School

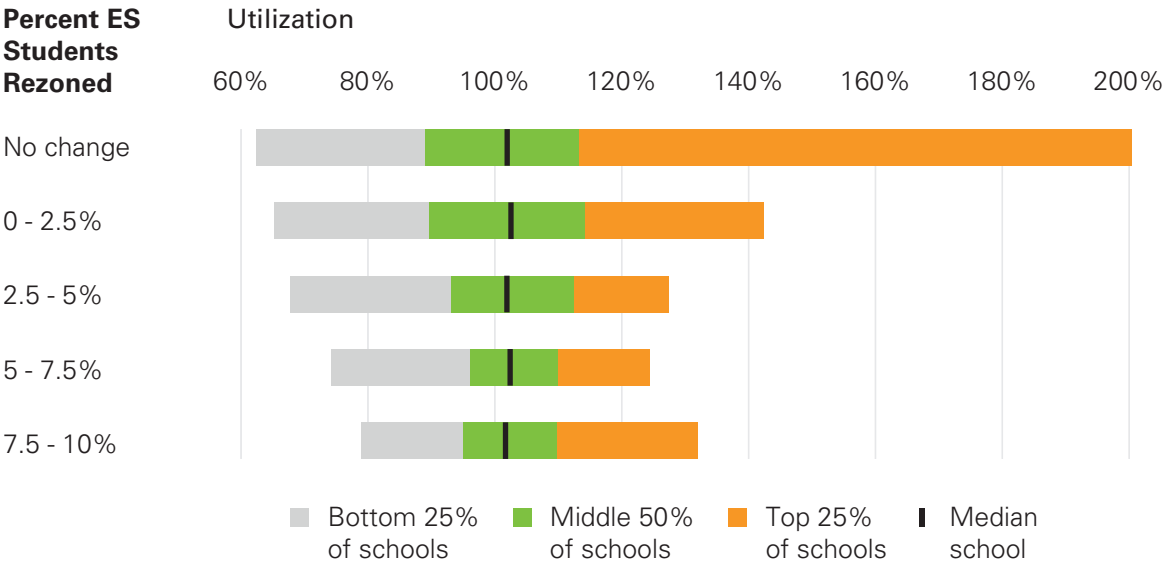


Figure 7, above, shows the relationship between school utilization and the average number of students reassigned to a new base school at the elementary school level.

The model runs that rezoned between 2.5% and 5% of students begin to show significant improvements to utilization, particularly for highly overutilized schools, represented by the orange bars in the chart above. By rezoning 7.5 - 10% of elementary school students, the share of elementary schools that are highly overutilized (>120% utilization) changes from 16% of schools today to 3% of schools.

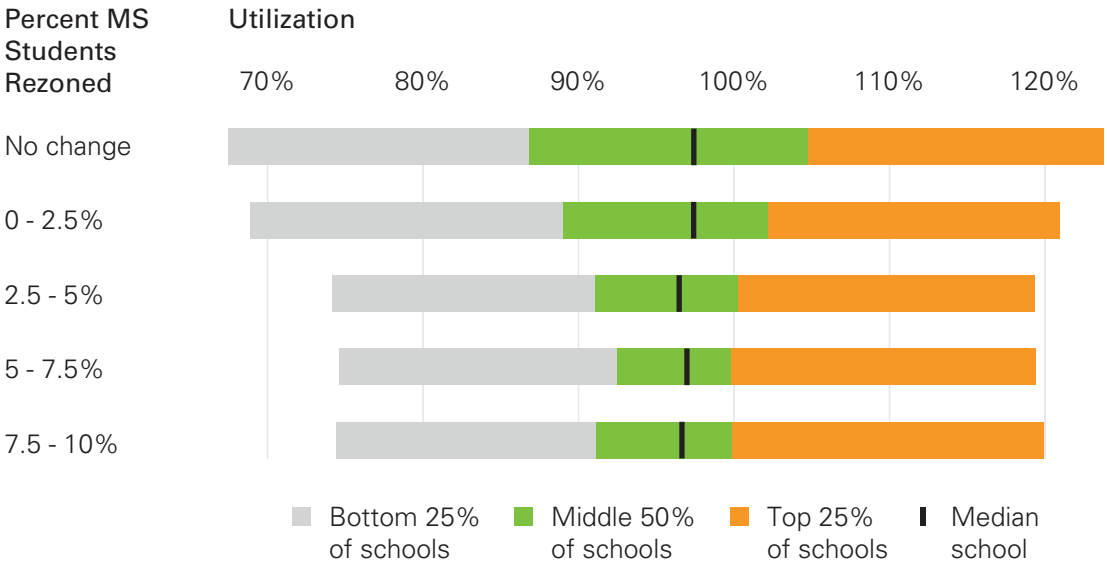
The Utilization A Model also finds significant utilization improvements for underutilized (<80% utilization) schools. On average, the Utilization A Model reduces the number of underutilized schools from about 12% of schools today to about 3% of schools. In doing so, the number of schools in the target utilization range of 80-100% utilization increases from 32% currently to 39%.

This leaves most schools somewhat overutilized, in the 100-120% utilization range. If 7.5 - 10% of elementary school students are reassigned, 55% of schools are somewhat overutilized up from 40% of schools today.

As such, the Utilization A Model can make elementary school utilizations more evenly distributed across the district, but significant utilization challenges remain.

Improvements in utilization at the middle school level are more modest than at the elementary school level. As shown in Figure 8 below, it is possible to bring more than half of middle schools within 90 and 100% utilization by rezoning 7.5 - 10% of middle school students. In doing so, about 70% of middle schools would be in the target utilization range of 80 - 100%. Further, there is an opportunity to reduce utilization outliers, bringing the number of middle schools that are either highly overutilized or underutilized down from 13% of schools overall to only 8% of schools.

Figure 8 — Middle School Utilization by Percent of Students Rezoned to New Base School



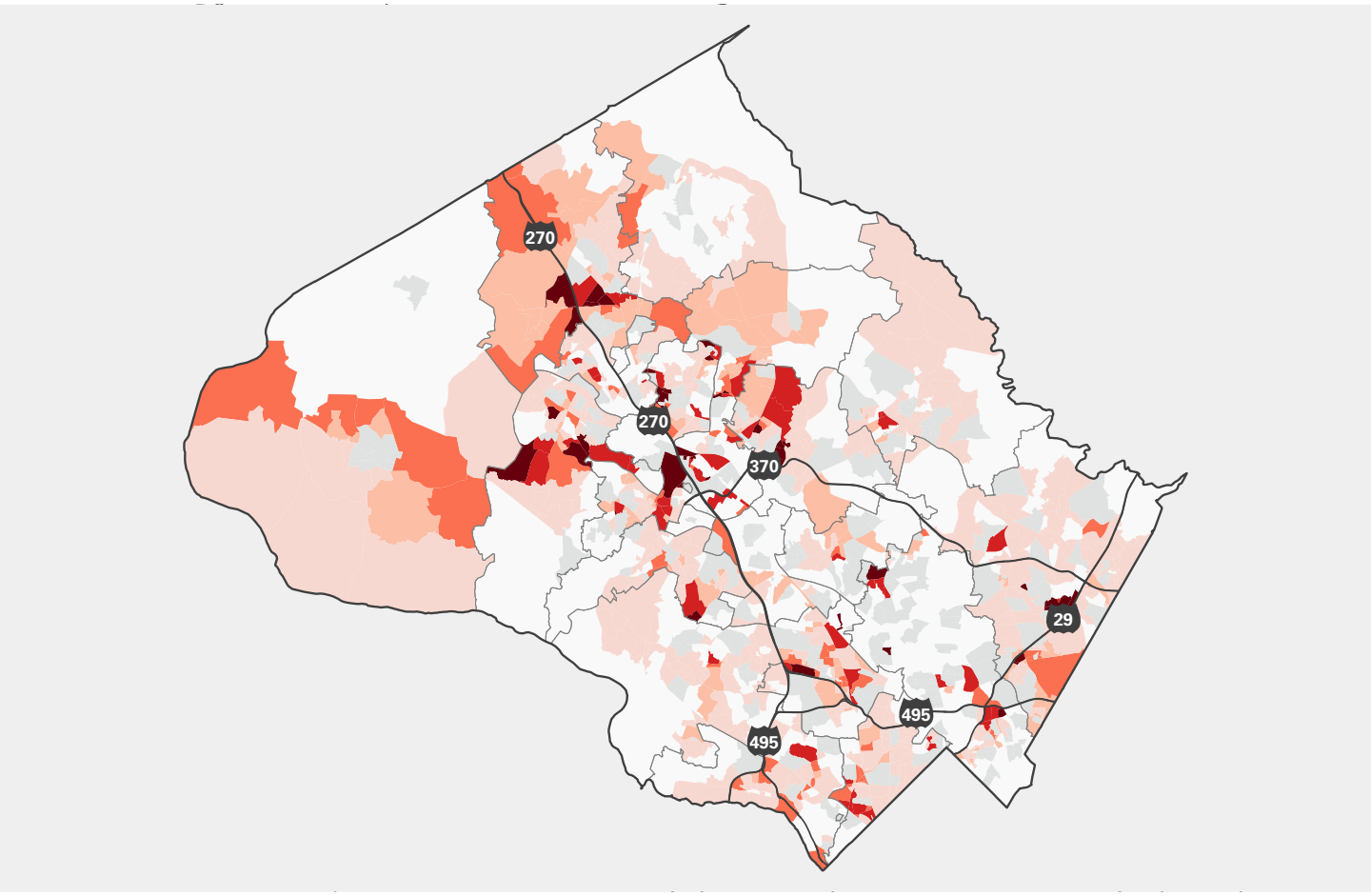
The Utilization A Model does not change existing Cluster or Consortia boundaries. As such, we only model possible utilization improvements between the eight high schools within the same Consortia. Due to these constraints, the utilization benefits to high schools are limited and total change to boundaries relatively constrained. Of the 2,000 high school Utilization A Models we ran, none redistricted more than 2.5% of high school students.

We find that Blake and Northwood High Schools have significant opportunity to reduce their utilizations, from 103% to 96% and 120% to 113% respectively. To do so, the utilizations of Springbrook HS would need to increase from 82% to 90% on average, and the utilization of Wheaton HS would need to increase from 98% to 102% on average. Please see page 162 in the appendix for a detailed breakdown of schools that had the most planning blocks reassigned.

Local Assignment Stability Impacts

As noted above, the Utilization A Model was designed to understand the trade-off between utilization and assignment stability if existing Cluster boundaries and articulation patterns are maintained. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas called planning blocks between two school attendance areas. The maps that follow examine the frequency of these swaps between attendance areas.

Figure 9 — Likelihood that Planning Block was Assigned to New Elementary School Attendance Area



Share of model runs where planning block was rezoned to new school

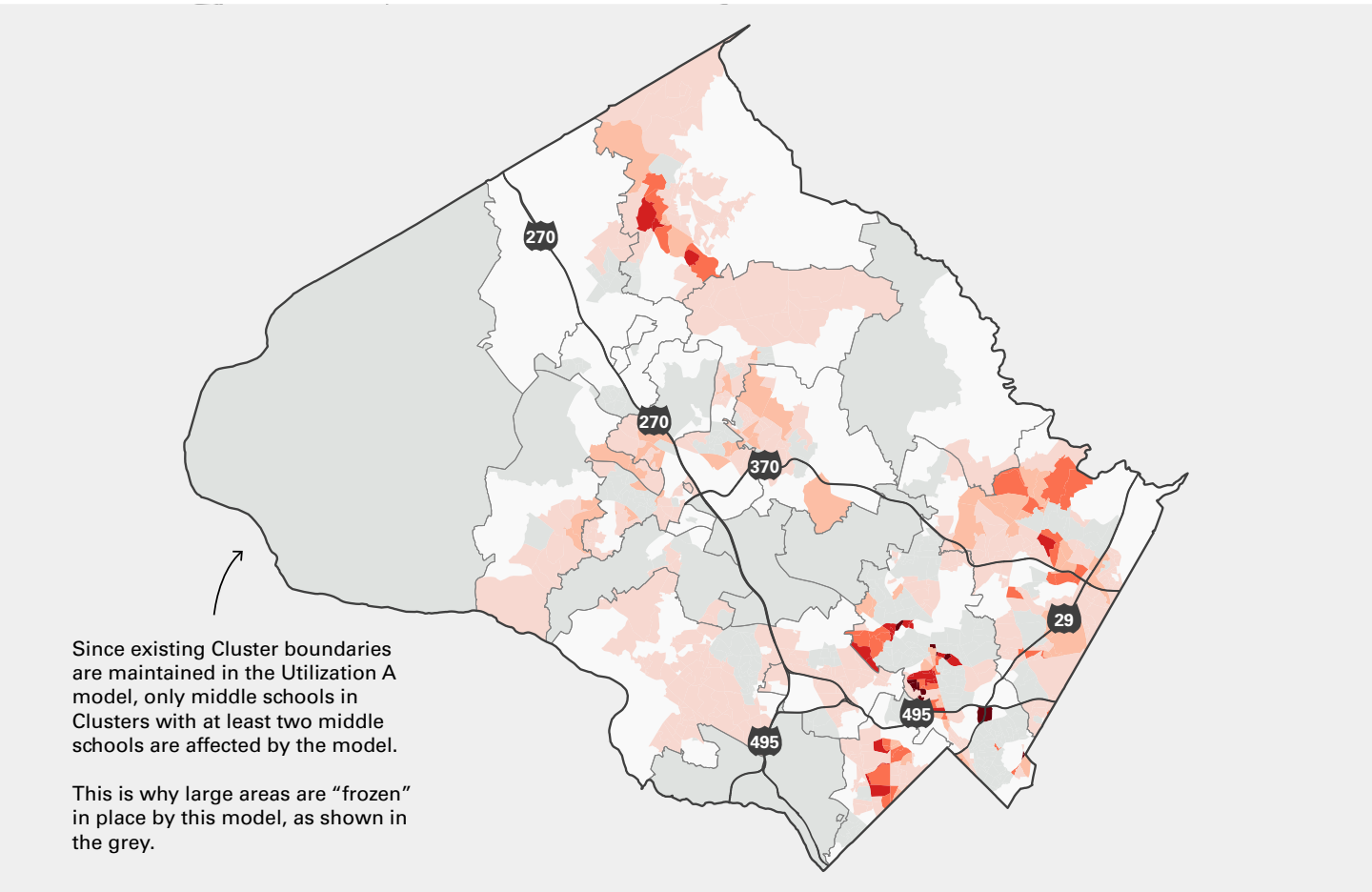
1-8% *5-23%* *23-41%* *41-66%* *>66%*

Frozen planning blocks *Never swapped* *Cluster boundary*

The map above illustrates that nearly all model runs make a small number of similar boundary changes at the elementary school level. These are targeted interventions that could improve utilizations at a limited scale. Further, boundary changes are generally clustered together, often along the border of two neighboring schools.

Notably, we find that planning blocks are more likely to be rezoned in Clusters along Interstate 270 at the elementary school level.

Figure 10 — Likelihood that Planning Block was Assigned to New Middle School Attendance Area



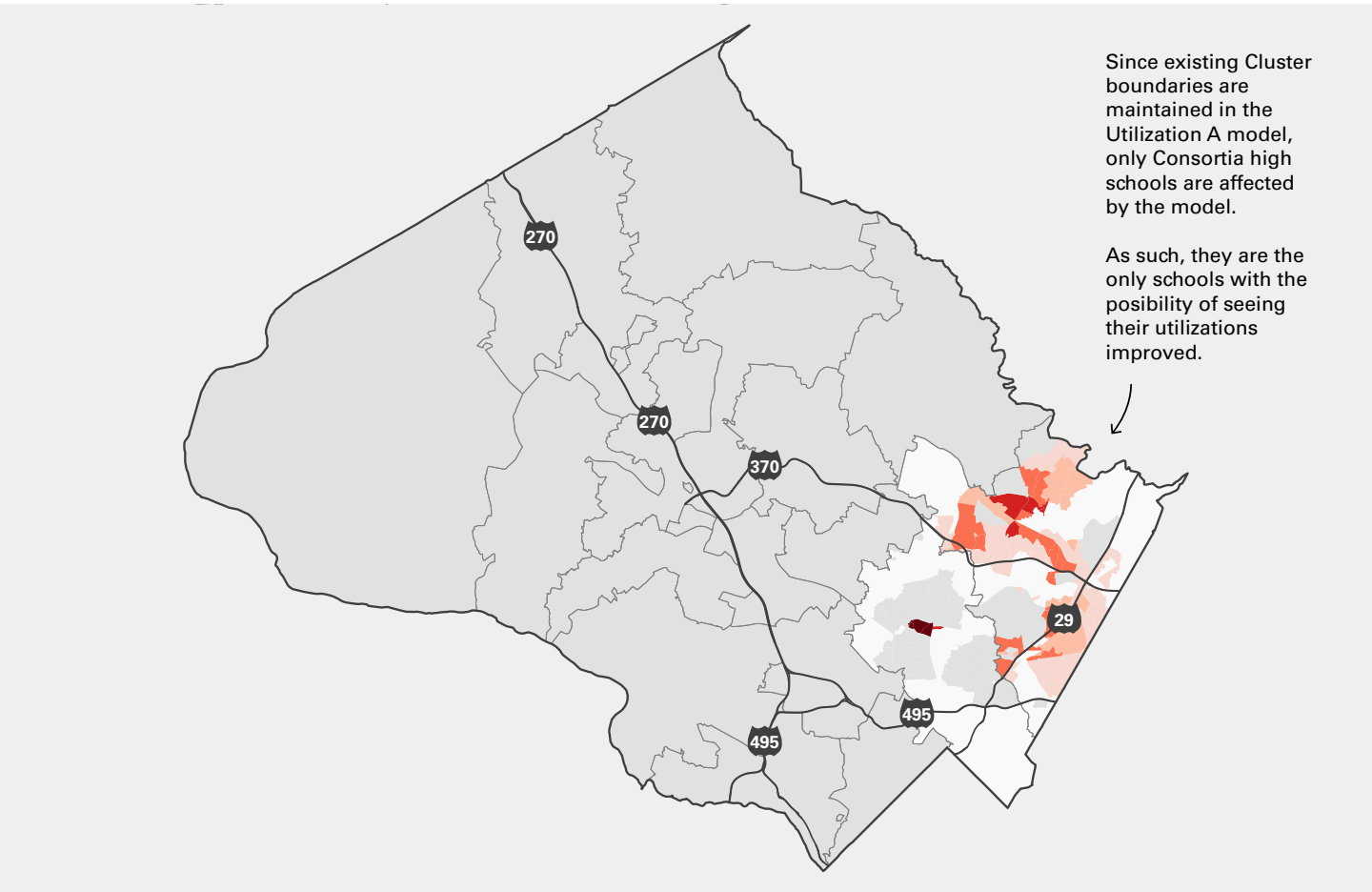
Share of model runs where planning block was rezoned to new school

1-7% *7-21%* *21-42%* *42-65%* *>65%*

Frozen planning blocks *Never swapped* *Cluster boundary*

The pattern of boundary changes suggested by the Utilization A Model at the middle school level is considerably different than those at the elementary school level. Notably, boundary changes are concentrated in the Northeast Consortium, Downcounty Consortium, Bethesda-Chevy Chase Cluster, and Damascus Cluster. Nevertheless, the Utilization A Model finds opportunities to improve middle school utilizations across the district.

Figure 11 — Likelihood that Planning Block was Assigned to New High School Attendance Area



As noted previously, the Utilization A Model maintains existing Cluster boundaries, meaning only Consortia high schools are impacted by the model. The model finds significant opportunity to improve utilizations of high schools in the Northeast Consortium and very limited opportunity to improve high school utilizations in the Downcounty Consortium.

Impacts on Diversity

The Utilization A Model found few impacts on the Diversity lens at the all three school levels. On average, the demographics of socioeconomically or racially isolated schools grew more similar to their neighboring schools by about one to two percentage points on average when 7.5-10% of students are reassigned. These changes are very modest, though positive.

At the elementary and middle school levels, we found that the schools most socioeconomically and racially similar to their nearest neighboring three schools grew more dissimilar from those schools by less than two percentage points, on average. This represents a relatively small change and generally positive from a Diversity perspective, since schools highly similar to their neighbors can contribute to more socioeconomic and racial isolation across the district.

Impacts on Proximity

We find negligible impacts to proximity in Utilization A Model runs. Average school distances to school did not increase by more than an eighth of a mile at any school level, as shown in Figure 12.

Figure 12 — Average Change in Distance to School by School Level

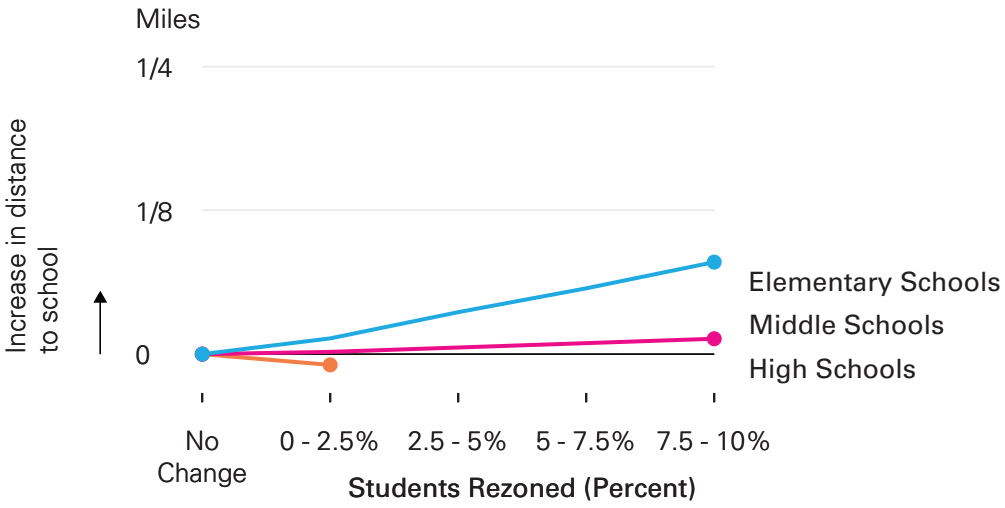


Figure 12, above, illustrates the average change in distance to school for students at each school level. Note that the Y-axis has a range from zero — in which there is no change — to a quarter-mile. Though average distances do increase at the middle and high school levels and are largest when the more students are rezoned, these impacts are very modest. An eighth of a mile is equal to 660 feet, less than two football fields in length.

2. Utilization B

Improving Utilization Between Neighboring Schools

Key Questions

What improvements in utilization can we achieve by redistricting across existing Cluster boundaries, disregarding current high school articulation patterns?

What impacts do these boundary changes create in terms of proximity, diversity, and assignment stability? What is the relationship between these factors?

What are the model targets? What is it measuring?

The model seeks to maximize the number of schools near the districtwide utilization average for each school level. For elementary schools that target is 102%; for middle schools 97%; for high schools 103%. To this end, the model treats overutilization the same as under-utilization.

The model explicitly prioritizes swaps between overutilized schools neighboring underutilized schools. As such, the model minimizes utilization dissimilarity between neighboring schools, though this measure is not explicitly minimized.

What isn't the model measuring?

Though the model does not explicitly target assignment stability, it does try to improve utilization in the fewest number of changes, thereby implicitly considering assignment stability.

We do not target diversity or proximity measures with this model, and we simply measure the impacts on these lenses when strictly optimizing for utilization.

Utilization B Findings

After running the Utilization B Model 2,000 times at each school level, we found the following:

1. **Utilization**
   Large improvements in utilization are possible, particularly for highly over- and under- utilized schools.

   Across all three school levels, the Utilization B Model is able to completely eliminate underutilized and overutilized schools. In particular, it is possible to bring all middle schools within 92 and 102% utilization and all high schools between 100 and 106% utilization.

2. **Diminishing Returns**
   When changing school boundaries at the elementary and middle school levels, we find diminishing benefits to utilization after rezoning about 5 - 8% of students.

3. **Capital Projects**
   Capital Projects are necessary to fully alleviate overcrowding challenges at all three school levels even when applying this redistricting model. By rezoning 7.5 - 10% of students, 18 elementary schools would be above the capital action threshold, compared to 27 in School Year 2019-20. No middle and no high schools meet this threshold, compared to three and eight in 2019, respectively. More information on capital action thresholds can be found on page 166 in the Appendix.

4. **Distance to School**
   These utilization benefits are possible with by increasing distances to school by no more than a eighth of mile for elementary and middle schools, on average. An eighth of a mile is 660 feet, less than two football fields.

   At high school levels, changes in distance to school on average are more significant, a quarter mile on average.

5. **Diversity**
   The Utilization B Model found few impacts on the Diversity lens at the all three school levels. On average, the demographics of socioeconomically or racially isolated schools grew more similar to their neighboring schools by about one to two percentage points on average when 7.5-10% of students are reassigned. These changes are very modest, though positive.

Utilization and Assignment Stability

The Utilization B Model was designed to understand the potential utilization benefits and assignment stability impacts of redistricting if existing Cluster boundaries and articulation patterns were removed. Together with the Utilization A Model, which maintains Cluster boundaries, we can better quantify the constraint on utilization posed by Cluster boundaries.

Significant opportunities to improve utilization were found across all Utilization B Model runs and school levels. Improvements are harder to achieve at the elementary school level than at the middle and high school levels.

Figure 13 — Elementary School Utilization by Percent of Students Rezoned to New Base School

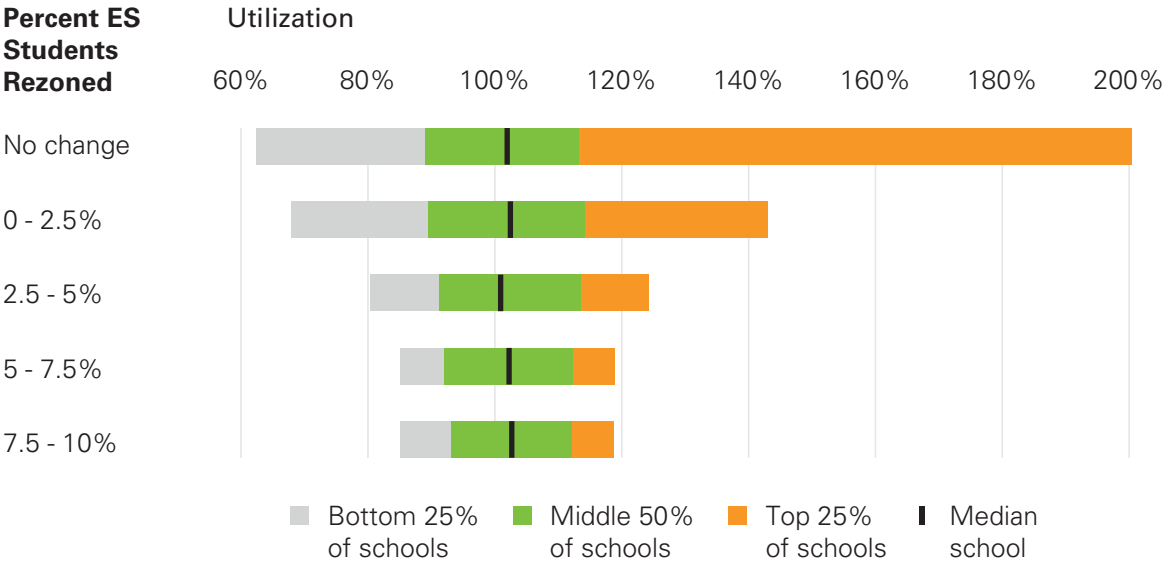


Figure 13, above, shows the relationship between school utilization and the average number of students reassigned to a new base school at the elementary school level.

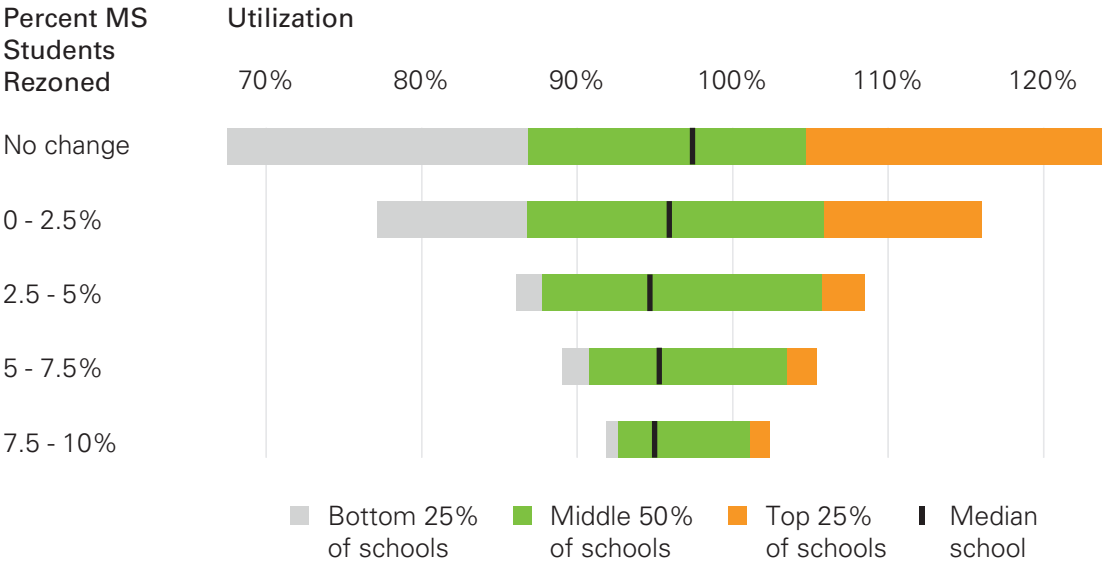
The model runs that rezoned between 2.5% and 5% of students begin to show significant improvements to utilization, particularly for schools with disproportionately high or low utilizations. For instance, we see the minimum utilization increasing from 63% to 75% on average, and the maximum utilization decreasing from 200% to 126% on average.

More aggressive model runs, which rezone between 7.5% and 10% of students, are on average able to bring all or nearly all schools within 80-120% utilization. Currently, about 72% of elementary schools fall in the 80-120% utilization range. Models that rezoned 7.5 - 10% of elementary school students to a new base school were on average able to completely eliminate underutilized schools (<80% utilization) and highly overutilized schools (>120% utilization). Without any changes, underutilized and highly overutilized schools represent 28% of schools. Utilization runs that rezone 7.5 - 10% of elementary school students increase the share of schools in the optimal utilization range of 80 - 100% from only 32% of schools to about 45% of schools.

It is possible to achieve large improvements in utilization at the middle school level without rezoning a large number of students to a new base school.

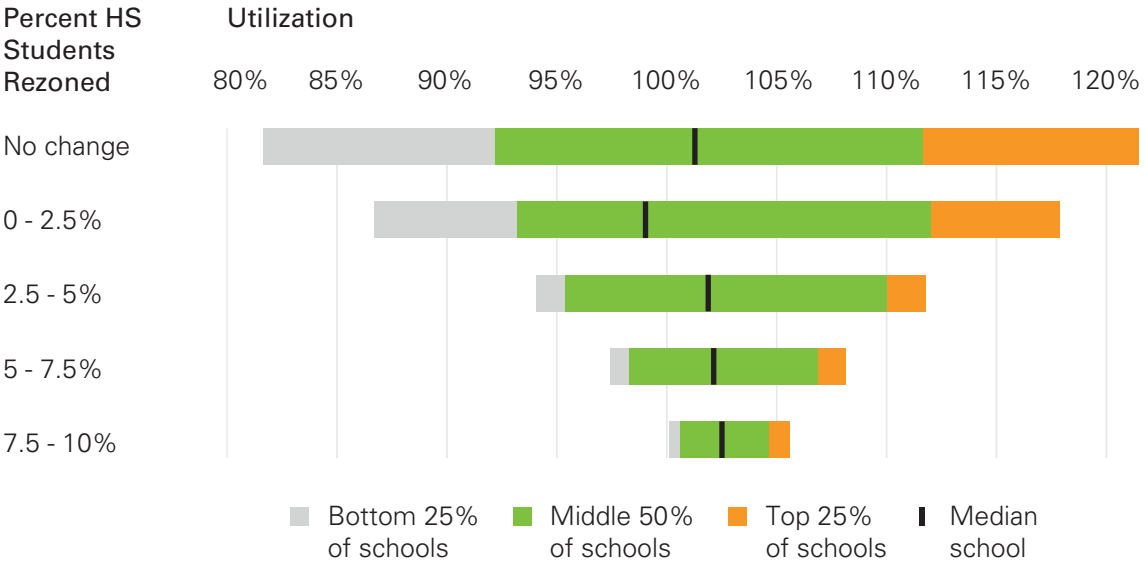
Currently, half of middle schools are utilized below 87% or over 105%, represented in the first and widest horizontal gray and orange bars in Figure 14, below. By rezoning 7.5 to 10% of middle school students, it is possible to bring all schools between 92% and 102% utilization. This brings all schools within five percentage points of the overall middle school utilization rate of 97%.

Figure 14 — Middle School Utilization by Percent of Students Rezoned to New Base School



At the high school level, the improvements in utilization that can be achieved are more substantial than at the middle or elementary school level, as shown in Figure 15, below.

Figure 15 — High School Utilization by Percent of Students Rezoned to New Base School



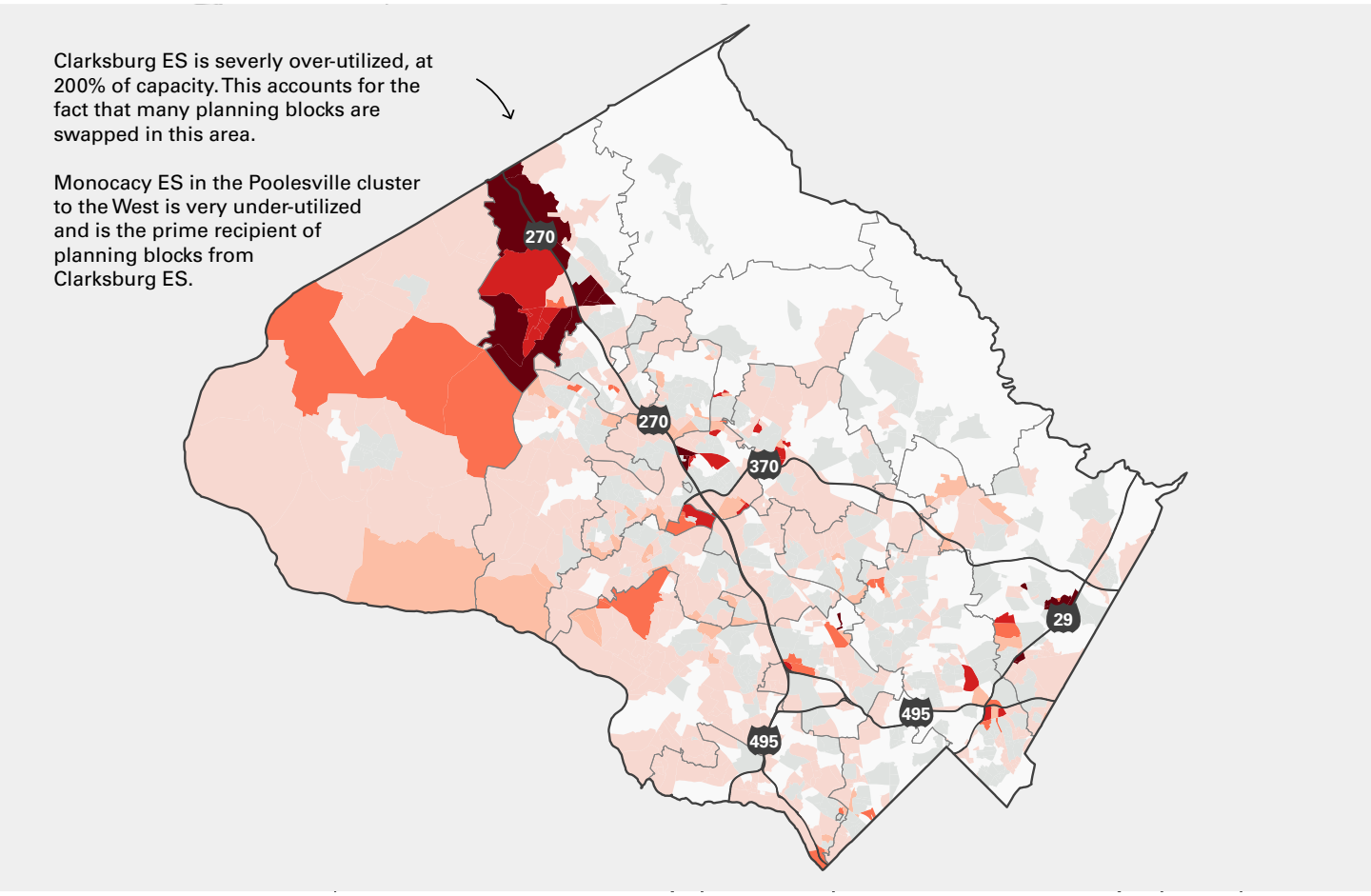
Currently, half of high schools are utilized below 92% or over 112%, represented in the first and widest horizontal gray and orange bars in Figure 15. By rezoning 7.5 to 10% of high school students, it is possible to bring all schools between 100% and 106% utilization. This brings all schools within three percentage points of the overall high school utilization rate of 103%.

Together, these three charts highlight the significant opportunities that exist to reduce utilizations across all three school levels.

What is the spatial distribution of these patterns? The following maps show how frequently a planning block, a small geographic area that is part of a larger school attendance area, was rezoned from one school to another in all Utilization B elementary school model runs.

Some of these planning blocks, shown in gray are "frozen" and prevented from being rezoned. Others are never swapped.

Figure 16 — Likelihood that Planning Block was Assigned to New Elementary School Attendance Area

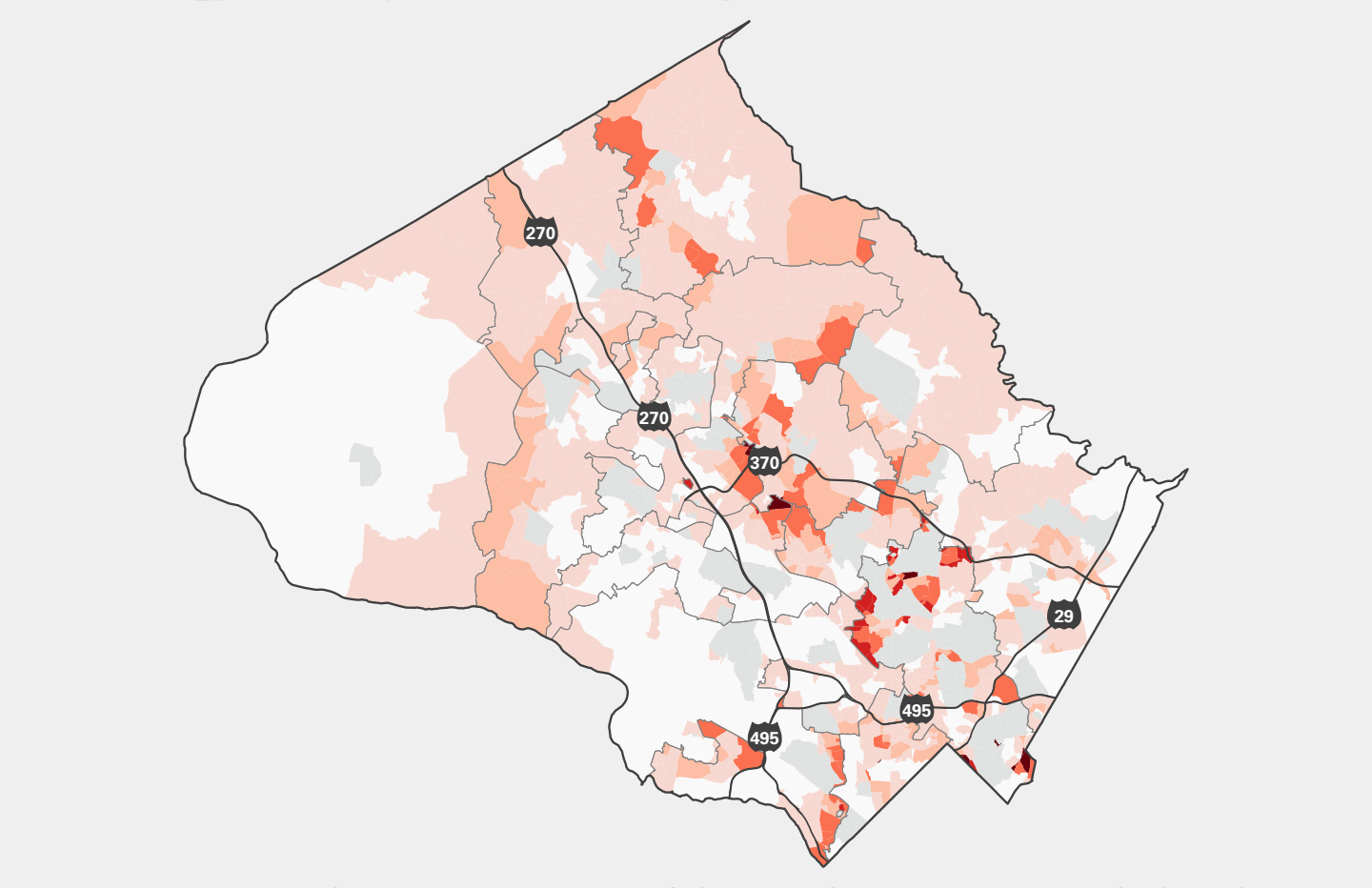


The map above illustrates that nearly all model runs make a small number of similar boundary changes. These are targeted interventions that could improve utilizations at a limited scale. Some of these changes are only made possible if you allow for boundary changes across Clusters, but not all.

Notably, we find that planning blocks are more likely to be rezoned south and west of Interstate 270 at the elementary school level.

This pattern is different at the middle school level. The map below illustrates that there are opportunities to balance utilizations between adjacent schools along Interstate 270 as well, but that planning blocks are more likely to be rezoned north and east of this corridor.

Figure 17 — Likelihood that Planning Block was Assigned to New Middle School Attendance Area

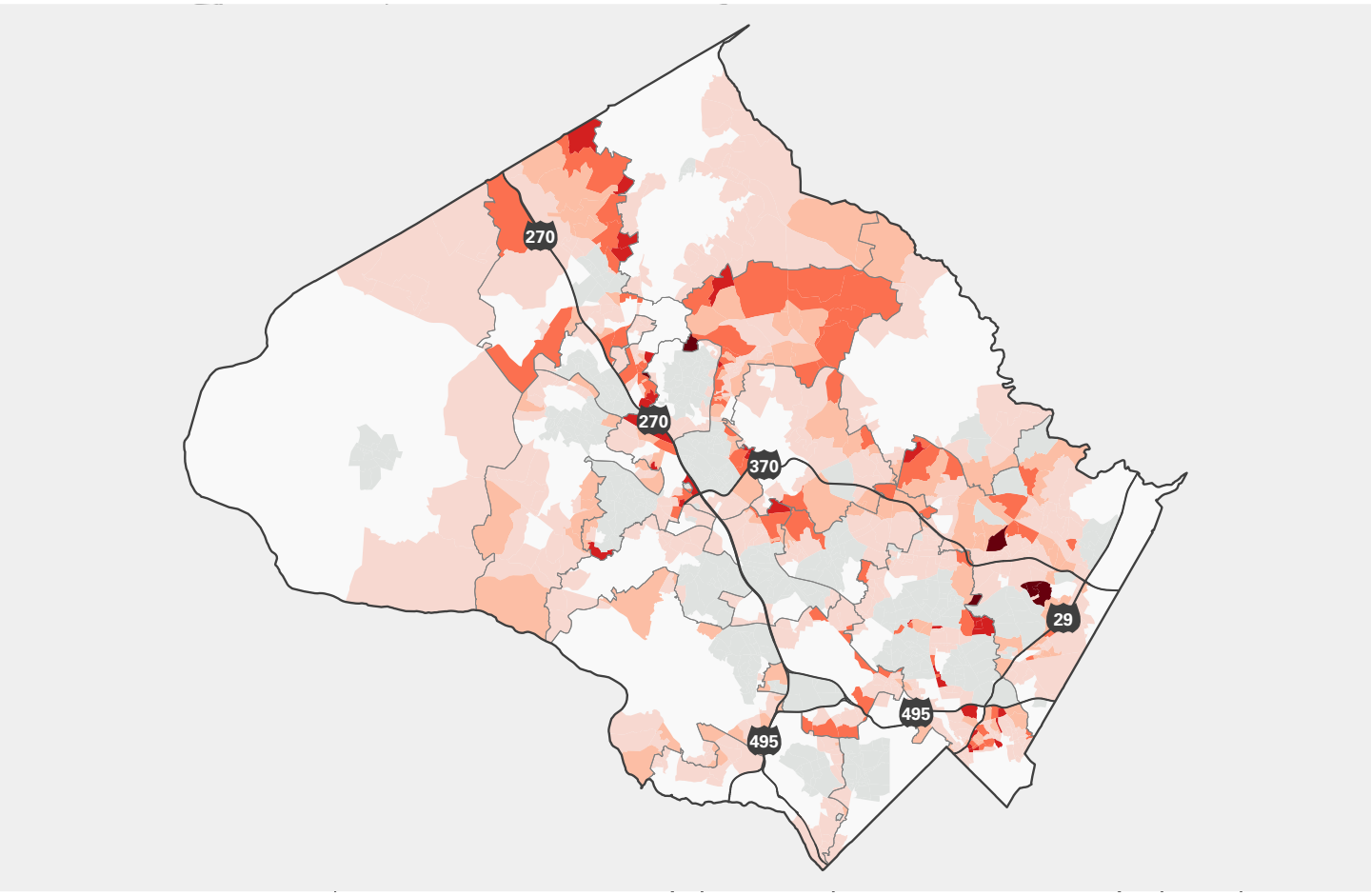


Share of model runs where planning block was rezoned to new school

1-6% *6-19%* *19-37%* *37-63%* *>63%*

Frozen planning blocks *Never swapped* *Cluster boundary*

Figure 18 — Likelihood that Planning Block was Assigned to New High School Attendance Area



Share of model runs where planning block was rezoned to new school

1-4% *4-11%* *11-24%* *24-50%* *>50%*

Frozen planning blocks *Never swapped* *Cluster boundary*

At the high school level we find patterns similar to those found at the middle school level, with planning blocks being more likely to be swapped between schools north and east of Interstate 270. Notably, the Clarksburg, Quince Orchard, and Gaithersburg Clusters see considerable change along their boundaries.

Impacts on Diversity

What are the impacts of these hypothetical boundary changes on the socioeconomic and racial dissimilarity of MCPS's schools? For the Utilization B Model, we find very few impacts to FARMS and racial dissimilarities between neighboring schools, overall. Notably, we find that the size of changes to diversity metrics increases the more students are zoned to a new base school, though these changes are positive from the point of view of Diversity, on average.

We find modest improvements to diversity metrics, with highly dissimilar schools becoming slightly more similar to their neighbors by an average of one to two percentage points. Highly similar schools become slightly less similar to their neighbors by one to two percentage points as well. Both of these are positive trends for diversity metrics. We find similarly few impacts at the middle and high school level on diversity metrics.

Impacts on Proximity

We find negligible impacts to proximity in Utilization B Model runs. Average school distances to school did not increase by more than a sixteenth of a mile at any school level, as shown in Figure 19.

Figure 19 — Average Change in Distance to School by School Level

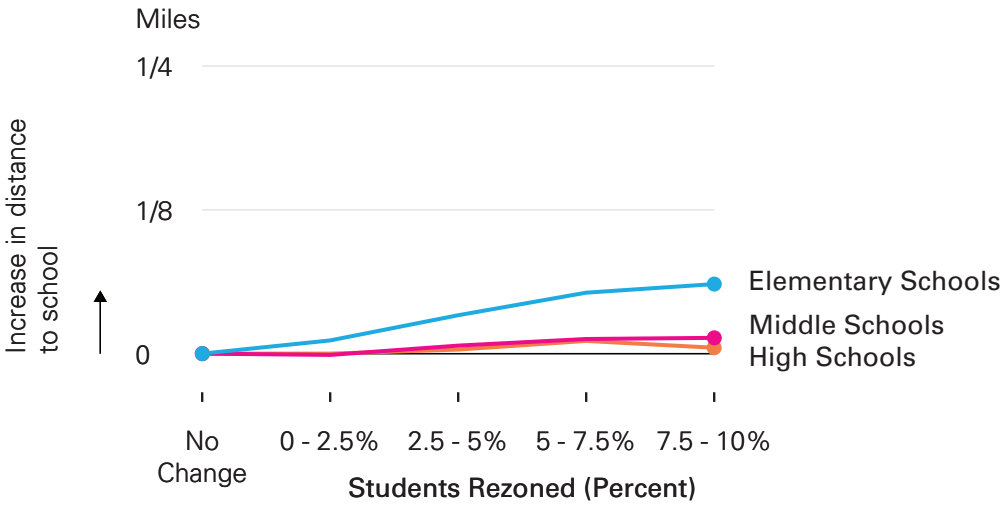


Figure 19, above, illustrates the average change in distance to school for students at each school level. Note that the Y-axis has a range from zero — in which there is no change — to a quarter-mile. Though average distances do increase across school levels and are largest when the most students are rezoned, these impacts are very modest.

3. Diversity

Improving Utilization While Reducing Demographic Dissimilarities

Key Questions

If MCPS sought to optimize utilization and diversity measures at a districtwide scale, where should boundary changes be focused? Which changes are likely to be most impactful, with the fewest changes to assignment stability?

To what extent is it possible to optimize diversity measures while still targeting utilization measures? Can we optimize these two lenses together at a districtwide scale without using known strategies like island assignments?

What are the model targets? What is it measuring?

This model seeks to maximize the number of schools near the districtwide utilization average for each school level while improving socioeconomic dissimilarity between neighboring schools. The model does not directly try to improve racial dissimilarity between neighborhood schools, only socioeconomic dissimilarity. However, given the correlation between socioeconomic and racial dissimilarity (see page 165 in appendix), the outcomes of the model can also be applied to race.

What isn't the model measuring?

We do not explicitly target assignment stability with this model, we only measure the impacts on this lens. Though the model does not explicitly target assignment stability, it does try to improve utilization and racial and socioeconomic dissimilarity in the fewest number of changes, thereby implicitly considering assignment stability.

We do not target proximity measures with this model, and we simply measure the impact on this lens.

Diversity Findings

After running the Diversity Model 2,000 times at each school level, we found the following:

1. **Diversity**
   Across school levels, it is possible to improve utilization and diversity metrics at the same time.

2. **Concentrated Diversity Improvements**
   Only the most socioeconomically and racially dissimilar schools – across school levels – see large improvements to diversity.

   By rezoning 7.5 - 10% of students, it is possible to reduce the racial dissimilarity of the most racially isolated schools on average by four percentage points (pp) at the elementary school level, two pp at the middle school level, and 2.5 pp at the high school level.

   It is more challenging to find improvements to socioeconomic dissimilarity across school levels. By rezoning 7.5 - 10% of students, it is possible to reduce the socioeconomic dissimilarity of the most socioeconomically isolated schools on average by 1.5 percentage points (pp) at the elementary school level and 1.5 pp at the high school level. In our model, the most socioeconomically isolated middle schools see their socioeconomic dissimilarities rise by about 0.5 pp on average when rezoning 7.5 - 10% of middle school students.

   This confirms our Interim Report findings that in comparison to comparable districts, MCPS's schools

are already relatively socioeconomically and racially balanced, but that a subset of schools are highly socioeconomically and racially isolated.

3. **Elementary School Utilization**
   By rezoning 7.5 - 10% of students, it is possible to bring more than 43% of elementary schools within the target utilization range of 80 - 100%, up from only 32% of schools. In doing so, it is possible to eliminate underutilized schools completely, which currently represent 12% of schools. However, about 11% of schools remain highly overutilized and 1% of schools remain underutilized and the number of schools requiring capital action is unchanged.

4. **Middle and High School Utilization**
   By rezoning only 2.5 - 5% of middle school students, it is possible to reduce the number of highly overutilized and underutilized schools to zero, down from 13% of middle schools overall. By rezoning only 2.5 - 5% of high school students, it is possible to eliminate highly overutilized schools completely. By rezoning 7.5 - 10% of high school students, it is possible to bring all high schools between a narrow utilization range of 97 to 109%. No middle or high schools require capital action when 7.5-10% of students are rezoned.

5. **Proximity Impacts**
   These utilization and diversity benefits can be achieved with modest impacts to proximity. By rezoning 7.5 - 10% of students, we see distances to school at the elementary school level increase by less than an eighth mile on average, an eighth mile at the middle school level, and a quarter mile for high schools.

Socioeconomic and Racial Dissimilarity

In this report, we measure diversity by comparing the socioeconomic and racial backgrounds of a school's students to the backgrounds of students at neighboring schools. This gets at the question of whether a boundary may be separating students of different demographic backgrounds from one another even if they live close to each other.

Please see the Key Definitions section of this report, on page 18, for a definition of dissimilarity. For a full definition and walk-through of how dissimilarity is calculated, please see pages 209 and 210 of the Interim Report.

In MCPS, a small number of schools have very low socioeconomic dissimilarity scores when comparing their demographics to the demographics of their three nearest neighboring schools, and a small number of schools have very high socioeconomic dissimilarity when comparing their demographics to the demographics of their three nearest neighboring schools. When you plot how many schools there are by their socioeconomic dissimilarity, we find the following: The Diversity Model finds that it is the small number of schools that start out being very dissimilar from their nearest neighboring schools that are the easiest to address when redrawing school boundaries to improve utilization.

Figure 20 — Socioeconomic Dissimilarity to Three Nearest Schools of the Same School Level

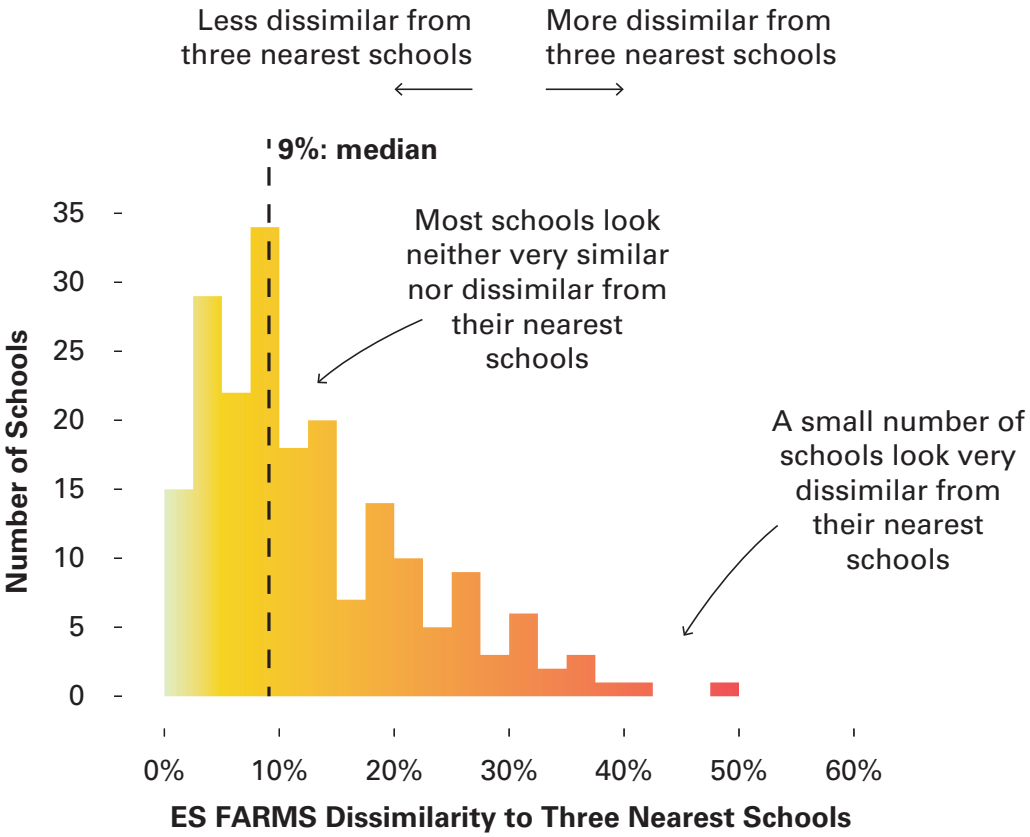
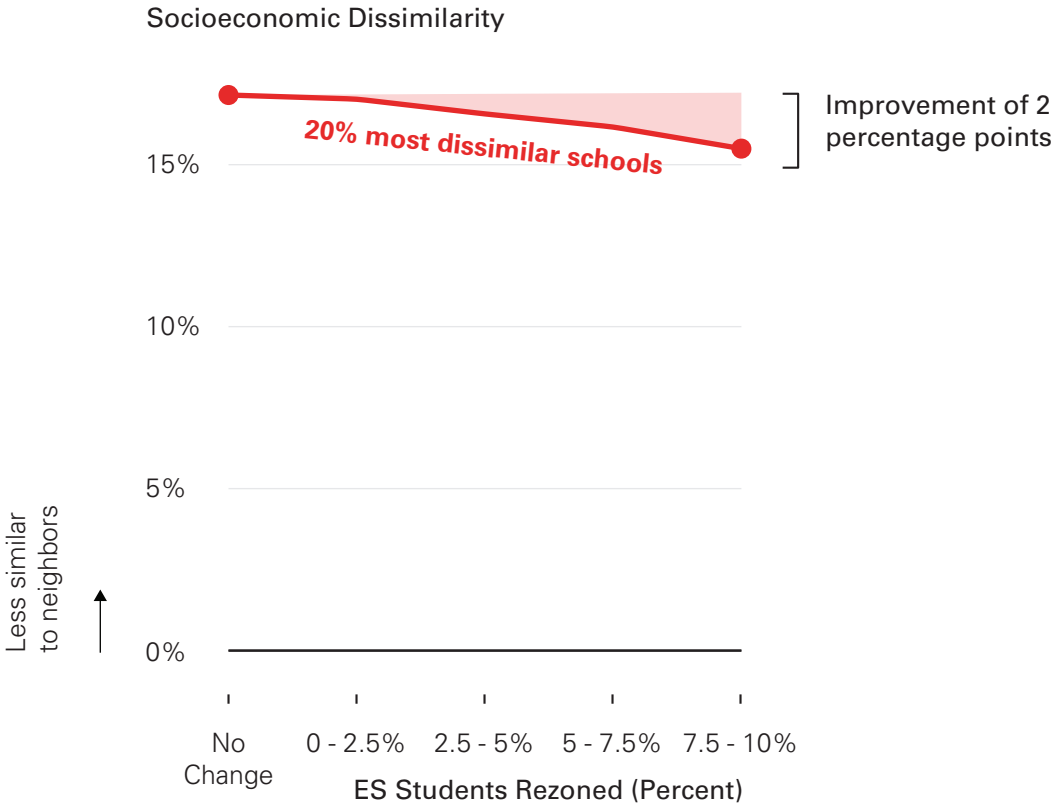


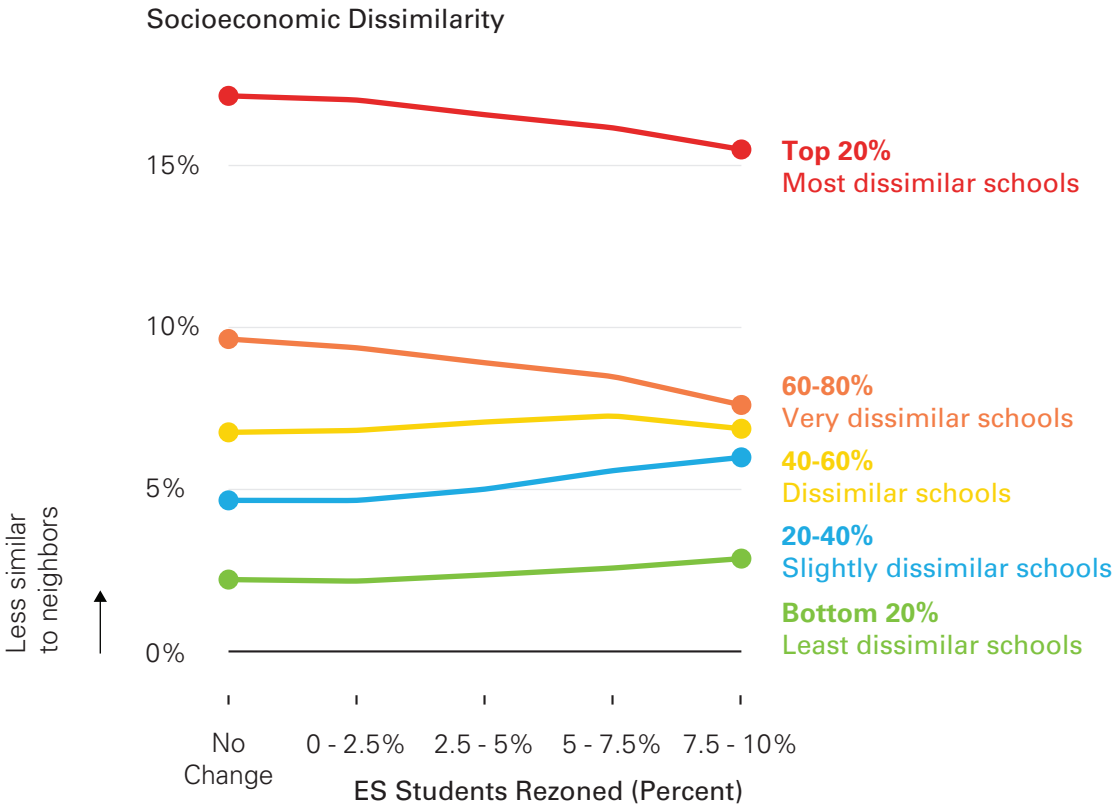
Figure 21, below, illustrates the change in the average socioeconomic dissimilarity of the most dissimilar elementary schools the more students are rezoned in the Diversity Model. We see that if 7.5 - 10% of students are rezoned, that the socioeconomic dissimilarities of the top 20% most dissimilar elementary schools improve on average by two percentage points. With 135 elementary schools, the 20% most dissimilar elementary schools represent 27 individual elementary schools.

Figure 21 — Change in Average ES Socioeconomic Dissimilarity to Three Nearest Neighboring Schools



How do the socioeconomic dissimilarities of the remaining 80% of elementary schools change in the Diversity Model? Figure 22, below, illustrates these changes.

Figure 22 — Change in Average ES Socioeconomic Dissimilarity to Three Nearest Neighboring Schools

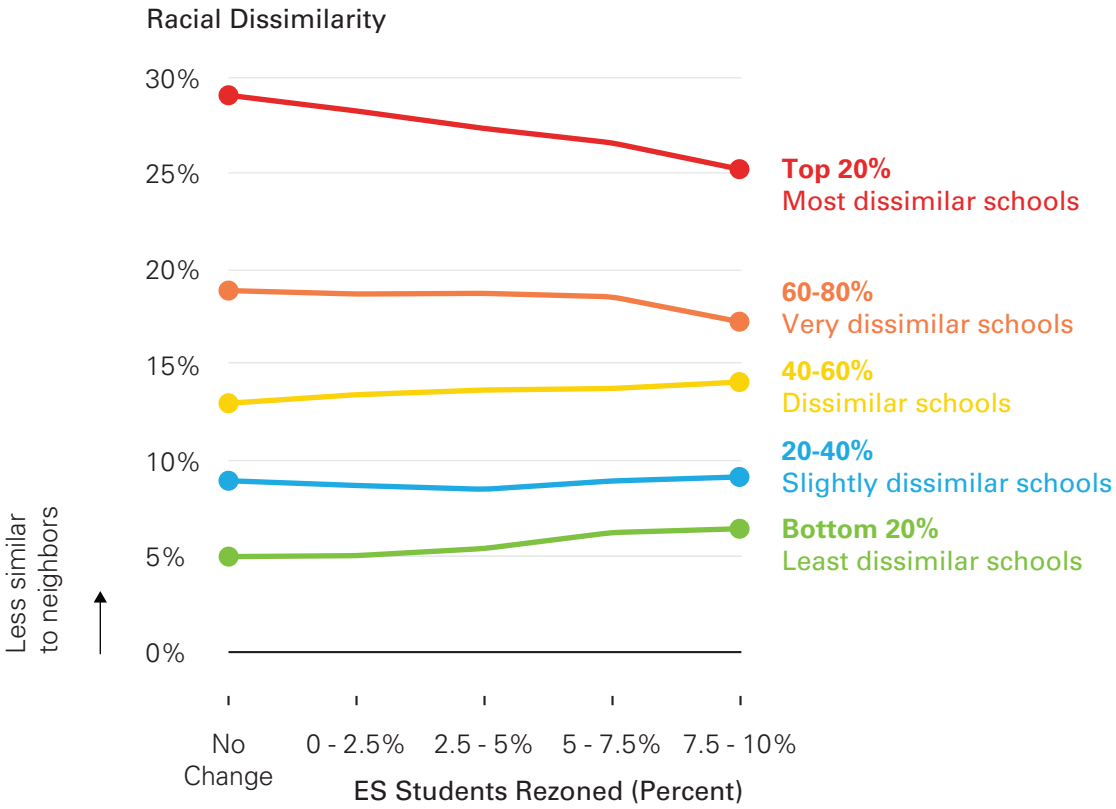


We find that the top 40% most dissimilar schools, represented by the red and orange lines in the chart above, see their socioeconomic dissimilarities drop on average. As noted above, the most dissimilar schools see their racial dissimilarities drop by about two percentage points on average. Similarly, very dissimilar schools – represented by the orange line – see their socioeconomic dissimilarities drop by about two percentage points on average.

At the same time, the socioeconomic dissimilarities of the 60% of remaining schools increase modestly. For slightly dissimilar schools, represented by the blue line, their socioeconomic dissimilarities increase by about 1.5 percentage points. The least dissimilar 20% of schools (represented by the green line) see their socioeconomic dissimilarities increase on average by 0.5 percentage point on average.

How do the racial dissimilarities of elementary schools change in the Diversity Model?

Figure 23 — Change in Average ES Racial Dissimilarity to Three Nearest Neighboring Schools

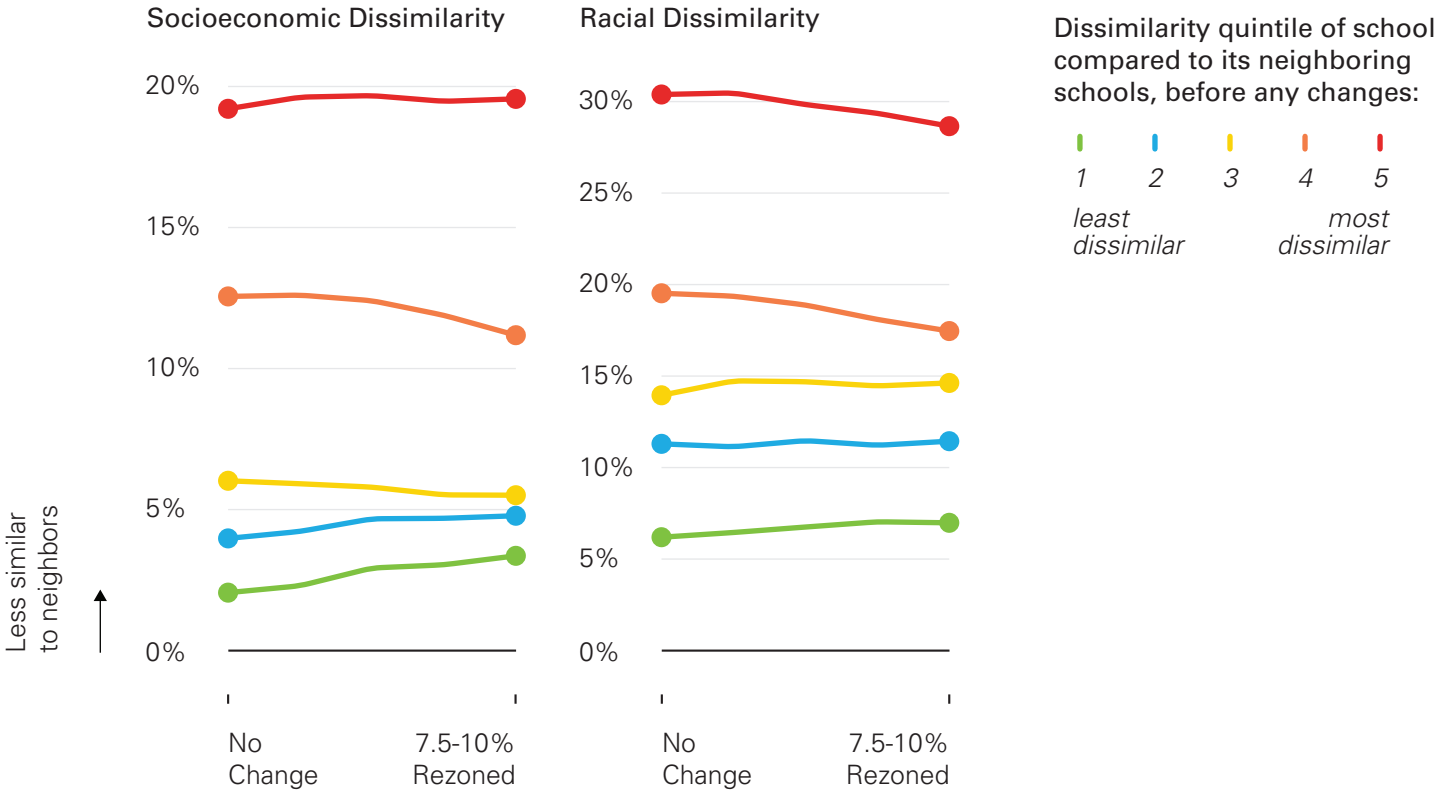


We find that the top 40% most dissimilar schools, represented by the red and orange lines in the chart above, see their racial dissimilarities drop on average. As noted above, the most dissimilar schools see their racial dissimilarities drop by about four percentage points on average. By contrast, very dissimilar schools – represented by the orange line – see their racial dissimilarities drop as well, but slightly less, about two percentage points on average.

At the same time, the racial dissimilarities of the 60% of remaining schools increase modestly. For slightly dissimilar schools, represented by the blue line, the change is almost zero. The least dissimilar 20% of schools (represented by the green line) and dissimilar schools (represented by the yellow line) see their racial dissimilarities increase on average by about one percentage point on average.

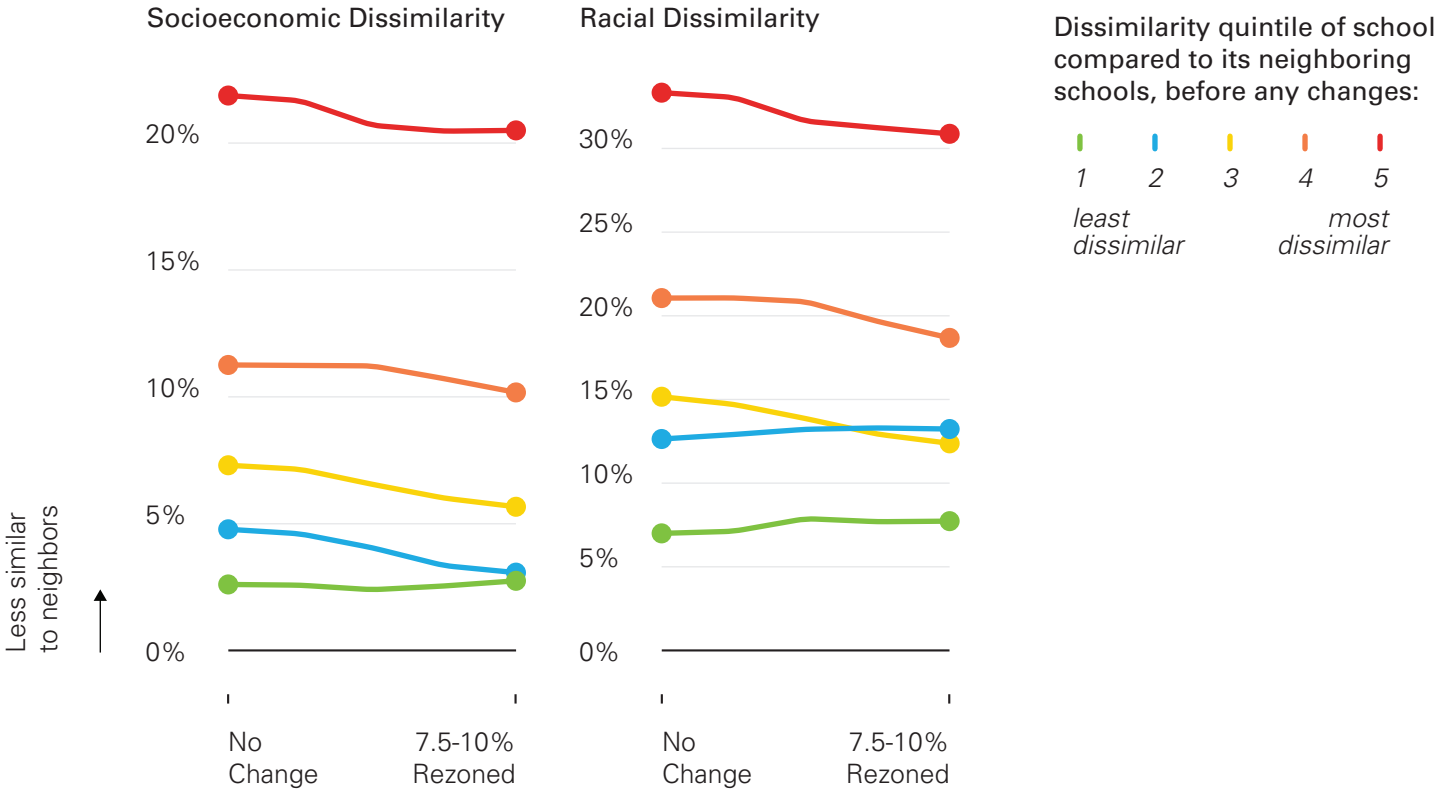
At the middle school level we find similar findings to at the elementary school level. On average, the largest swings in demographic dissimilarity occur for the most and least dissimilar schools. In particular, the schools in the fourth quintile (60-80% most dissimilar schools), saw their dissimilarities decrease by two to three percentage points on average. The schools in the first quintile (0-20% most dissimilar schools), saw their dissimilarities increase on average by one to three percentage points.

Figure 24 — Change in Average MS Demographic Dissimilarity to Three Nearest Neighboring Schools



Though the racial dissimilarities of the most racially dissimilar middle schools decreased by one to two percentage points on average, the most socioeconomically dissimilar schools see a small positive change of about one percentage point to their dissimilarity when 7.5-10% of students are rezoned. As noted, these numbers represent averages, and sometimes the model will identify an important utilization improvement, even if it comes at the cost of fewer improvements to socioeconomic dissimilarity.

Figure 25 — Change in Average HS Demographic Dissimilarity to Three Nearest Neighboring Schools



Finally, at the high school level we find similar findings to the elementary and middle school levels. On average, the largest swings in demographic dissimilarity occur for the most and least dissimilar schools. In particular, the schools in the fifth quintile (80-100% most dissimilar schools), saw their dissimilarities decrease by three to four percentage points on average when 7.5-10% of students are rezoned. Similarly, schools in the fourth quintile (60-80% most dissimilar schools), saw their dissimilarities decrease by two to three percentage points on average when 7.5-10% of students are rezoned.

At the high school level we find significant decreases in dissimilarity for schools in the second and third quintiles as well, a pattern not seen at the elementary and middle school levels. This suggests that improvements in dissimilarity for the most dissimilar schools are resulting in improvements for less dissimilar schools as well.

Utilization and Assignment Stability

It is possible to improve school utilizations and diversity metrics at the same time, while rezoning fewer than 10 percent of students to a new base school if existing Cluster boundaries and articulation patterns are removed. These findings are similar to the Utilization B Model but with larger improvements to diversity metrics and fewer improvements to utilization.

Improvements in utilization were found across all Diversity Model runs and school levels. Improvements are harder to achieve at the elementary school level than at the middle and high school levels.

Figure 26 — Elementary School Utilization by Percent of Students Rezoned to New Base School

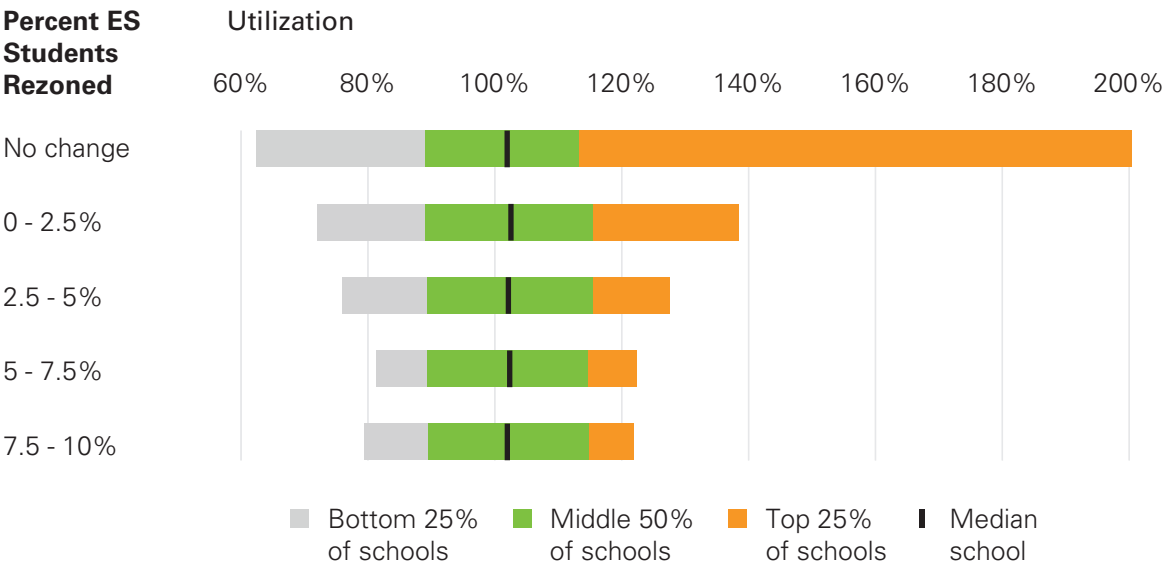


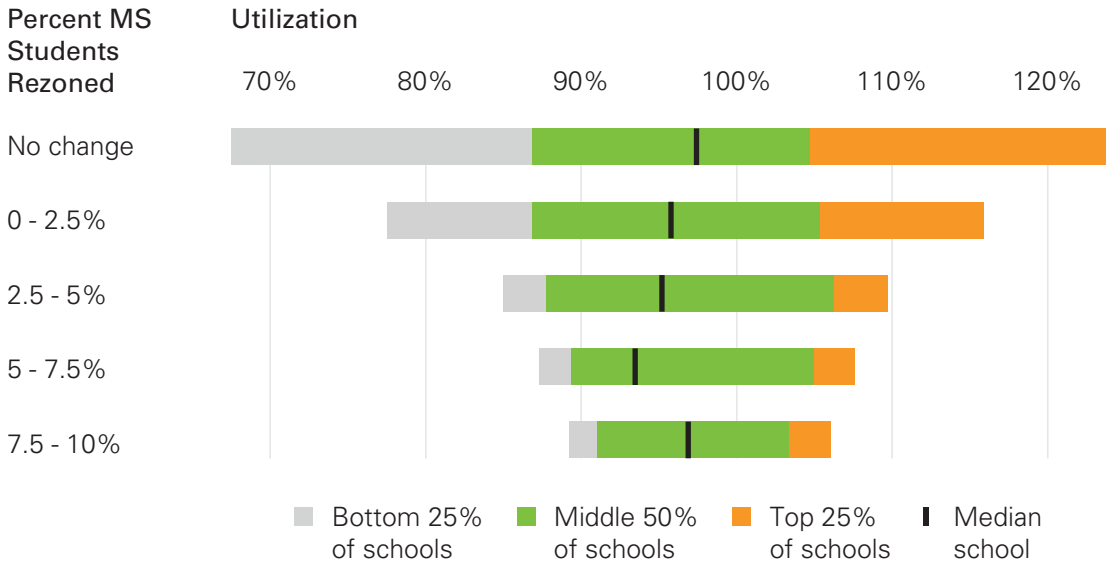
Figure 26, above, shows the relationship between school utilization and the average number of students reassigned to a new base school at the elementary school level.

The model runs that rezoned between 2.5% and 5% of students begin to show significant improvements to utilization, particularly for schools with disproportionately high or low utilizations.

By rezoning between 7.5 and 10% of elementary school students, the Diversity Model is able to reduce the share of schools that are underutilized from 12% overall to only 1% of schools. In doing so, the Diversity Model reduces the share of schools that are highly overutilized to 11% of schools overall, down from 16% of schools. As such, the Diversity Model makes large improvements to elementary school utilizations but fewer than the Utilization B Model, which does not consider diversity and is able to completely eliminate schools that are either underutilized or highly overutilized.

The Diversity Model is able to increase the share of schools in the target utilization range of 80 - 100% from 32% to 43% of schools by rezoning between 5 and 7.5% of elementary school students.

Figure 27 — Middle School Utilization by Percent of Students Rezoned to New Base School

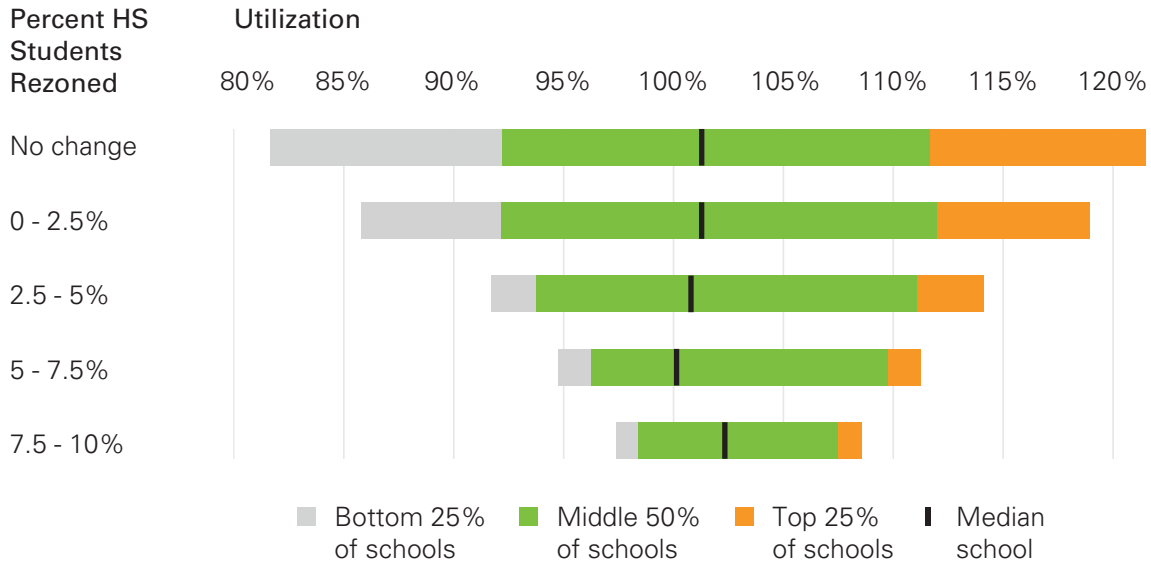


As shown in Figure 27 and Figure 28, it is possible to achieve large improvements in utilization at the middle and high school levels as well while rezoning fewer than 10 percent of students to a new base school.

At the middle school level, the Diversity Model is able to bring all schools between 89% and 106% utilization by rezoning between 7.5 and 10% of students. In doing so, the share of schools that are either underutilized or highly overutilized decreases from 13% of schools overall to zero.

At the high school level, the Diversity Model is able to bring all schools within 97% and 108% utilization, thereby bringing all high schools within at most six percentage points of the districtwide utilization for high schools of 103%. While this approach actually increases the number of schools that are overutilized, the Diversity Model renders utilizations much more evenly distributed across the district.

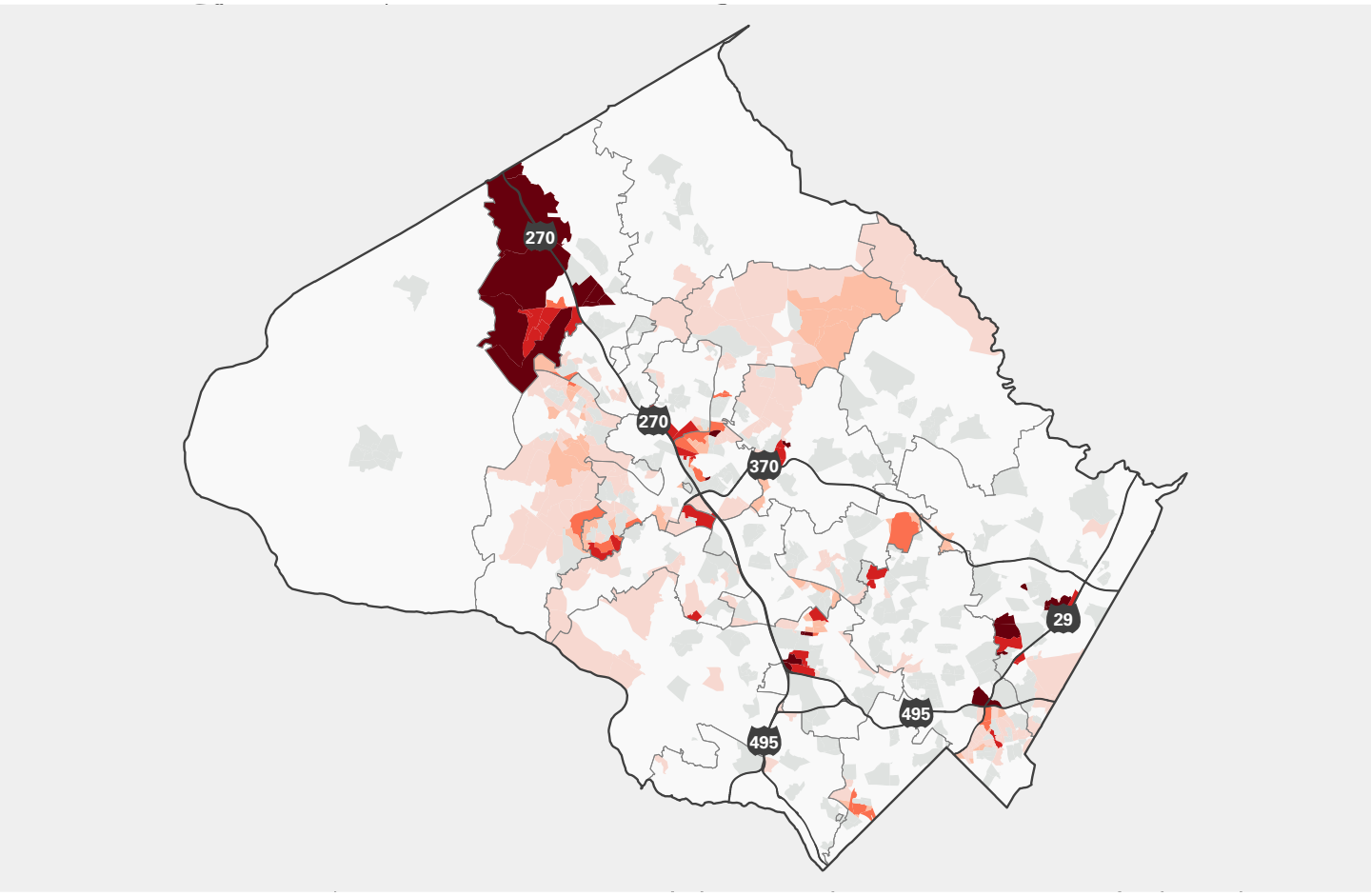
Figure 28 — High School Utilization by Percent of Students Rezoned to New Base School



Local Assignment Stability Impacts

As noted above, the Diversity Model was designed to understand whether it is possible to improve utilization and diversity metrics at the same time and to what extent. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas called planning blocks between two school attendance areas. Figure 29, below, maps the frequency that a planning block was rezoned from one school to another in all model runs.

Figure 29 — Likelihood that Planning Block was Assigned to New Elementary School Attendance Area

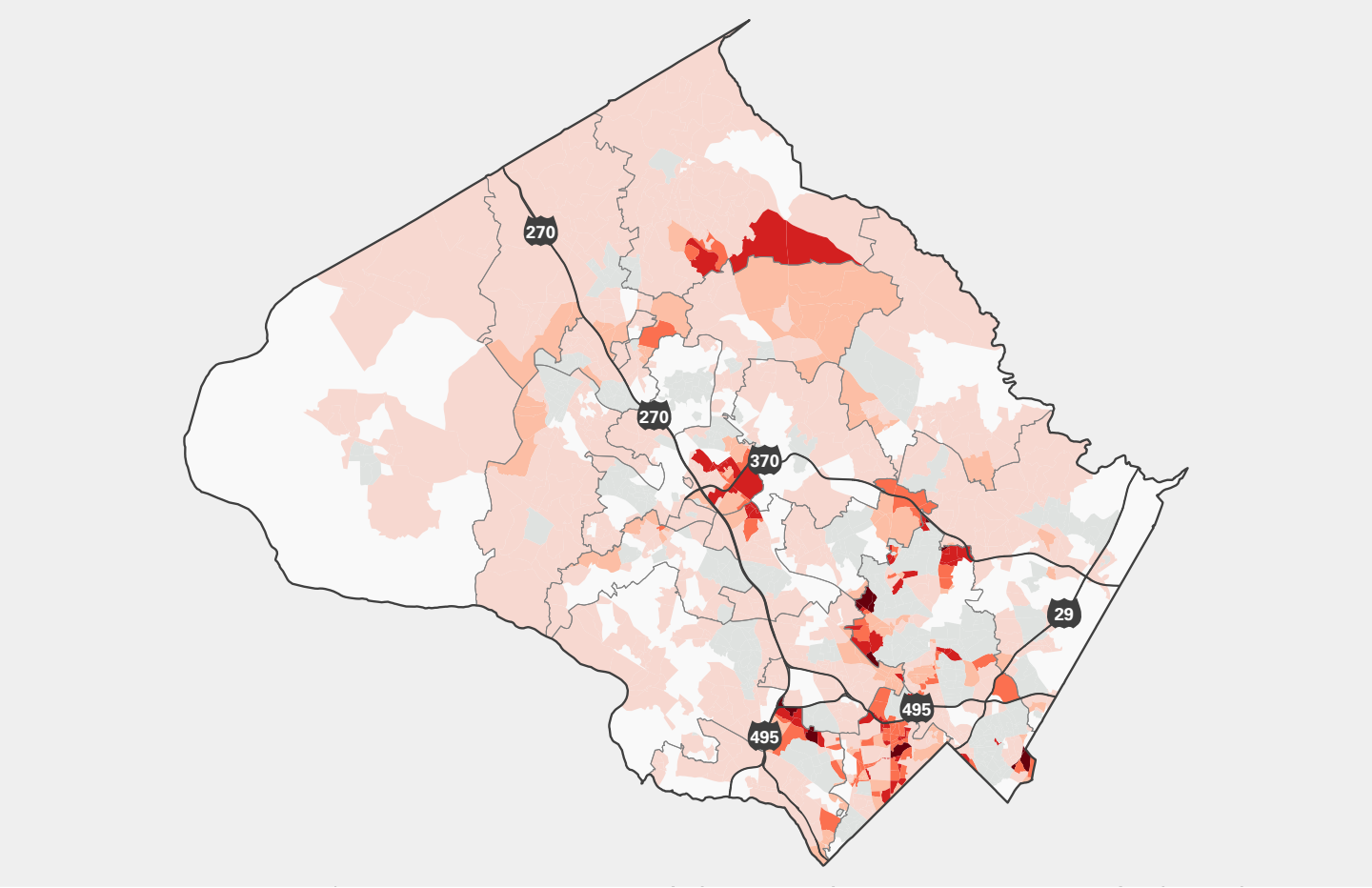


Some geographic patterns emerge. First, most models make the same targeted changes, suggesting that there are a number of low hanging fruit available to improve utilization and diversity metrics between neighboring schools. These changes tend to fall along the Interstate 270 corridor, though many opportunities exist elsewhere.

At the elementary school level many planning blocks are never swapped. This stands in sharp contrast to the middle and high school levels, where the Diversity Model explores far more possibilities in trying to improve utilization and diversity metrics simultaneously.

At the middle school level we find that changes are concentrated in the southwest corner of the district near Washington, D.C., in the Downcounty Consortium, and near Gaithersburg.

Figure 30 — Likelihood that Planning Block was Assigned to New Middle School Attendance Area



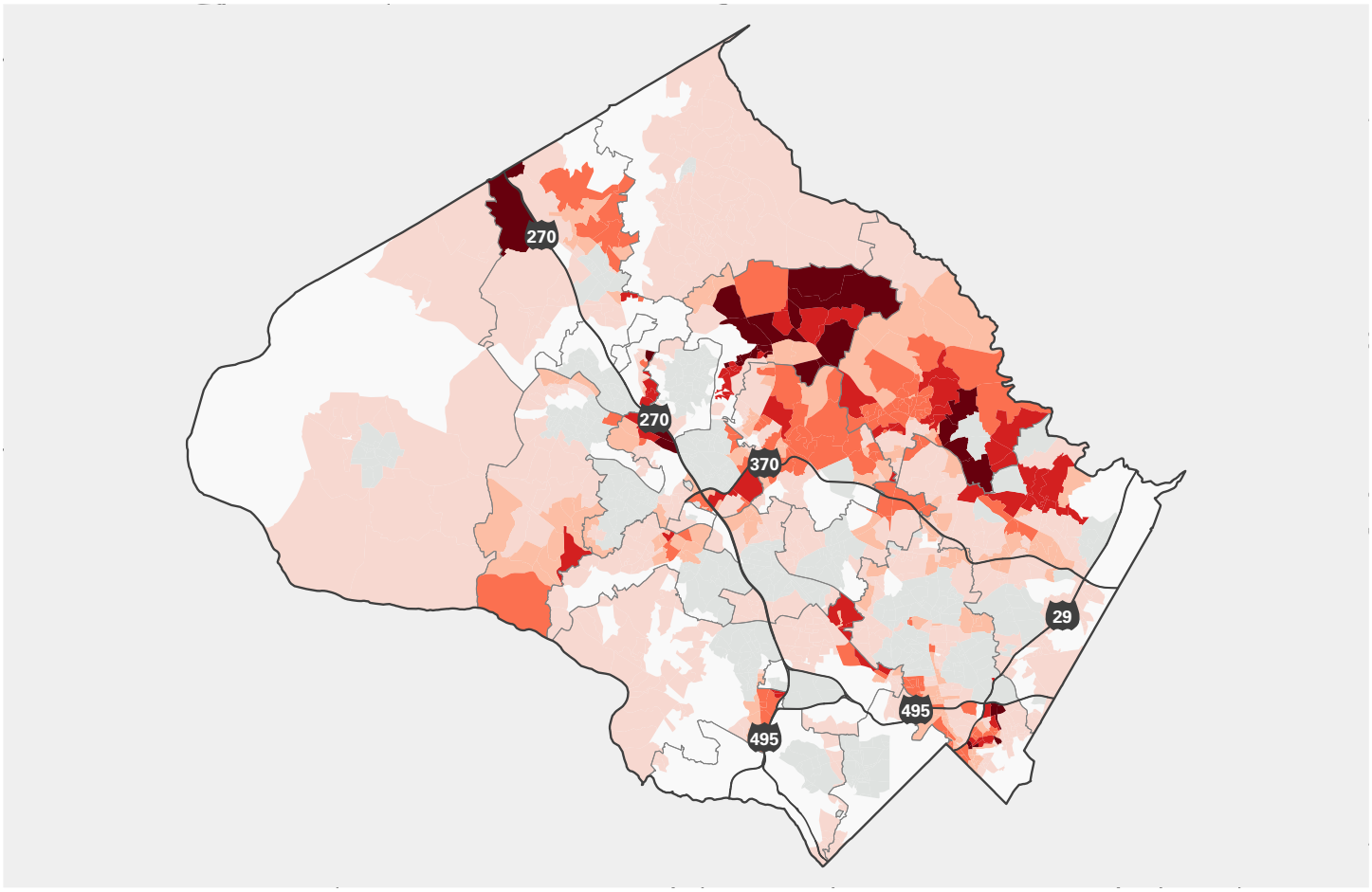
Share of model runs where planning block was rezoned to new school

1-8% *8-25%* *25-44%* *44-69%* *>69%*

Frozen planning blocks *Never swapped* *Cluster boundary*

At the high school level we find that planning block swaps are concentrated along Interstate 270, as with other models, but that a new geographic pattern emerges not seen in other models: a large number of planning block swaps concentrated in the lower density communities between the Northwest Consortium and the Gaithersburg Cluster.

Figure 31 — Likelihood that Planning Block was Assigned to New High School Attendance Area



Share of model runs where planning block was rezoned to new school

1-5% *5-14%* *14-26%* *26-43%* *>43%*

Frozen planning blocks *Never swapped* *Cluster boundary*

Impacts on Proximity

We find modest impacts to proximity in Diversity Model runs. Average school distances to school increased across all three models as the number of students rezoned increases. At the elementary and middle school levels, average distances to school do not increase by more than an eighth of a mile at the most. High school students would see their average distances to school increase at a maximum by a quarter mile.

Figure 32 — Average Change in Distance to School by School Level

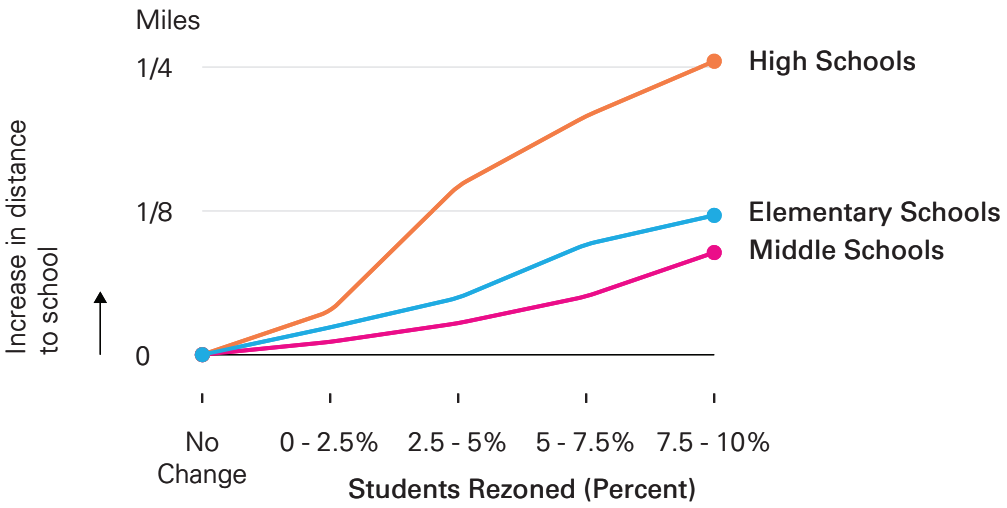


Figure 32, above, illustrates the average change in distance to school for students at each school level based on the number of students rezoned to a new base school. Note that the Y-axis has a range from zero — in which there is no change — to a quarter-mile.

These results suggest that any boundary plan that aims to substantially improve diversity metrics would likely have modest impacts on student distances to school on average.

4. Proximity A

Improving Utilization While Reducing Average Distances to School

Key Questions

To what extent is it possible to optimize distances to school while still targeting utilization measures? Can we optimize these two lenses together at a districtwide scale?

If MCPS sought to optimize utilization and distances to school at a districtwide scale, where should boundary changes be focused?

What are the model targets? What is it measuring?

This model seeks to maximize the number of schools near the districtwide utilization average for each school level while improving distances to school.

What isn't the model measuring?

We do not explicitly target assignment stability with this model, we only measure the impacts on this lens. Though the model does not explicitly target assignment stability, it does try to improve utilization and distances to school in the fewest number of changes, thereby implicitly considering assignment stability.

We do not target diversity measures with this model, and we simply measure the impact on this lens.

Proximity A Findings

After running the Proximity A Model 2,000 times at each school level, we found the following:

1. **Utilization Proximity Trade-Offs**
   Despite prioritizing proximity, the Proximity A Model was not readily able to improve distances to school and utilization at the same time when island assignments are maintained and when rezoning fewer than 10% of students. In fact, modest increases to distance to school were necessary to achieve significant utilization improvements.

2. **A Different Approach to Proximity is Needed**
   As noted above, the Proximity A Model was not able to improve distances to school while improving utilization and rezoning fewer than 10% of students.

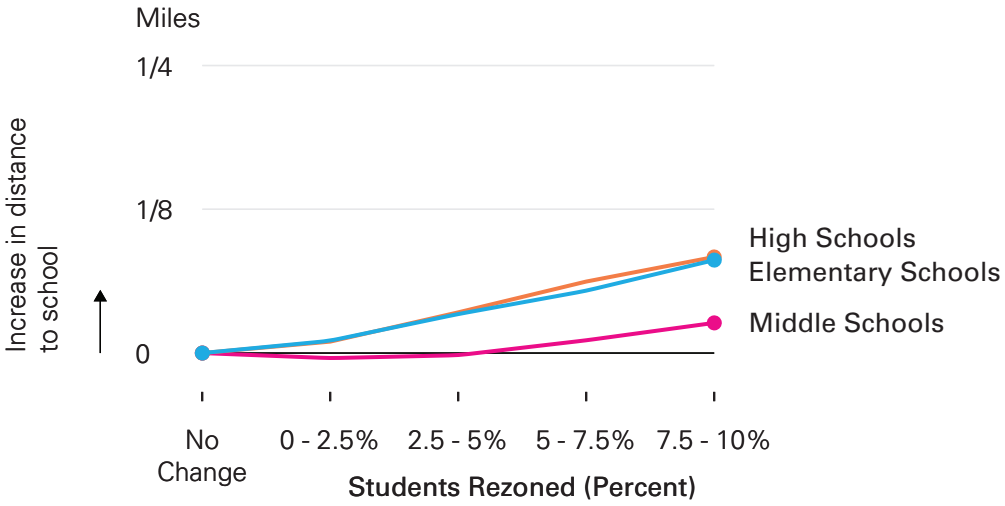
   However, it might be possible to improve distances to school by allowing more than 10% of students to be rezoned. What would be the impacts on utilization, assignment stability, and diversity measures if this approach were taken?

   Finding lackluster results for the Proximity A Model, we developed a second model that looks at proximity, the Proximity B Model. The Proximity B Model breaks from the other four models by analyzing boundary scenarios in which more than 10% of students are assigned to a new base school. Please see page 72 for the Proximity B Model.

Distance to School

Across model runs we observe minor increases in distance to school across school levels, despite tuning the model to prioritize minimizing distance to school along with balancing utilization. The average change across the entire district is modest and increase as more students are rezoned, reaching roughly 1/20th of a mile increase on average at the middle school level and a tenth of a mile at the elementary and high school levels on average. Across model runs and across the district localized increases and decreases to distance to school are observed across school levels.

Figure 33 — Average Change in Distance to School by School Level



Utilization and Assignment Stability

It is possible to improve school utilization while rezoning fewer than 10% of students to a new base school if existing cluster boundaries and articulation patterns are removed. These findings are similar to the Utilization B Model, with similar minor increases in distances to school, albeit having approached rezoning through an approach specifically targeted at reducing average distances to school.

Improvements in utilization were found across all proximity model runs and school levels in models that rezoned fewer than 10% of students:

- **Elementary schools:** At the elementary school level, it is possible to bring all schools within 82% and 120% utilization, with most schools near the districtwide average utilization of 102%. Currently, elementary schools are utilized between 61% and 201% of school capacity.
- **Middle schools:** At the middle school level, it is possible to bring all schools within 92% and 102% utilization, within five percentage points of the districtwide middle school utilization rate of 97%. Currently, middle schools are utilized between 69% and 122% of school capacity.
- **High schools:** At the high school level, it is possible to bring all schools within 99% and 106% utilization, within four percentage points of the districtwide utilization rate for high schools of 103%. Currently, high schools are utilized between 82% and 122% of school capacity.

5. Proximity B

Optimizing Distance to School Then Improving Utilization

Key Questions

Can distance to school be reduced while ensuring that utilization is optimally balanced across the district? If all students attend their closest school, can schools achieve the target utilization rate range?

What are the model targets? What is it measuring?

This model seeks to maximize the number of schools near the district-wide utilization average for each school level after optimizing the average distance to school. Unlike the other models, this model starts by reassigning students to their closest school (Step One), and then by balancing utilization (Step Two). The results shown in this section are a product of two distinct steps.

Step One rezones students to the school closest to their home, resulting in an input dataset that represents the optimal assignment based on distance to school, except for island assignments. Island assignments were maintained as inputs for consistency with the other models in light of significant concern around island assignments highlighted in the engagement process.

Step Two consists of model runs that search for opportunities to balance utilization based while ensuring that distance to school is minimally impacted.

What isn't the model measuring?

Like the other four models, this model implicitly seeks to reach its targets for average utilization rates and distance to school while maintaining assignment stability as much as possible.

This model seeks to preserve the new school assignments generated in Step One, as opposed to the other models that seek to preserve assignment stability relative to existing conditions. As a reminder, island assignments are maintained through Step One, but may change in Step Two. Changes to assignment stability are measured against the new starting point established in Step One, but are reported in reference to actual assignment stability.

This model does not focus on time spent traveling to and from school as a measure of proximity due to the availability of quality data. It also does not focus on the creation or modification of walk zones, since these zones are informed by both distance and road conditions. We do not target diversity measures with this model, though we do measure its impacts on this lens.

Proximity B Findings

After initially rezoning students to their closest school (Step One), we ran the Proximity B Model (Step Two), which simultaneously optimizes for utilization & proximity, 2,000 times and found the following:

Step One Findings

1. **While rezoning students to their closest schools reduces average distances to school, it negatively impacts assignment stability**
   After performing Step One, we see that at the elementary school level, rezoning students to their closest schools only decreases the average distance to school for all elementary students by 0.06 miles. At the middle and high school levels, rezoning all students to their closest schools reduces the average distance to school by 0.21 and 0.36 miles, respectively.

   Rezoning students to their closest schools requires significant reassignment of students: 18.6% of ES students, 25.0% of MS students, and 23.8% of HS students would need to be rezoned for students to attend their closest school (this assumes students in island assignments are kept in place after Step One).

2. **Rezoning students to their closest school has a drastic negative impact on utilization rates**
   Rezoning elementary school students to their closest school in Step One widens the total range of utilization rates from 62% - 200% to 34% - 225%. This increases the total number of overutilized elementary schools from 20 to 38. The effect is similar at the middle and

high school levels, with more schools becoming significantly under- and overutilized.

Step Two Findings

3. **Across each school level, it is extremely difficult to improve average distance to school and balance utilization.**
   At the elementary school level, model runs in Step Two that seek to balance utilization maintain up to 0.04 miles improvement in average distance to school, while increasing the number of highly overutilized elementary schools in the district from 20 to 38 compared to existing conditions. Although the number of highly overutilized schools increase over these model runs, the maximum utilization rate decreases to 164% compared to 200% under existing conditions.

   At the middle school level, model runs are able to reduce the average distance to school by up to 0.14 miles, while increasing the number of highly overutilized schools from two to four compared to existing conditions. At the high school level, model runs illustrate that an improvement of up to 0.36 miles is possible while balancing for utilization.

   At the elementary school level, it was not possible to significantly improve utilization, as observed in the other models, without slightly increasing the average distance to school. At the middle school level, the model reduces average distance to school by a tenth of a mile and makes modest improvements to overall utilization.

At the high school level, average distances are improved by 0.05 miles compared to existing conditions, but utilization rates are both higher and lower than under existing conditions.

4. **Optimizing distances to school and then balancing utilization has positive impact on diversity metrics.**

FARMS Dissimilarity

At the elementary school level, the most dissimilar schools showed a decrease of up to 1.7%, while the least dissimilar schools increased in dissimilarity by up to 1.7%.

At the middle school level, the most dissimilar and least dissimilar schools showed maximum changes of -1.7% and +2.4% respectively across model runs. At the high school level, the most and least dissimilar schools saw maximum changes of -3.5% and +8.6% respectively across model runs.

Racial Dissimilarity

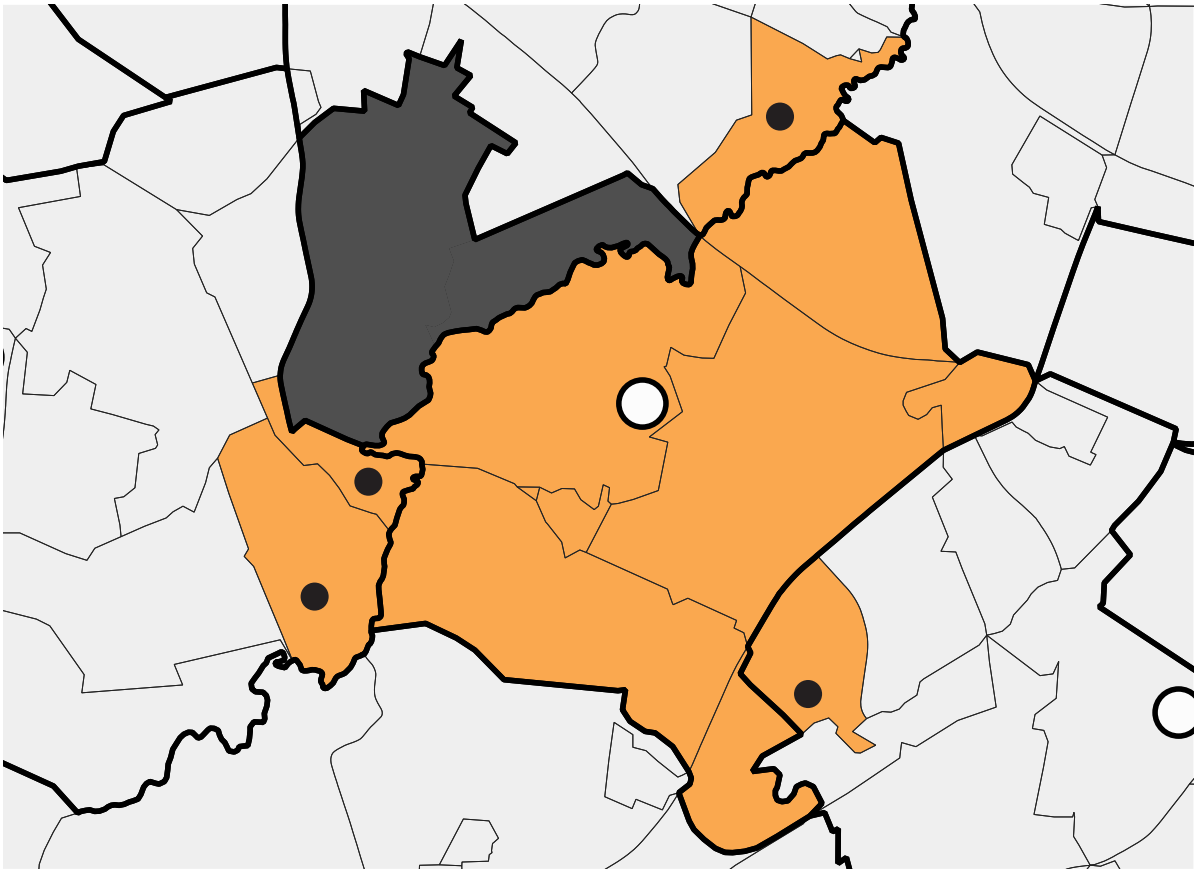
After the Step Two model runs, racial dissimilarity values exhibited similar changes across model runs compared to FARMS dissimilarity. At the elementary school level, the most dissimilar schools saw a decrease of up to 2.6%. The least dissimilar schools saw a maximum increase of 3.3% across model runs.

At the middle school level, the most and least dissimilar schools saw changes of 5.2% decrease and 3.6% increase, respectively. At the high school level, the most and least dissimilar schools showed maximum changes of -4.6% and +7.8% respectively.

Rezoning and Minimizing Distance to School

To approach the task of minimizing the average distance to school across all schools, an extra step was required before the model was run. Step One consisted of reassigning planning to the closest school based on the center point of each planning block.

Figure 34 — Average Change in Distance to Elementary Schools by Percent of Students Rezoned to New Base School



Example of new school attendance area after Step One rezoning
Planning blocks swapped before model runs

Existing School Boundaries
Island Assignment Planning Blocks
Planning Blocks
Schools

Island assignment polygons and other frozen planning blocks retained their original school assignment for consistency with other models and to ensure that resulting assignment areas are reasonably shaped. We acknowledge that reassigning students in island assignment areas as part of Step One would have a greater impact on both the reduction in average distance to school at each level, as well as the percentage of students that are initially reassigned.

Unlike the other models, which use the existing school assignment areas as a starting point for model runs, the Proximity B model uses these closest school assignment areas as the starting point for model runs. We refer to this first step of reassigning students to their closest school as the Step One rezoning.

Step Two consists of actually running the model to balance utilization rates, similar to the other models presented in this report. The logic used in the actual model runs is the same as that used in the Utilization B model. The Proximity B model is unique because of Step Two.

In order to best understand the potential of improving proximity to schools, this model does not treat assignment stability in the same way as the other models: 18.6% of ES students, 25.0% of MS students, and 23.8% of HS students are rezoned as part of the Step One rezoning before the model is run. The model then balances utilization across schools and cluster boundaries, using the same logic as the Utilization B model.

Impacts on Distance to School and Assignment Stability

After Step One, in which students are rezoned to their closest school, the model seeks to balance each school level's utilization rate. Some model runs increase the average distance to school while attempting to balance utilization. These model runs have been excluded from the following results.

Figure 35 — Average Change in Distance After Step One Initial Rezoning

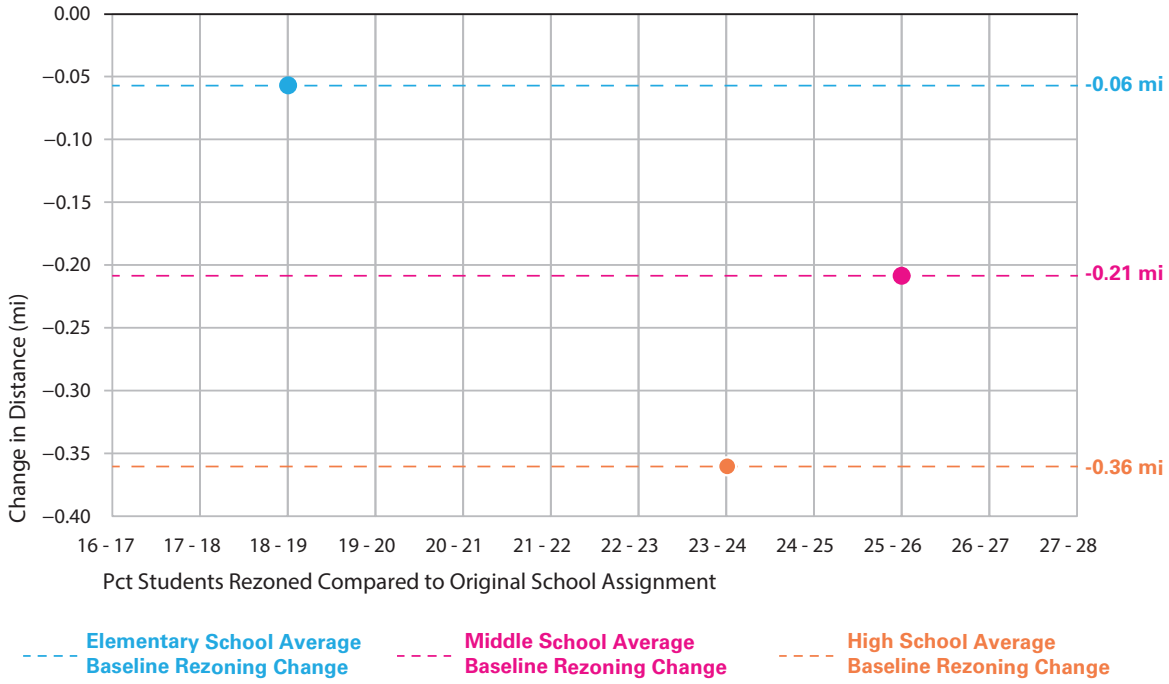


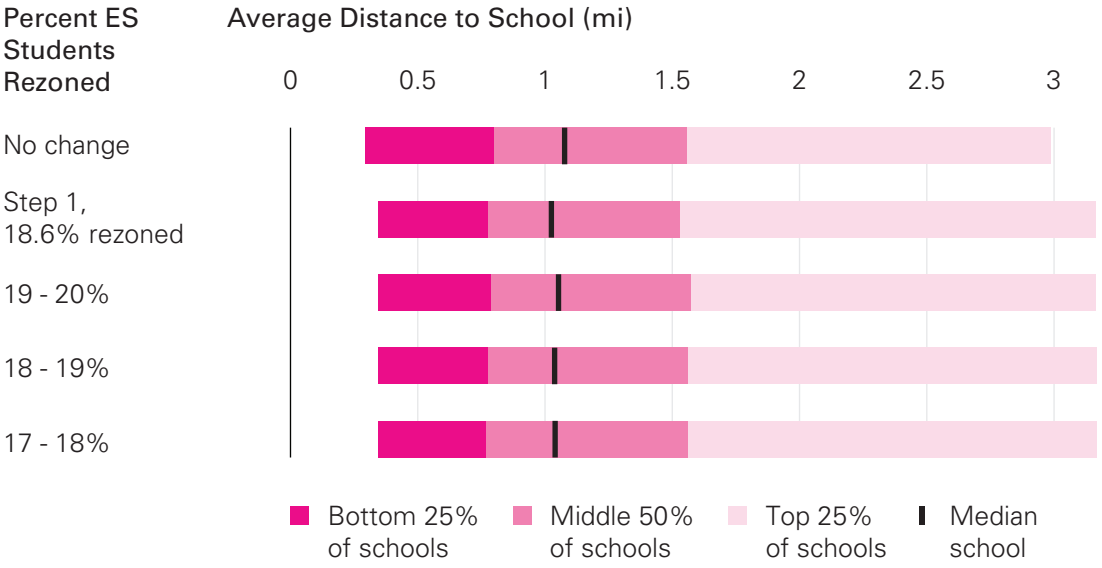
Figure 35 above shows the average change in distance for each school level after Step One is performed. Each dotted line represents the difference in average distance relative to existing conditions (represented as zero miles). At the elementary school level, a modest average improvement of 0.06 miles is observed, while a 0.21 mile and 0.36 mile average improvement are possible at the middle and high school levels, respectively.

The large colored points represent the percentage of students that are initially rezoned at each level to assign students to their closest schools. Assigning students to their closest schools would have substantial impact on assignment stability, requiring 18.6% of ES students, 25.0% of MS students, and 23.8% of HS students to be rezoned. As discussed in the following pages, this Step One rezoning creates new utilization challenges across the district. Step Two model runs attempt to improve utilization rates while maintaining an improvement in average distance to school, although doing so often diminishes the improvements in average distance to school.

Model Impacts on Distance to School

Figure 36 below shows how the average distance to elementary schools changes across model runs compared to existing conditions. The graph is organized so that the existing conditions are represented in the top bar; the Step One rezoning, which preserves current island assignments, is represented in the second bar; and subsequent model runs are shown in the remaining bars. Note that Step One starts by rezoning 18.6% of students. Subsequent model runs can rezone some students to their current base school, and decrease the total number of rezoned students (as shown by the bar labeled 17 - 18%), or rezone students to schools besides their closest school or their base school (reflected in the bar labeled 19-20%). The bar labeled 18-19% reflects model runs that rezone less than 1% of students compared to the Step One rezoning.

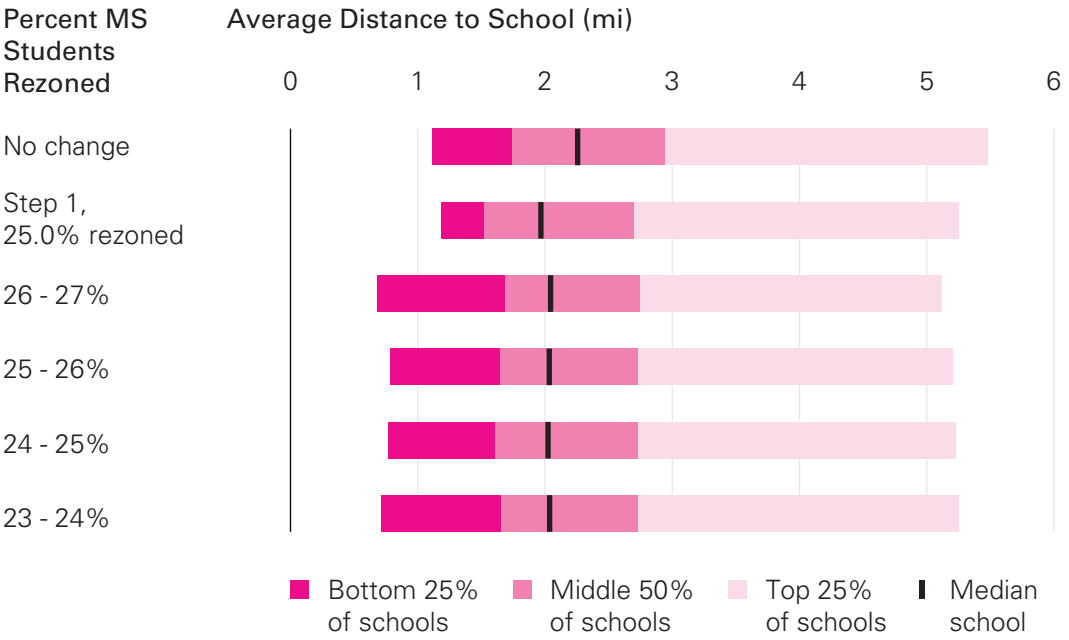
Figure 36 — Distribution of Change in Distance to Elementary Schools by Percent of Students Rezoned to New Base School



Taking the Step One bar as an example, we see that the median distance decreases slightly compared to existing conditions, from 1.07 miles to 1.02 miles. The median distances for the subsequent rezonings all remain below the current median distance to school. However, across each rezoning category, there is little overall change in distance to school. Note that retaining island assignments can restrict overall improvements in distance to school, and in a small number of cases may slightly increase the average distance to school as the contiguous assignment areas change.

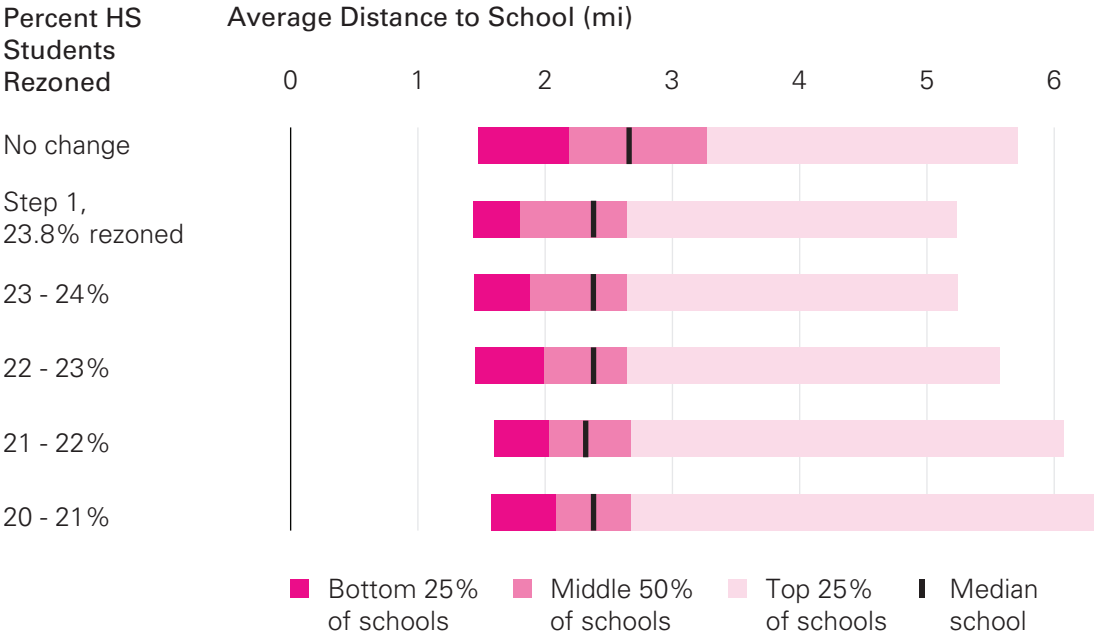
Figure 37 displays the same information for middle schools. We can see a more pronounced shift between the No Change scenario and the Step One rezoning scenario, with the median distance decreasing from 2.3 miles to just below two miles. Distances for the middle 50% and top 25% of schools also shift to the left, suggesting improvements in average distance for many middle schools in the initial rezoning. As students are rezoned across model runs, average distances to schools change, with certain schools achieving an average distance to school of less than a mile. This decrease in average distance compared to the Step One rezoning results in part from changes made to island assignment areas, which are maintained in the Step One rezoning.

Figure 37 — Distribution of Change in Distance to Middle Schools by Percent of Students Rezoned to New Base School



At the high school level, we see that each category of school shifts to the left in the Step One bar as compared to the No Change bar. As model runs rezone more students, illustrated in the bottom four bars, we see that the median distance remains similar, and lower than under existing conditions, but average distances for schools in the top 25% grow larger as more students are rezoned. In model runs at the high school level, the general trend was for students to be rezoned back to their original schools, which explains that the percentage of students rezoned decreases across model runs from 23 - 24% down to 20 - 21%.

Figure 38 — Distribution of Change in Distance to High Schools by Percent of Students Rezoned to New Base School



Utilization Rate Change

Targeting distance to school while prioritizing utilization produced mixed results across school levels and model runs. Across school levels, there is a general trade-off between reducing average distances to schools and balancing utilization. While decreases in average distance to school can be achieved at each school level, improvements to utilization are less successful compared to the other models that focus on utilization. As a reminder, the results presented in this section relate only to model runs that decrease the average distance to school. This section compares the impact of Step One rezoning (bar labeled Step One) and Step Two model runs (all bars below Step One bar) compared against existing conditions (top bar labeled "No change").

Figure 39 — Elementary School Utilization by Percent of Students Rezoned to New Base School

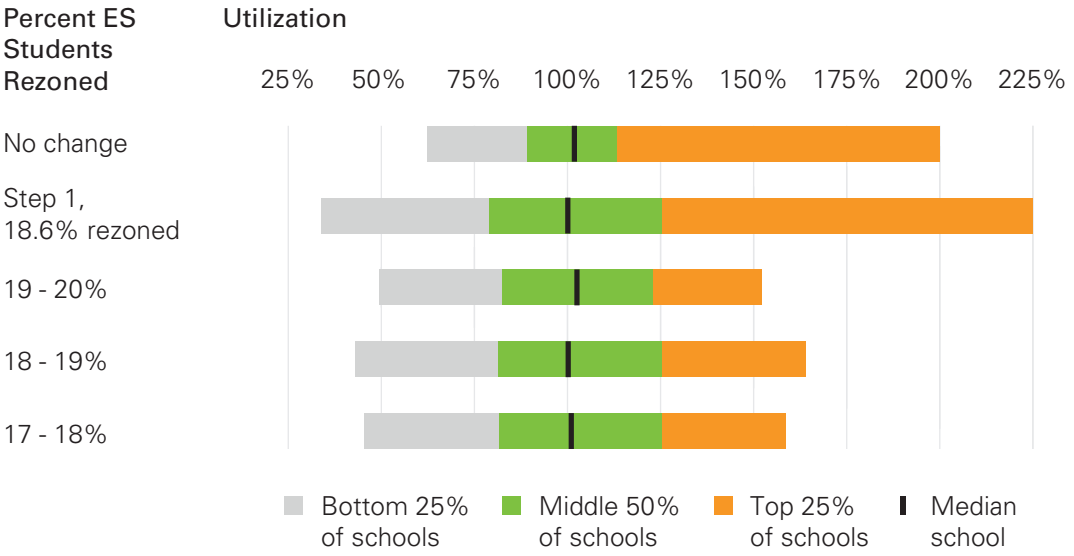
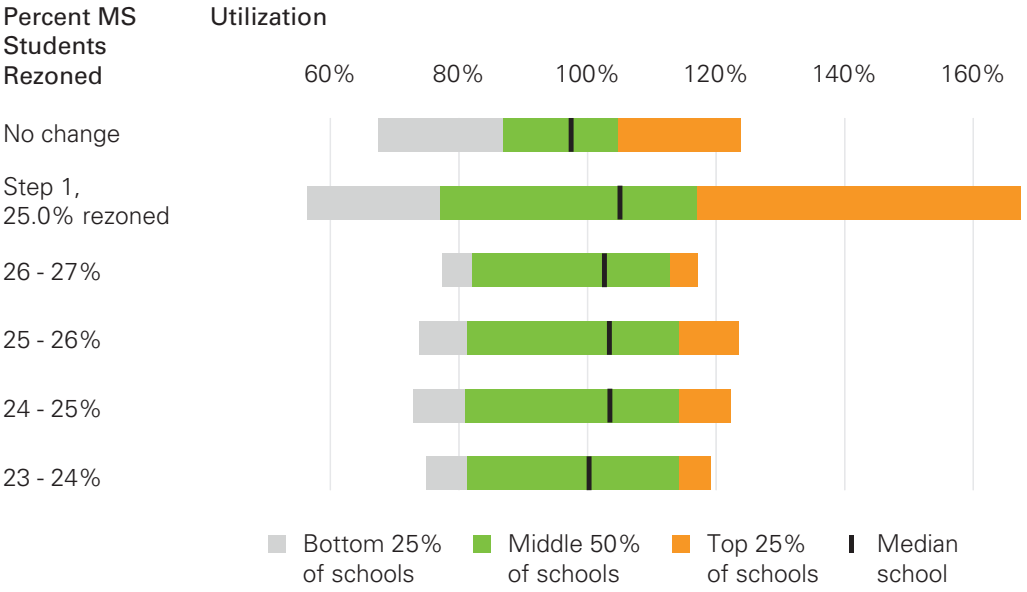


Figure 39 shows the impact on utilization achieved across Proximity B model runs at the elementary school level. Rezoning students to their closest schools, as illustrated in the Step One bar, has a negative impact on utilization rates across the district. Each of the colored bars is wider than in the No Change scenario, indicating that there is a greater variation in utilization rates under this scenario than there is under existing conditions. The lowest and highest utilization rates are 34% and 225%, compared to 62% and 200% in existing conditions. The remaining three bars reveal the average utilization rates of schools as students are rezoned across model runs. Even rezoning up to two percent of students beyond the Step One rezoning can have major benefits to balancing utilization. The bar labeled 18 - 19% rezoned less than one percent of students beyond the Step One rezoning, yet reduces the overall range of utilization rates to between 43% and 164%. While the overall difference between the most highly overutilized and underutilized schools in the district is reduced by 17%, more underutilized schools are created as a result. Model runs that rezone more students than the Step One rezoning (illustrated in the row labeled 19 - 20%) reduce the variation in utilization rates beyond existing conditions and the Step One rezoning scenario, but are not nearly as effective at balancing utilization as the other models. These results suggest that the goals of minimizing distances to school and balancing utilization rates across schools are at odds at the elementary school level even when students are initially rezoned to their closest school.

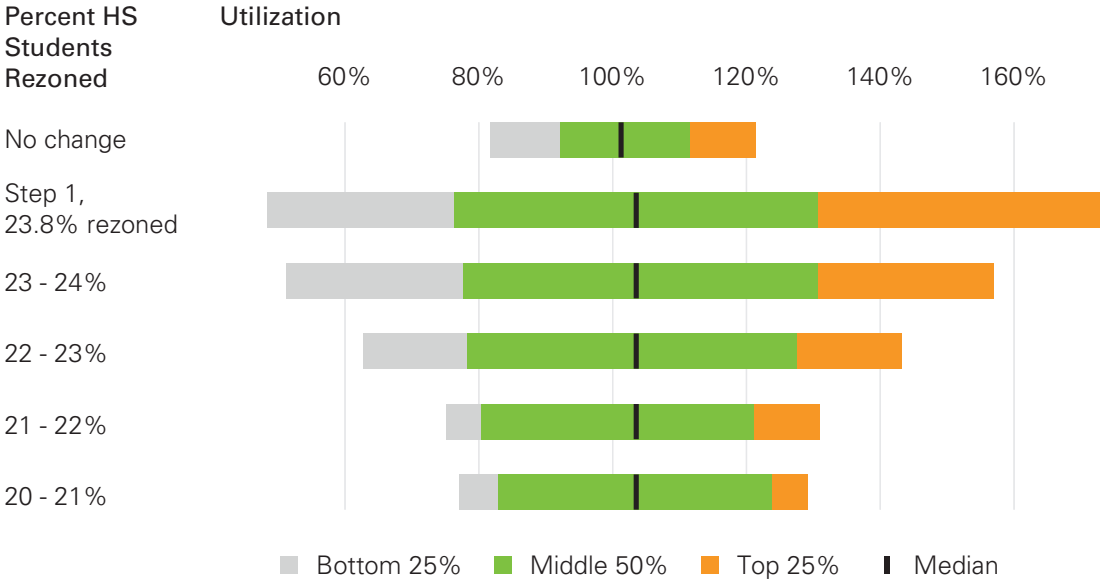
At the middle school level, the Step One rezoning has a similar negative effect on the overall balance of utilization rates, with more schools becoming underutilized and highly overutilized as compared to existing conditions. However, rezoning up to an additional two percent of students results in a narrower overall distribution of utilization rates than under existing conditions, illustrated in the bar labeled 26 - 27% in the figure below.

Figure 40 — Middle School Utilization by Percent of Students Rezoned to New Base School



At the high school level, we see that the utilization rates of schools where all students attend their closest school are less balanced than under existing conditions: not only is each colored bar wider, but the gray and orange bars extend much further beyond the target utilization range than they do under current conditions, as shown in the top bar. In model runs where more students are rezoned compared to the Step One rezoning, utilization rates are less balanced on average compared to existing conditions.

Figure 41 — High School Utilization by Percent of Students Rezoned to New Base School



Impacts on Diversity

The impact of Step Two model runs on racial or FARMS dissimilarity is beneficial at each school level when compared to existing conditions and similar to the results of Model 3 (Diversity). The following paragraphs discuss diversity metrics of Step Two model runs compared to existing conditions.

In terms of FARMS dissimilarity, the middle 20% of schools at the elementary school level exhibited a maximum average 0.3% increase in FARMS dissimilarity across model runs compared to existing conditions. The most dissimilar schools displayed a maximum average decrease in dissimilarity of 1.7%, while the least dissimilar schools showed a maximum average decrease of 1.7%

At the middle school level, there was a maximum average increase of 2.6% for the middle 20% of schools. The most and least dissimilar schools display maximum average changes of -1.7% and +2.4%, respectively. High schools exhibited similar behavior, with the middle 20% of students showing an average increase of 1.8% in dissimilarity, with the most and least dissimilar schools showing a maximum change of -3.5% and +8.6% respectively.

The impact on racial dissimilarity is similar across school levels. At the elementary school level, the middle 20% of schools saw a maximum average increase of 1.2% across rezonings. The most dissimilar schools dropped by 2.6% on average, while the least dissimilar schools increased by a maximum of 3.3% on average.

Middle schools exhibited similar degrees of change, with the middle 20% of students showing a maximum average decrease of 1.8%, while the most and least dissimilar schools changed by an average of -5.2% and +3.6%, respectively. At the high school level, the middle 20% of schools saw less than one percent change in dissimilarity. The most and least dissimilar schools saw maximum changes of -4.6% and + 7.8% respectively.

3. Community Engagement

Introduction

The second section of this report covers the intent, approach, and outcomes of Phase 2 of community engagement. The engagement activities in this phase built off of the engagement and analysis from Phase 1, and were centered around the Interactive Boundary Explorer (IBE), a virtual platform that allows community members and stakeholders to explore the data used in this analysis, and share their insights and feedback.

Due to the COVID-19 pandemic, engagement activities during Phase 2 were entirely virtual, including meetings and webinars held via Zoom, and self-guided use of the IBE tool, related resources, and the integrated online survey.

Engagement activities included:

- **Interactive Boundary Explorer (IBE)**, an online platform featuring an interactive data tool, resources, and an integrated survey
- **Areawide virtual meetings** (including two webinars and a community feedback and conversation event)
- **Small group meetings** to engage underrepresented groups
- **Student engagement** (including presentations at student leadership meetings and a countywide virtual student summit)

Engagement Overview

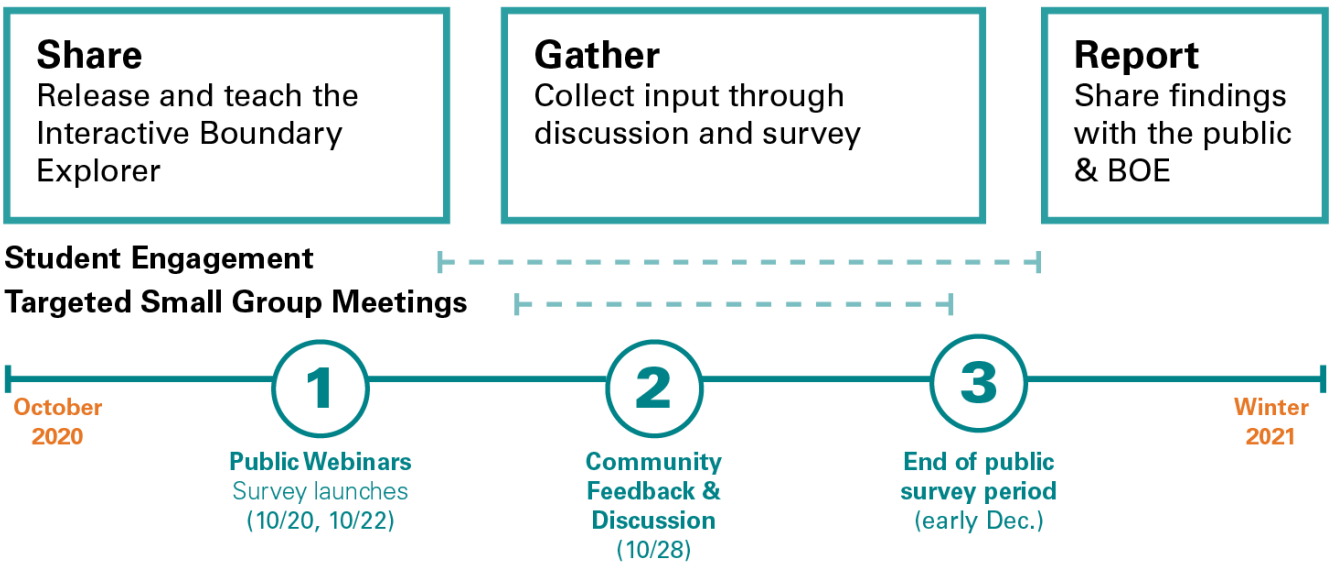
Phase 1 engagement served two purposes: to educate residents about the data that had been gathered on utilization, student diversity, proximity to schools, and assignment stability (the central lenses for the boundary analysis) and to gather feedback from residents about which factors they saw as most important to weigh when analyzing school boundaries as well as what should guide any changes to school boundaries across the district in the future.

Engagement for Phase 2 served a different, yet complementary purpose. This phase centers around the Interactive Boundary Explorer (IBE) tool that the consultant team designed and built, drawing from current MCPS datasets (2019-2020 school year) and from a deep understanding of the community's input in Phase 1.

The IBE Tool enables interested residents to visit the tool's website (https://interactiveboundaryexplorer.com/) and:

- Immerse themselves in the data that is being analyzed in the District Boundary Analysis initiative (throughout Phase 1, many residents had asked to see the data in greater detail)
- Access additional context about the analysis, explore visual data at the school, neighborhood, cluster, and district level
- Add their voices in sharing what they learned and what important insights emerge for them.

While our engagement approach in Phase 1 centered around large, face-to-face meetings in venues well distributed around the county, due to COVID-19, Phase 2 engagement had to be conducted virtually and in a tighter time frame (late October until the end of November).



The desired results from engagement in Phase 2 were to educate as many residents as possible about the IBE tool and encourage them to both use the interactive tool and provide feedback by filling out an extensive survey after using the tool. Once the website for the IBE tool had been completed, the WXY consultant team in collaboration with MCPS, promoted and recruited for three different sets of engagement activities: areawide public engagement (including public webinars and an IBE Community Feedback and Discussion Session), targeted small-group engagement, and student engagement.

Public Webinars

MCPS convened two, 90-minute, webinars-- one on October 20, the other on October 22. The webinars provided a full orientation to the IBE tool through a series of short demonstrations followed by a live practice session in which attendees gained access to the tool site and completed a ten-minute exercise that allowed them to use a few basic aspects of the tool. The webinars closed with a Q&A session.

Numbers Engaged: 167 at the first meeting; 113 at the second meeting – 280 total
Live stream views: 430+

IBE Community Feedback and Discussion Session

MCPS convened a single, virtual, 90-minute, dialogue session on October 28th, a week after the initial webinars which launched Phase 2 of the engagement. Participants were asked to spend time exploring the IBE before this session, using key questions shared during webinars as a guide.

The purpose of this community feedback session was to facilitate a deliberation among residents based on their time using the IBE about what insights they were able to draw from looking at school boundaries through the lenses of facility utilization, diversity, and proximity to schools.

Attendees were encouraged to continue to use the tool and to share the link with friends, neighbors, and their school community.

Numbers Engaged: 115 participants; 178 live stream views

Small Group Meetings

There are many populations that experience barriers to participation in community meetings, but whose views, perspectives, and lived experiences are essential to gather. Thus, the purpose of the small group meetings is to make sure that important segments of the Montgomery County population, which were underrepresented in the larger meetings, still have an opportunity to learn about and provide feedback on the IBE tool. These segments include low income residents and people associated with some racial, ethnic, cultural, or language groups.

Small group meetings during Phase 2 ran between 60-75 minutes, following a similar format and conveying the same information as the public webinars and feedback session. Due to the smaller group size (between eight to ten in each meeting), these sessions allowed more time for participant questions and discussion around the use of the IBE.

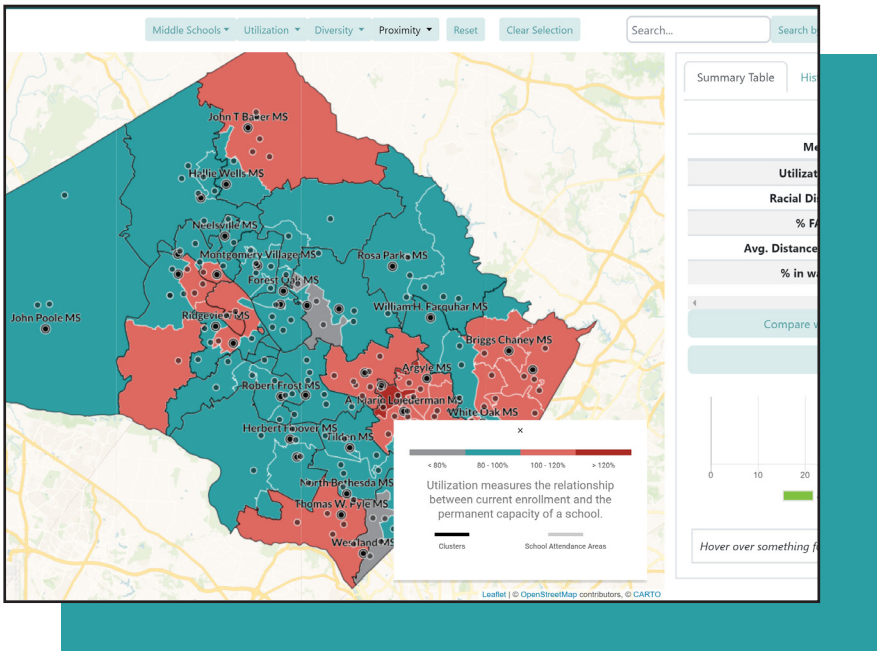
Numbers Engaged: 51 participants across five separate meetings

Student Engagement

Throughout the Phase 2 engagement process, the WXY team collaborated with the Office of School Support and Improvement, the Montgomery County Regional SGA (MCR), and the Student Member of the Board of Education (SMOB) to coordinate a series of engagements with MCPS students. Earlier in the process, these engagements consisted of short presentations at existing meetings organized by student leaders from Montgomery County Regional SGA (MCR) and the SMOB to raise awareness and gather initial comments and questions about the IBE from students. The process culminated in two longer discussion-based virtual events organized by the same leadership organizations.

The two discussion-based events—held on December 9 and December 19th –used student presentations of their IBE findings as a catalyst for small group discussions held in student-led breakout rooms. In each case, participants reconvened following breakout conversations to exchange highlights and insights based on their time using the IBE.

Numbers engaged: 412 students across five separate meetings



Screenshot of the Interactive Boundary Explorer (IBE)

What did we learn?

Insights from the Interactive Boundary Explorer (IBE)

Interactive Boundary Explorer Overview

The Interactive Boundary Explorer (IBE) is an online platform that was developed to give the MCPS community an opportunity to interact with the data being analyzed as part of the Districtwide Boundary Analysis, and add their voice to the process. The IBE was the central platform for Phase 2 engagement.

The IBE is a two-way engagement tool: it both allows users to see, learn, and interact with information and data, and gathers feedback and input from these users. User feedback is gathered primarily through an integrated survey instrument on the website. The IBE has three main functions:

- **A resource for information and context:** users can browse high-level insights from the data analysis and read definitions to key terms and concepts.
- **A portal to explore data:** the IBE allows users to conduct their own inquiry, searching for schools, reading the data table, and visualizing data about utilization, diversity, and proximity on a map, histogram, or scatterplot.
- **A platform for public input:** users were encouraged to complete the survey after spending time on the IBE to provide their input about challenges and opportunities related to school boundaries in MCPS, and their priorities for future planning.

Challenges and Opportunities

In the context of the COVID-19 pandemic, this mechanism for engagement presented both advantages and challenges. The virtual nature of the tool presented an opportunity for community members to participate in the process safely, and with a degree of interactivity and agency that might not be seen in a typical virtual engagement process.

Summary of Insights

- Survey respondents tended to be parents of MCPS students (64%), while 27% were students. About 54% reside in the Southwest of the county (including Bethesda, Potomac, Chevy Chase).
- While respondents identified a range of challenges with school boundaries at the ES and HS levels, most challenges identified at the middle school level (66%) relate to proximity.
- In terms of priorities, respondents emphasized proximity to schools and student assignment stability (including minimizing boundary changes and minimizing the number of students impacted by them).
- 18% of respondents say that the COVID-19 pandemic has changed their priorities around school boundaries.

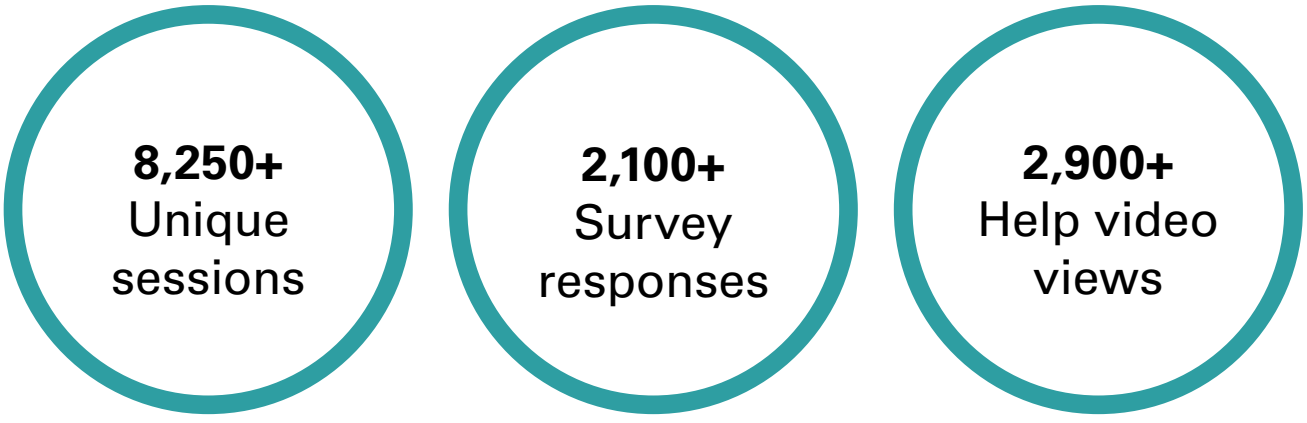
Access to data presents an opportunity for greater transparency in the boundary analysis process, and for more informed conversations. By having access to relevant datasets, participants have the opportunity to challenge their own assumptions or opinions, seeing how their lived experience compares to the trends and conditions seen in the data.

One challenge for meaningful engagement with the IBE is data literacy. Among members of the public there is a wide range of familiarity and comfort levels with data. To address this, the IBE features a "Getting Started" section with several resources to aid users in navigating the tool's functions and the data itself (all translated into several languages): six help videos, participant worksheets (or "cheat sheets") with step by step instructions, click-through guided exercises. Comments in public engagement suggest that these resources aided many users, however the time required to both learn the tool and use it may have been a barrier to entry for many members of the public.

Other challenges for IBE use include: technology access (the data tool is not compatible with mobile devices, so users needed both access to broadband and to a laptop, desktop, or tablet), and ongoing urgent issues in the school system (namely, the COVID-19 pandemic, virtual learning, and a plan for re-opening schools for in person instruction). Many respondents on the IBE survey and attendees at areawide engagement events expressed a desire to see MCPS prioritize their work on COVID-19 and school reopening, and expressed criticism of the timing of this engagement in light of other pressing challenges facing the school system.

Due perhaps in part to some of the challenges named above, and the inability to host in-person meetings in several regions of the county, IBE survey respondents were not representative of the wider population of Montgomery County in terms of racial demographics and geographic region of residence within the county.

Response rates for several questions -- particularly those later in the survey-- are much lower than the total response rate for the survey. Users were not required to fill out all questions, and could submit a survey at any point of completion. The survey results shared later in this section include response rates for added context.



Use of the Interactive Boundary Explorer, October 20, 2020 to December 1, 2020.

Key Insights

The following pages share the findings from the IBE survey, based on usage between the tool launch on October 20, 2020 and December 1, 2020. It should be noted that, while this cut-off was necessary to adhere to the report and presentation timeline, data will continue to be collected throughout the month of December, and passed on to the MCPS Board of Education.[1]

User Demographics

Of respondents to the IBE survey before December 1, 2020:

- 40% identify as White/Caucasian, 29% selected "I do not care to say." After these categories, the most represented group was Asian American/Pacific Islander at 15%.
- 54% live in the southwest of the county, in the vicinity of Bethesda, Chevy Chase, and Potomac. Second to this region was the Central part of the county (Rockville, Derwood) at 16%.
- 64% of respondents were parents of past, present, or future MCPS students. 27% of respondents were students.

Priorities

- Survey respondents rate proximity to school and assignment stability as their top priorities: 87% of respondents rating "ensuring students live as close as possible to school" as extremely important, and 82% of respondents rated "minimizing students impacted by boundary changes" as extremely important.
- Respondents tended to indicate diversity as a much lower priority: 36% of respondents rated "balancing socioeconomic and racial diversity between nearby schools" as not important, and only 10% rated it as extremely important.
- While 45% of respondents see utilization as important, only 19% rate it as extremely important.
- Survey results show key differences in priorities among residents based on region of residence. The priorities of respondents in the Southeast part of the district tended to vary the most from those in other regions, with a much higher proportion of respondents rating "Balance diversity among nearby schools" as important or extremely important than the district as a

1 An analysis of duplicate responses was conducted for quality control, using unique user ID's. 28 duplicate results were eliminated from analysis, amounting to about 1% of total responses. In these instances, only one randomly selected submission from each IBE user was considered in the analysis.

whole, fewer rating proximity priorities as extremely important, and far more emphasizing utilization as important. The southern region follows a similar pattern relative to the district as a whole, though differences are less strongly pronounced. Given the relatively small sample size for these and other regions, further research is recommended to understand how community priorities vary across the district's regions.

- When asked about whether COVID-19 had shifted their priorities with regard to school boundaries, 18% of respondents said it has changed their priorities, while 82% said COVID-19 has not changed their priorities.

Challenges and Opportunities

Challenges by school level

- Across school levels, the three challenges respondents identified most often were utilization (balancing utilization rates among nearby schools), high racial dissimilarity between nearby schools, and far distances between home and school.
- These challenges shift by lens across school levels, with the most distinct trend being proximity challenges at the MS level:
  - At the ES level, respondents identified proximity challenges somewhat more often than utilization and diversity, with 31% utilization, 28% diversity, and 40% proximity challenges.
  - At the MS level, respondents consider distance to school the greatest challenge. Altogether, approximately 66% of reported challenges at this level related to proximity, as compared to 24% for diversity and 11% for utilization.
  - At the HS level, proximity to school is also identified most often as a challenge (51%), as compared to utilization (22%) or diversity (27%).

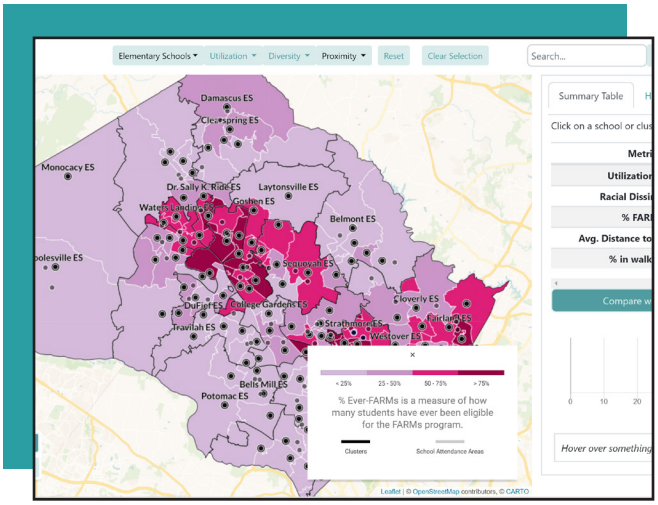
Challenges by cluster

- Respondents identified utilization challenges most often in: Clarksburg, Downcounty Consortium, Walter Johnson, and Bethesda-Chevy Chase
- Respondents identified diversity challenges most often in: Winston Churchill, Walt Whitman, Bethesda-Chevy Chase, and Downcounty Consortium
- Respondents identified proximity challenges most often in: Clarksburg, Poolesville, and Downcounty Consortium

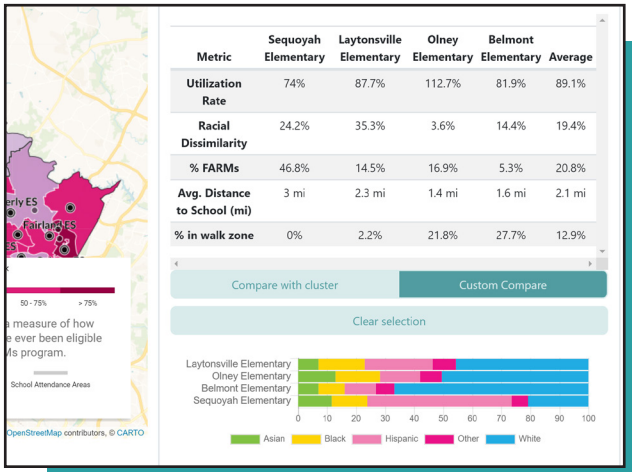
Opportunities to balance the lenses

- Across clusters and school levels, the three factors respondents rated as the greatest opportunities to balance the lenses were:

    1. Decreasing racial dissimilarity between nearby schools
    2. Balancing utilization between nearby schools
    3. Balancing FARMS rates between nearby schools



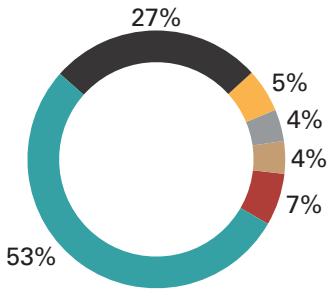
The data tool within the IBE displays a map view on the left, and a data summary panel on the right. Both of these views can be customized and used to visualize data in different formats.



Interactive Boundary Explorer Survey Results

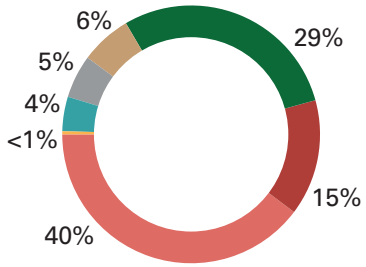
1. Demographics

A. Select all of those that apply to you:



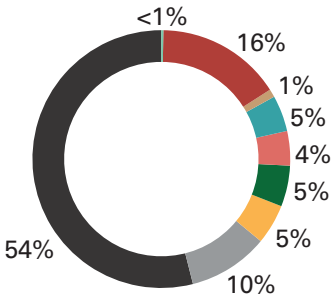
- I am a Pre-K-12 student in MCPS
- I am a teacher/staff member at MCPS
- I am a parent/guardian with kids currently in MCPS
- I am a parent/guardian with kids who will attend MCPS
- I am a parent/guardian who used to have children in MCPS
- Connected to the county in other ways

B. I consider myself:



- African American/Black
- Caucasian/ White
- Hispanic or Latino
- Asian American or Pacific Islander
- Native American
- More than one race
- I don't care to say

C. Which of these best describes where you live:



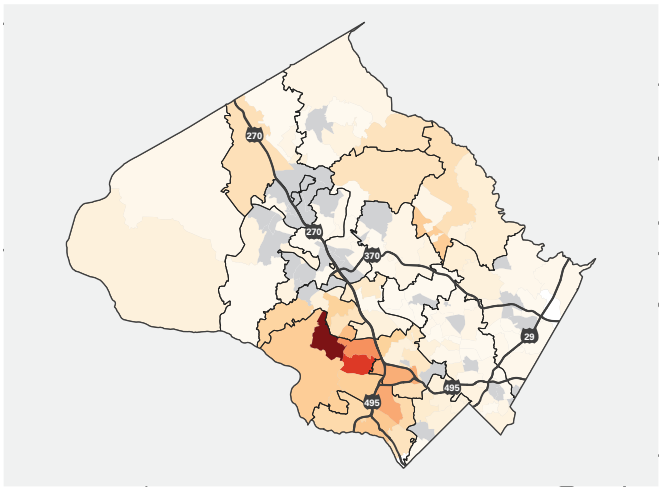
- North Central: In the vicinity of Gaithersburg and Montgomery Village
- Northeast: In the vicinity of Damascus and Clarksburg
- Northwest: In the vicinity of Poolesville, Dickerson, Boyds and Germantown
- Central: In the vicinity of Rockville and Derwood
- East: In the vicinity of Colesville, Fairland and Burtonsville
- South: In the vicinity of Sliver Spring, Takoma Park, Wheaton and White Oak
- Southwest: In the vicinity of Bethesda, Chevy Chase and Potomac
- I live outside Montgomery County, but connected to the county in other ways

Response rate: A (2,041 responses); B (1,987 responses; C (1,975 responses)

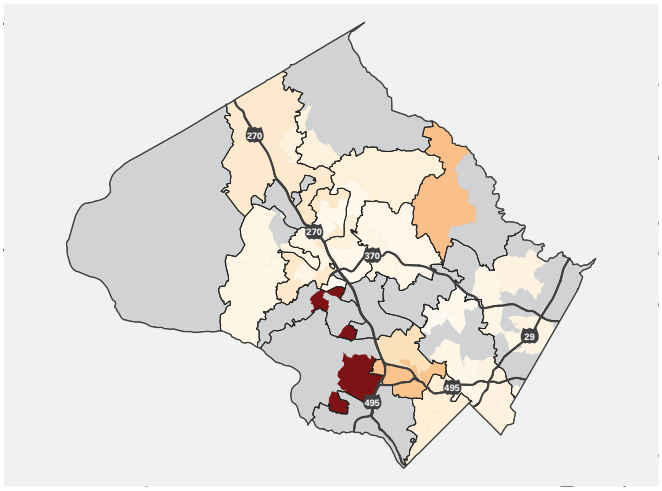
2. Schools of Interest

Participants were asked to indicate any school or schools they are particularly interested in (i.e. the school they attend or their child attends). The geographic pattern for these responses in large part mirrors the demographic data for survey respondents in that it is focused on the southwest region of the county. However, there are exceptions to this, such as an interest in the Sherwood cluster.

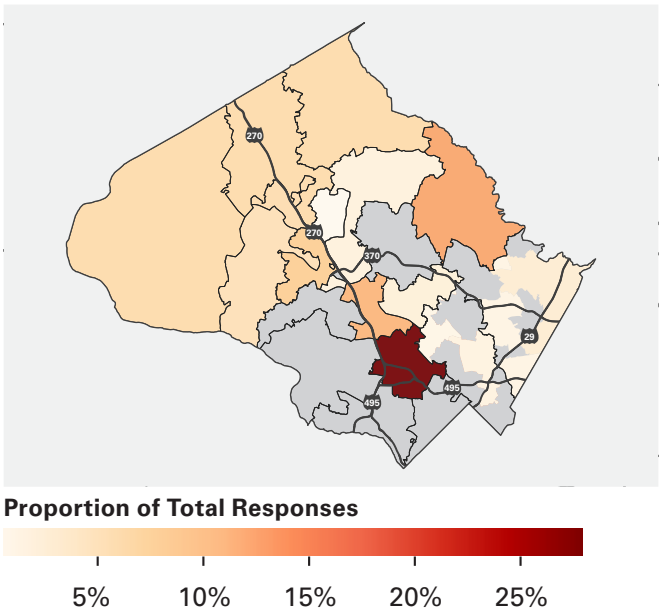
Elementary Schools



Middle Schools



High Schools



Schools of particular interest included:

- **Elementary Schools:** Wayside, Bells Mill, Beverly Farms, Ashburton, Burning Tree, Potomac
- **Middle Schools:** Cabin John, North Bethesda, Rosa Parks
- **High Schools:** Walter Johnson, Richard Montgomery, Sherwood

Response rate: 1,110 responses

3. Perception of Balance Between the Lenses

Overall, most respondents said they feel that utilization, diversity, and proximity are well balanced or very well balanced between their/their child's school and its nearby schools. The proportion of respondents who gave each rating was fairly equivalent across the three lenses surveyed, with proximity gaining the highest proportion of "very effective" ratings.

How effectively do you think utilization, diversity, and proximity are balanced between your (/your child's) school and its nearby schools?

Utilization

Diversity

Proximity

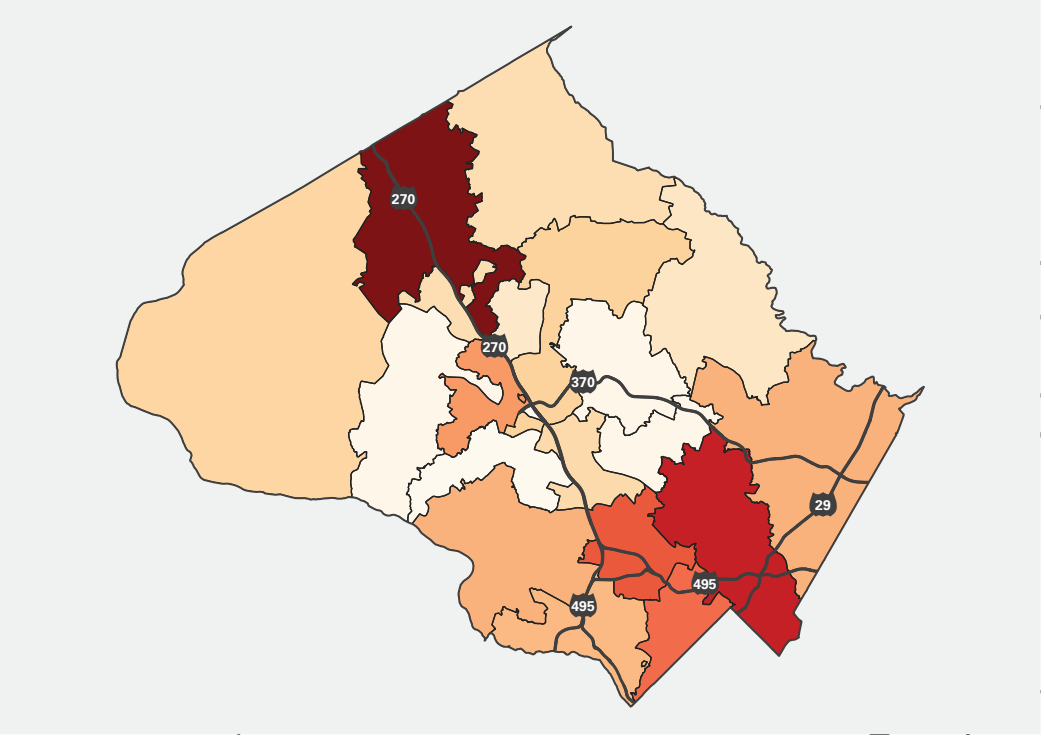
Response rate: Utilization (1,144), Diversity (1,151), Proximity (1,157)

4. Challenges: Utilization

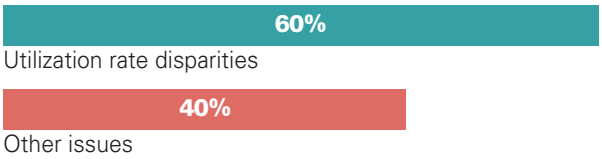
Respondents indicated challenges with utilization in the following clusters most often: Clarksburg, Downcounty Consortium, Walter Johnson, and Bethesda-Chevy Chase.

Are there any clusters where you see significant challenges with utilization?

Figure 42 — Utilization Challenges



What kind of challenges?



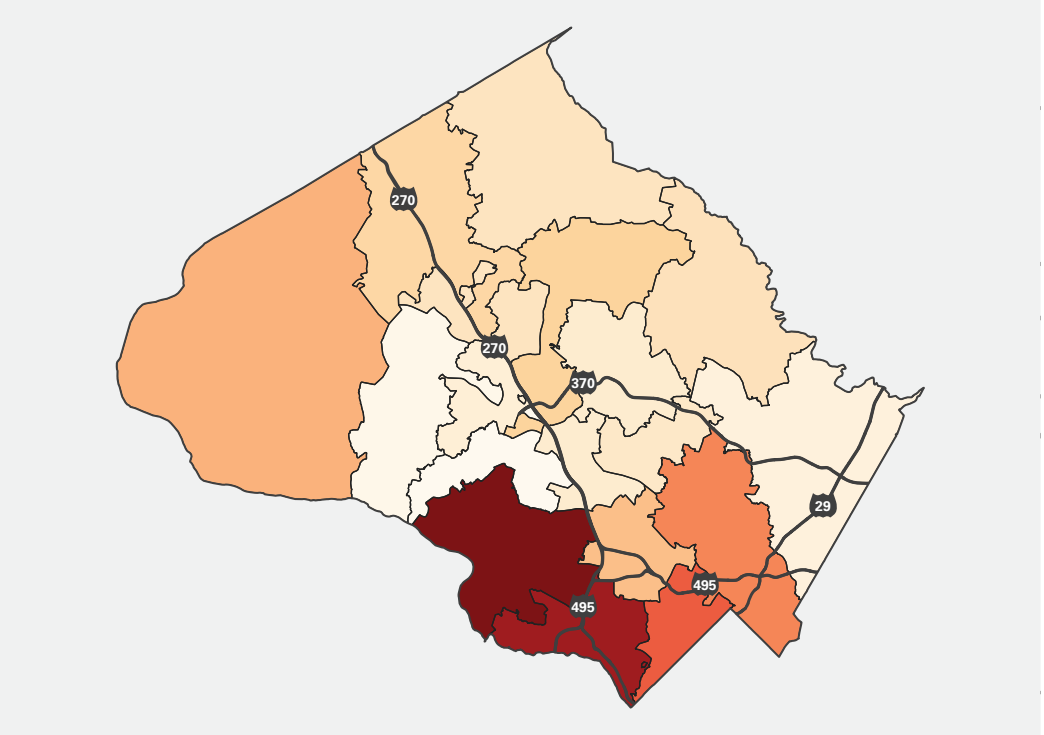
Response rate: Clusters (164 responses), Kind of challenges (727 responses). Note: Multiple responses were possible. Respondents may have selected challenge types without specifying a Cluster.

5. Challenges: Diversity

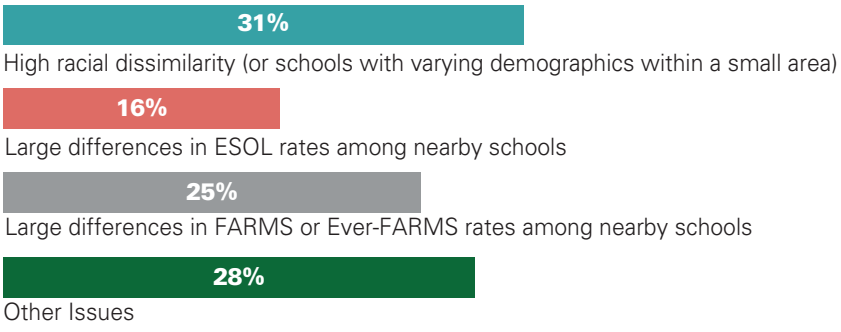
Respondents indicated challenges with diversity most often in the following clusters: Winston Churchill, Walt Whitman, Bethesda-Chevy Chase, and Downcounty Consortium. The challenges cited most often were high racial dissimilarity and "other."

Are there any clusters where you see significant challenges with diversity?

Figure 43 — Diversity Challenges



What kind of challenges?



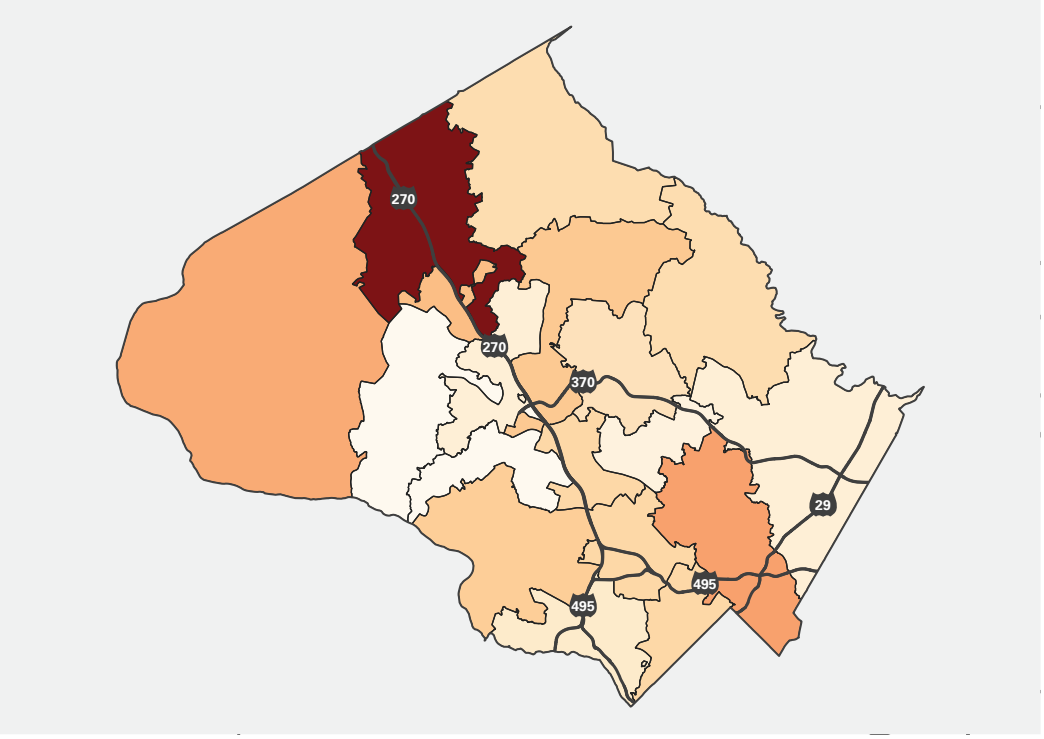
Response rate: Clusters (127 responses), Kind of challenges (718 responses). Note: Multiple responses were possible. Respondents may have selected challenge types without specifying a Cluster.

6. Challenges: Proximity

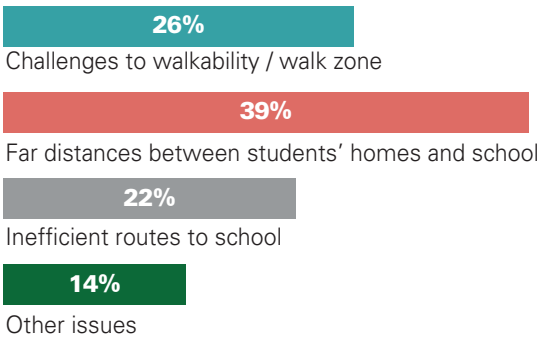
Respondents indicated challenges with proximity to school most often in Clarksburg, Poolesville, and the Downcounty Consortium.

Are there any clusters where you see significant challenges with proximity?

Figure 44 — Proximity Challenges



What kind of challenges?



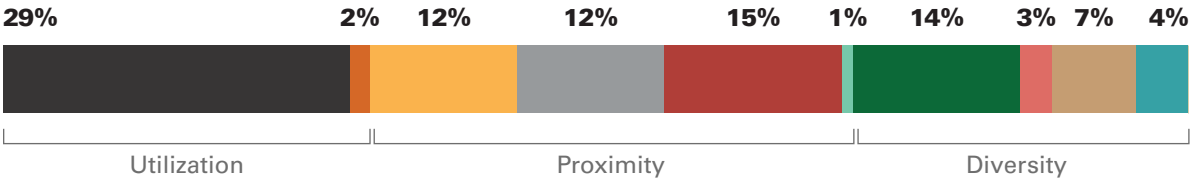
Response rate: Clusters (127 responses), Kind of challenges (705 responses). Note: Multiple responses were possible. Respondents may have selected challenge types without specifying a Cluster.

7. Challenges by School Level

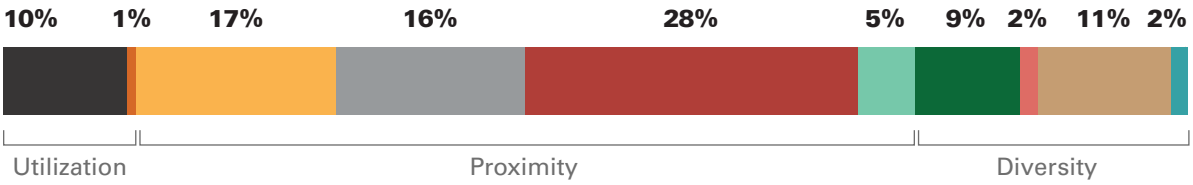
Challenges identified by respondents shift by lens across school levels, with the most distinct trend being proximity challenges at the middle school level.

Which school levels (elementary, middle, high) across the entire district do you think have the greatest challenges with school boundaries?

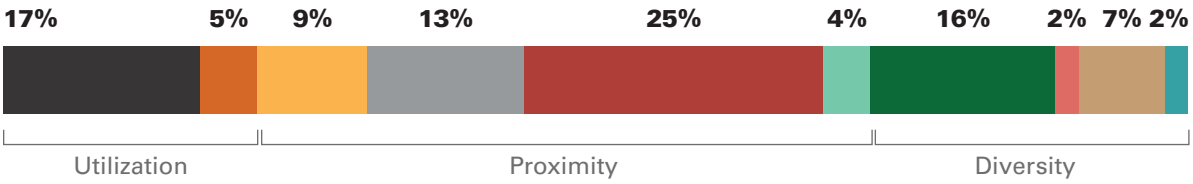
Elementary Schools



Middle Schools



High Schools



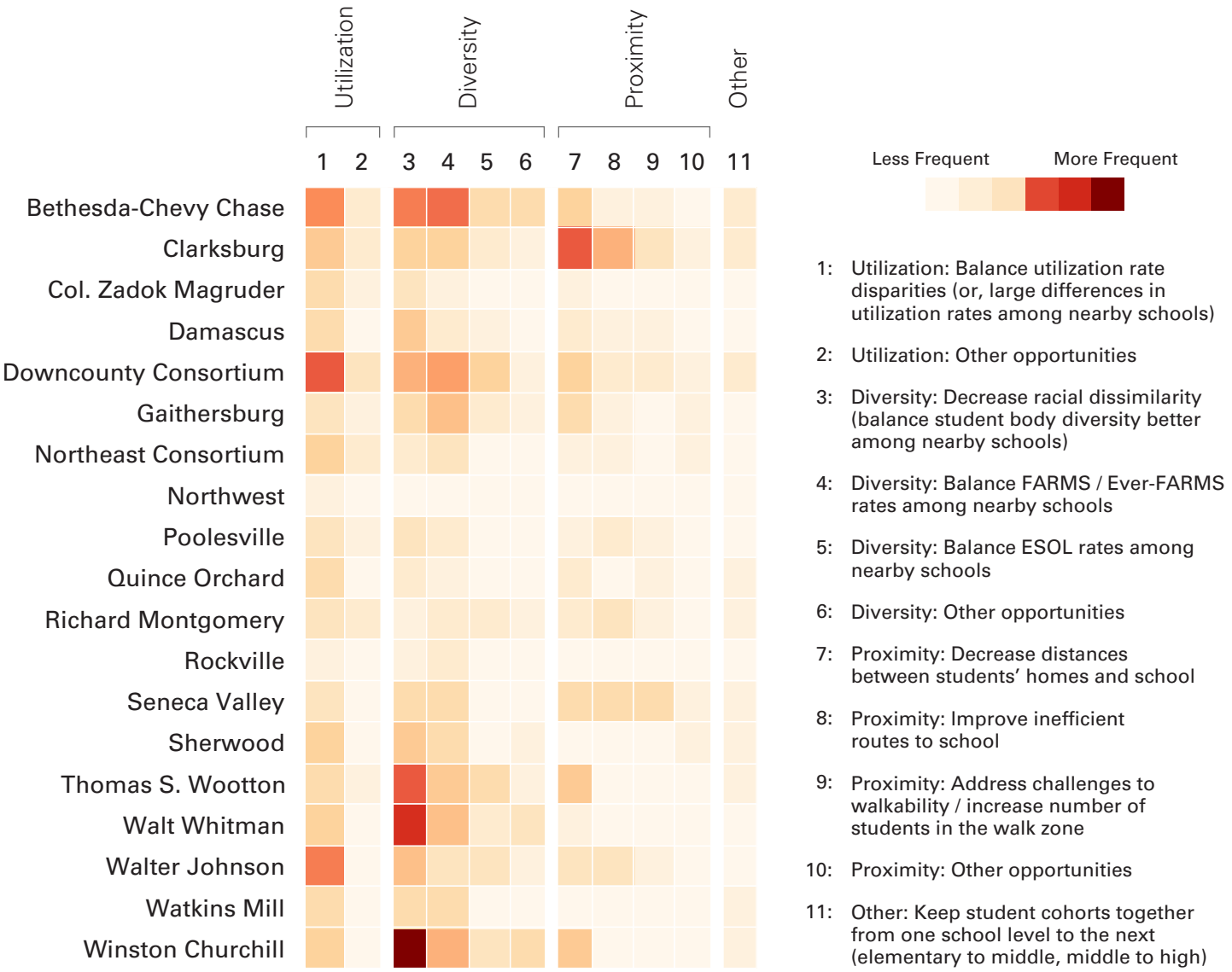
- Utilization rate disparities
- Utilization: Other utilization challenges
- Proximity: Challenges to walkability/walk zone
- Proximity: Inefficient routes to schools
- Proximity: Far distances between students' homes and schools
- Proximity: Other proximity challenges
- Diversity: High racial dissimilarity
- Diversity: Other diversity challenges
- Diversity: Large differences in FARMS or Ever-FARMS rates among nearby schools
- Diversity: Large differences in ESOL rates among nearby schools

Response rate: 270 responses

8. Opportunities to Balance the Lenses

Are there any clusters or parts of the County where you see an opportunity to balance utilization, diversity, and proximity? Where and how?

Figure 45 — Opportunities to Balance the Lenses



When prompted to identify areas and issues to balance, respondents most often selected decreasing racial dissimilarity, balancing utilization rates, balancing FARMS/Ever-FARMS rates among nearby schools, and decreasing distance between students' homes and school. Each of these opportunities is also associated with particular clusters, as seen in the graphic above. The most frequent opportunity identified was the opportunity to decrease racial dissimilarity in the Churchill cluster.

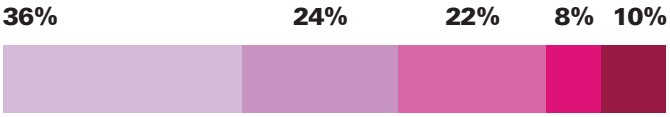
Response rate: 156 responses

9. Priorities

Respondents emphasized proximity to schools and student assignment stability. The priority with the highest percentage of "extremely important" (5) ratings was "Ensuring students attend schools closest to their homes" with 87% of respondents rating this as high priority. Assignment stability and cohort stability were also highly rated among the majority of respondents, who rated minimizing boundary changes and the number of students impacted by boundary changes as "extremely important" (68% and 82%, respectively).* Balancing diversity among nearby schools is the priority with the fewest "extremely important" ratings, and the greatest proportion of "not important", with over a third of respondents rating this as "not important."

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

Balance diversity among nearby schools



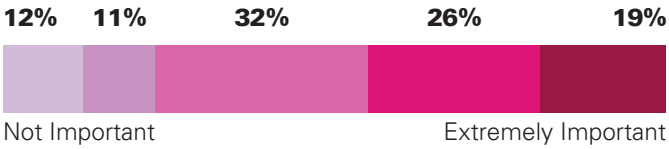
Minimize boundary changes

Ensure students attend school closest to home

Minimize number of students affected by boundary changes

Cohort stability*

Ensure schools are in the target utilization range



Maximize walkers

**For more on how cohort stability was treated in the modeling, please see page 29 of this report.*
Response rate: Ranged from 1,129 responses - 1,224 responses per priority.

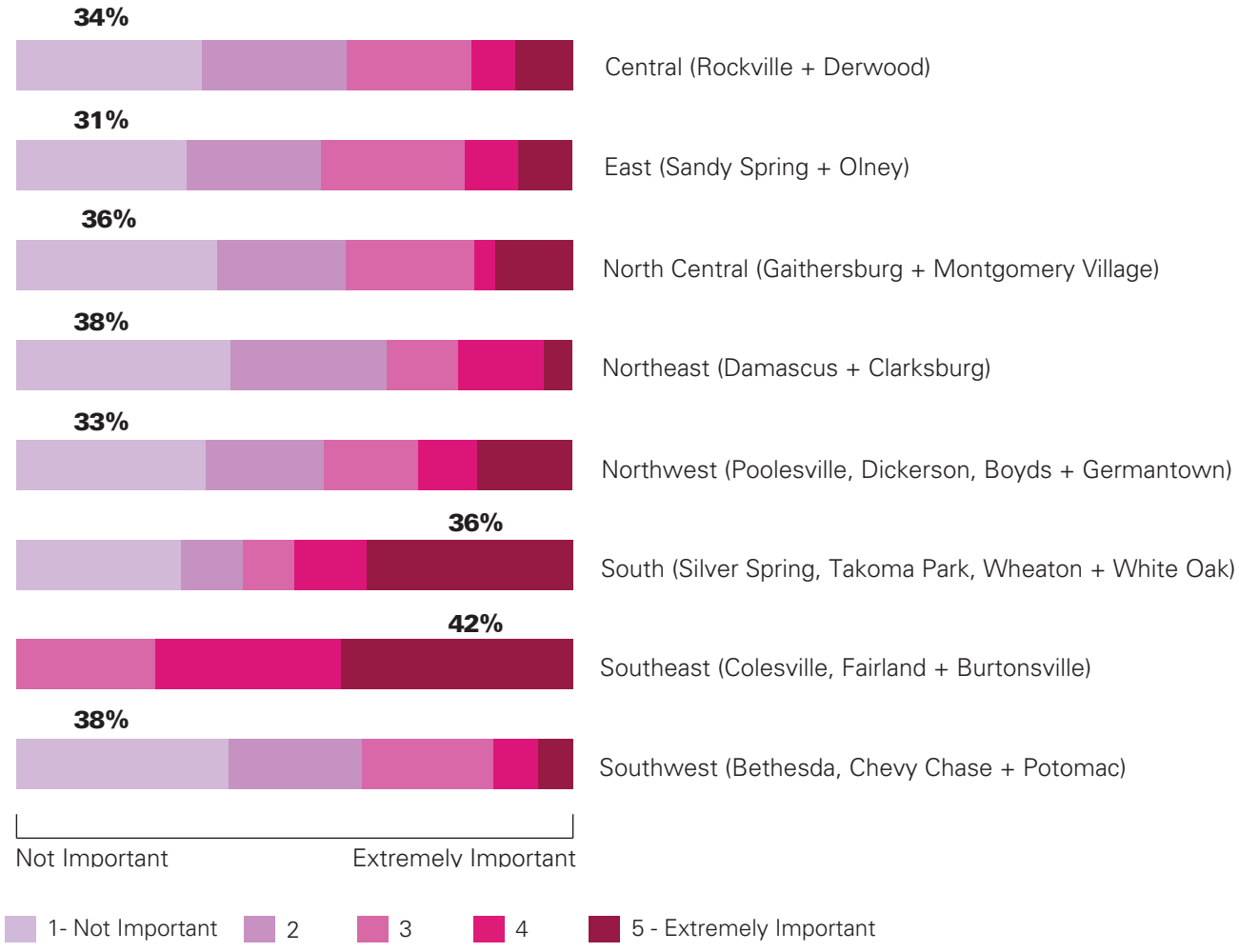
9. Priorities by Region

While the majority (57%) of survey respondents who responded to this question reported to live in the Southwest of the district, there were key differences in priorities among residents based on region of residence. The priorities of respondents in the Southeast part of the district tended to vary the most from those in other regions, with a much higher proportion of respondents rating "Balance diversity among nearby schools" as important or extremely important than the district as a whole, far fewer rating proximity priorities as extremely important, and far more emphasizing utilization as important. The southern region follows a similar pattern relative to the district as a whole, though differences are less strongly pronounced. Given the relatively small sample size for many regions in the district (see response rate note below), including the Southeast, further research is recommended to understand how community priorities vary across the district's regions.

Proportion of respondents to this question by region: Central (15%), East (5%), North Central (9%), Northeast (4%), Northwest (4%)*, South (5%), Southeast (1%)*, Southwest (57%).*

** Indicates fewer than 50 responses.*

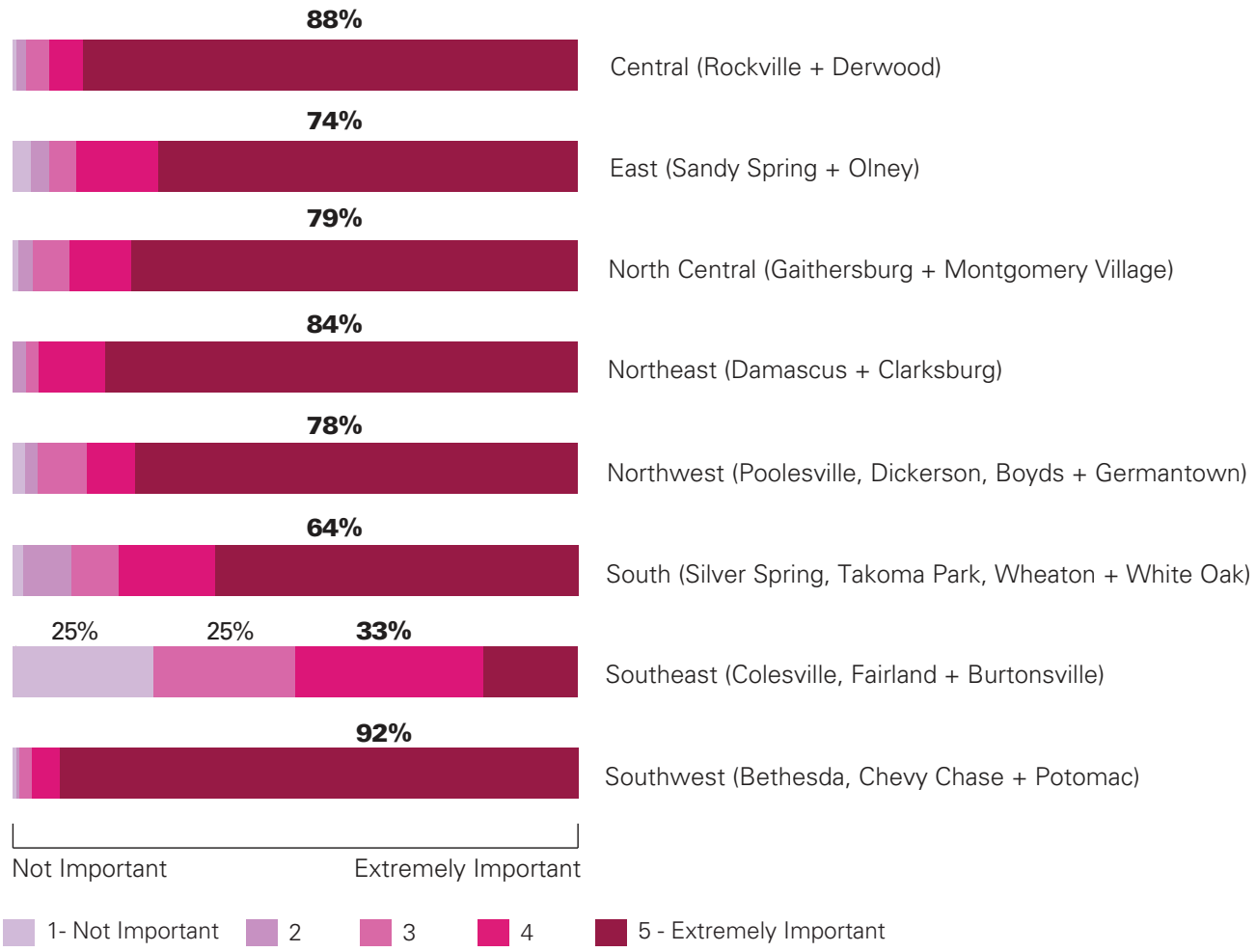
1. Balance diversity among nearby schools



9. Priorities by Region (cont'd.)

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

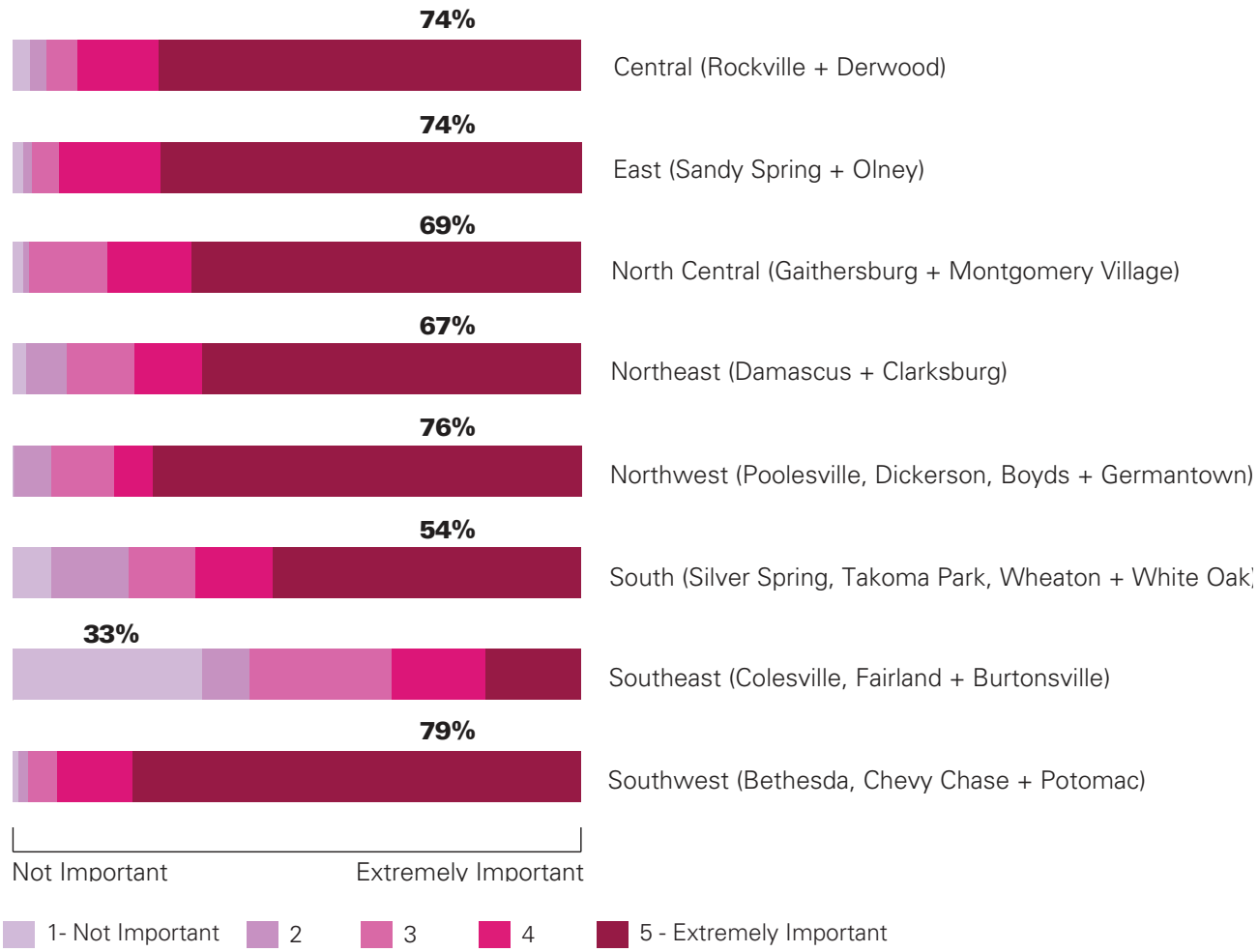
2. Ensure students attend school closest to home



9. Priorities by Region (cont'd.)

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

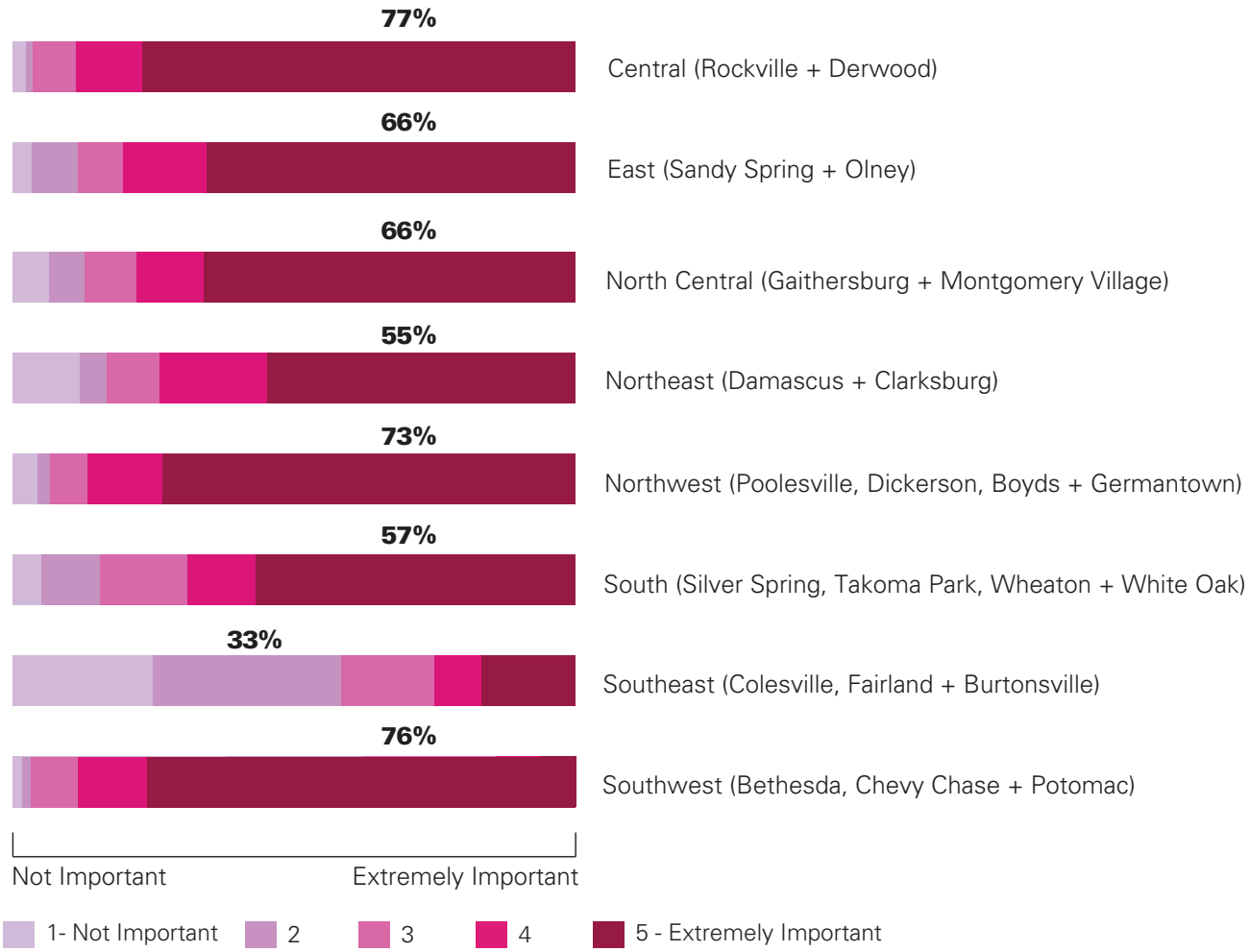
3. Cohort stability



9. Priorities by Region (cont'd.)

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

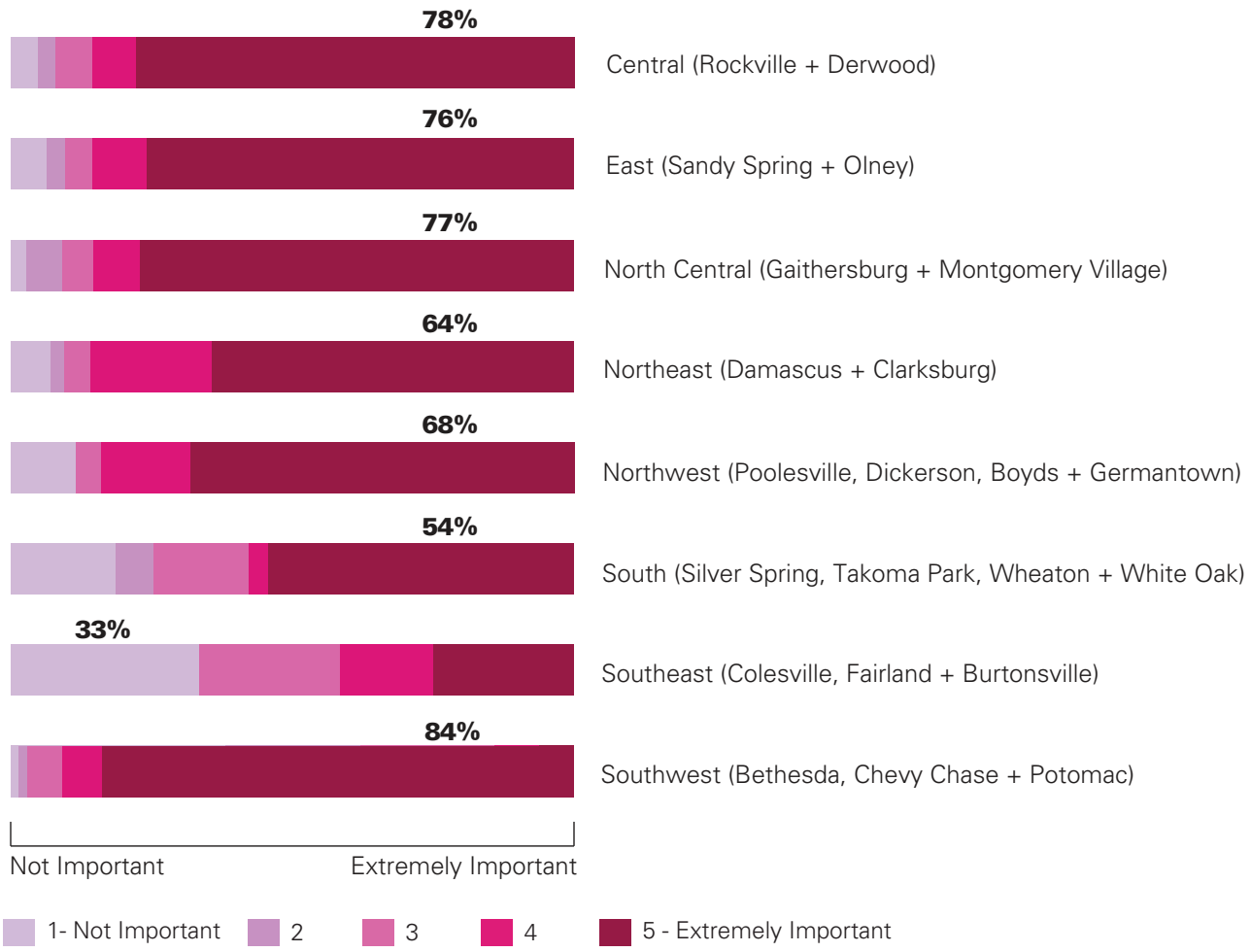
4. Maximize walkers



9. Priorities by Region (cont'd.)

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

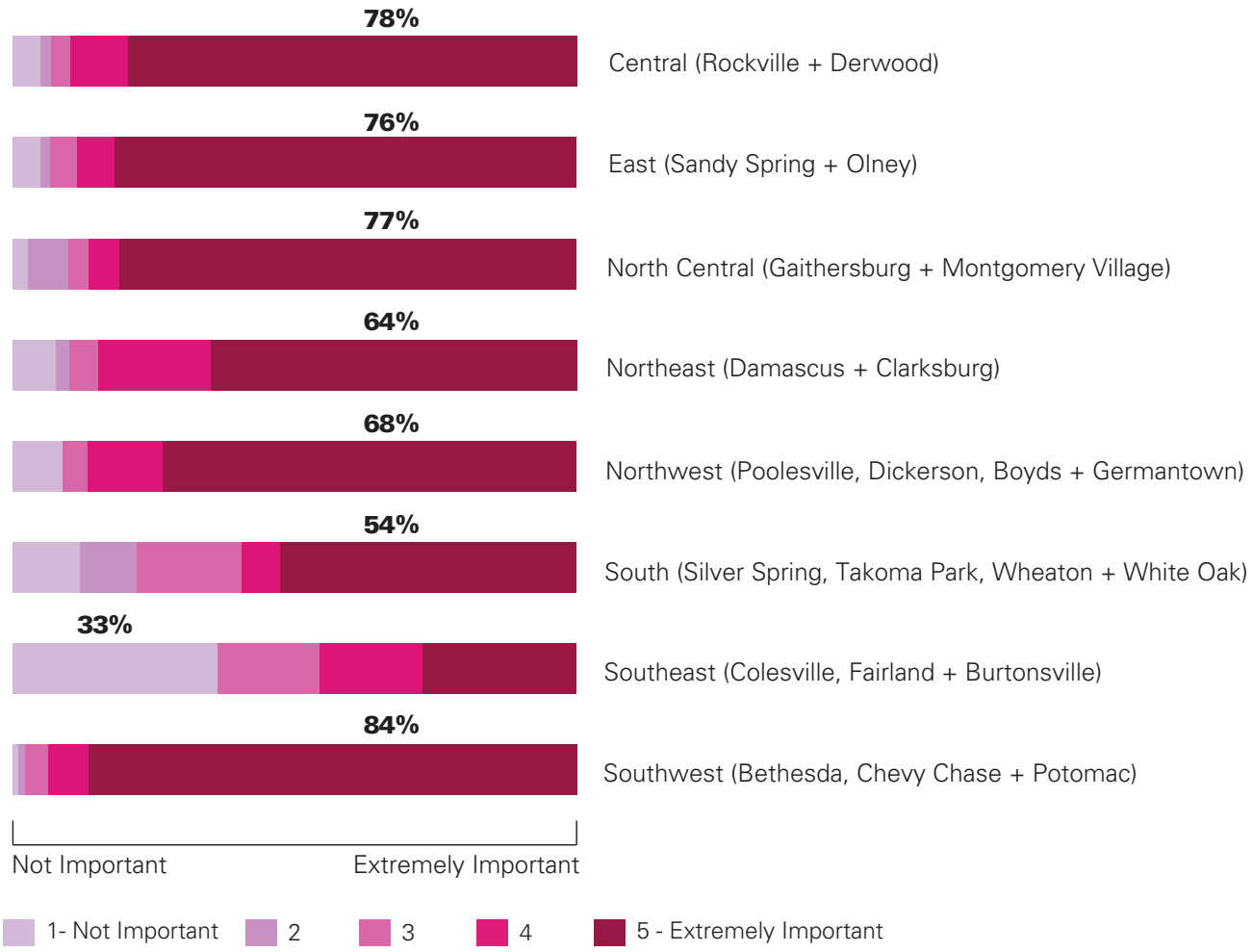
5. Minimize boundary changes



9. Priorities by Region (cont'd.)

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

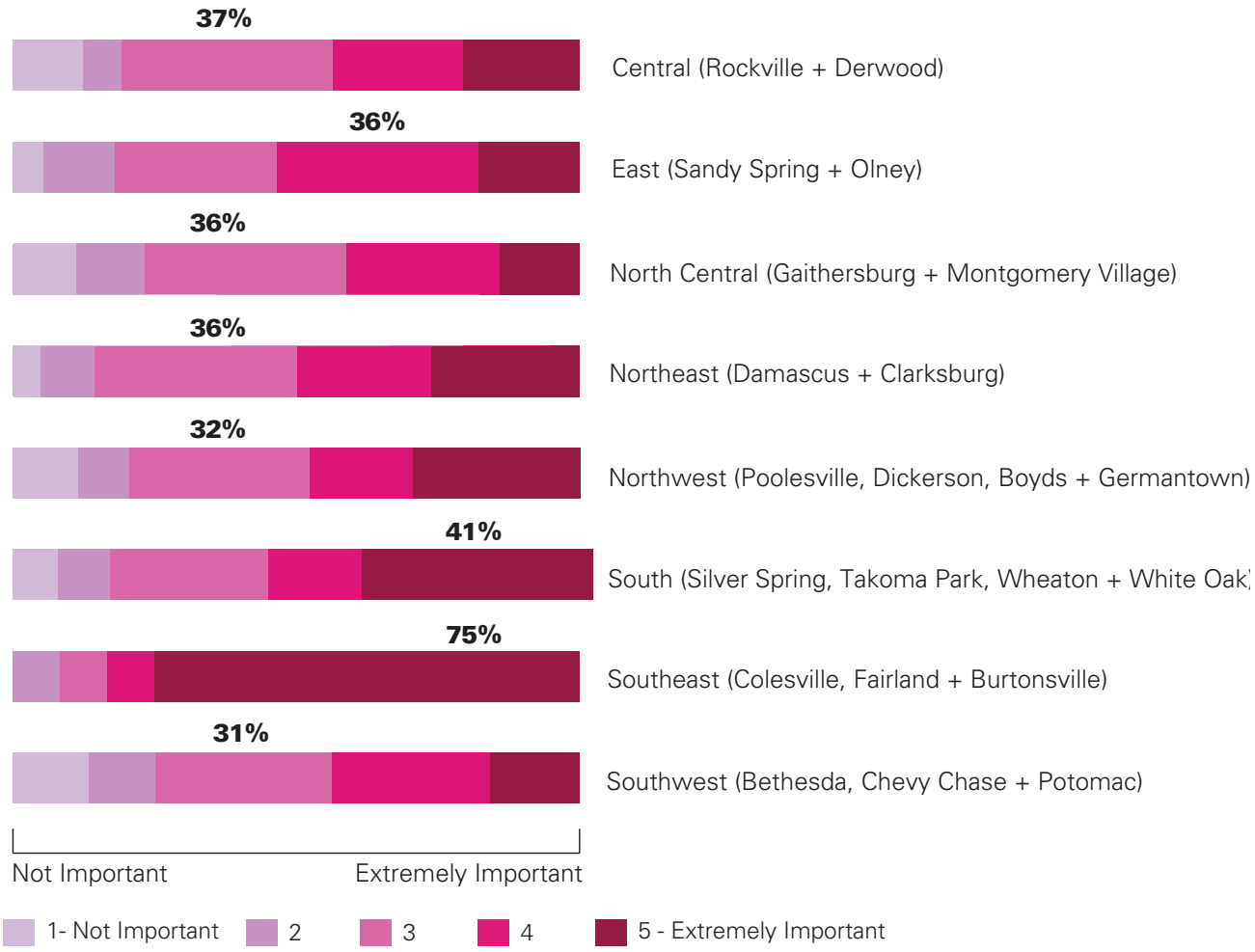
6. Minimize number of students impacted by boundary changes



9. Priorities by Region (cont'd.)

Considering the different priorities below, which do you think are the most urgent for MCPS to address when considering future boundary changes?

7. Ensure schools are in the target utilization range

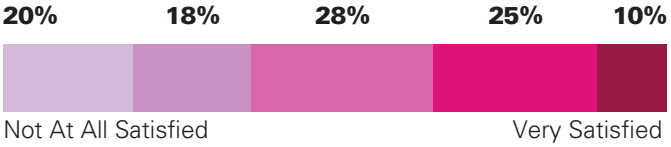


10. Virtual Learning

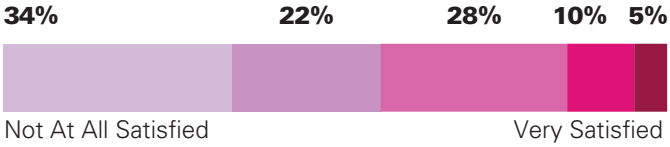
Overall, the majority of respondents indicated being dissatisfied or neutral with regard to virtual learning. However, over a third of respondents rated their overall satisfaction with the quality of virtual learning a 4 or 5 out of 5.

Please rate your experiences (or your children's experiences) with virtual learning in 2020:

Overall satisfaction



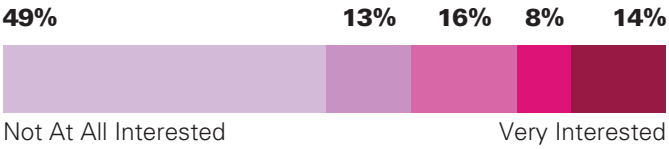
Satisfaction compared to in-person instruction



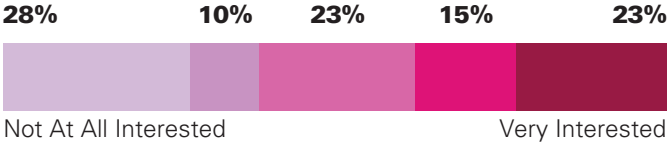
Rate the following in terms of your interest for future academic years:

In-person only instruction

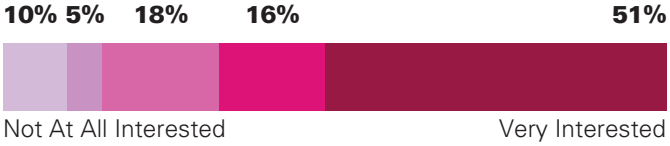
Online-only instruction



Hybrid learning models



Special programs at in-person facilities



Respondents tended to indicate interest in a return to in-person only instruction, and a lack of interest in online-only instruction. 59% of respondents indicated strong interest in in-person only instruction, and 51% indicated high interest in special programs held at in-person facilities (i.e. arts, music, sports).

Response rate: Ranged from 1,032 responses - 1,092 responses per question.

Additional Comments

Respondents also provided general feedback and insights about the IBE and their priorities related to school boundaries. Below are some key themes and highlights from these comments.

Feedback on the IBE

- Some respondents expressed frustration that the IBE uses 2019-2020 data, and makes use of data that is publicly available.
- Many respondents stressed that boundary analysis and other work should be put on hold until a return to school plan is in place.
- Concern about the survey, including concern that input will be ignored by the IBE, and that respondents will be disproportionately White and from the Southwest of the county.

Insights about boundaries and priorities

- Some respondents continue to express concern about boundary changes and negative impacts of possible future changes, as well as frustration about a lack of transparency from the Board of Education.
- Many respondents commented on utilization challenges, including overutilized and underutilized schools in close proximity. Some also commented that utilization is increasingly important in light of the need to social distance.
- Emphasis on the importance of proximity to schools.
- Some respondents say COVID-19 has made accessibility to school by foot or by bike a greater priority, and expressed concern about safety in transportation to school.
- Some respondents stressed the importance of ensuring equitable distribution of resources to schools to improve outcomes (instead of boundary changes, which are perceived by many as synonymous with busing students farther from home).

Insights related to virtual learning

- Virtual learning presents unique challenges for different age groups, and for students with disabilities. Respondents report both benefits (i.e. older students who gain sleep and avoid long commutes) and threats (i.e. students falling behind academically or socio-emotionally).
- The most important thing is to ensure the safety of the students, teachers and staff. First priority for in-person learning should be the students who cannot learn online due to special needs.
- Many comments praised the hard work of teachers during virtual learning. Many also stressed that teachers need more training and support.
- Virtual learning presents equity challenges and impacts low-income families disproportionately. Some respondents urged resources and support be distributed to these families. Others noted that the pandemic is widening the achievement gap.

What did we learn?

Insights from Areawide Engagement

Public Webinars

The two public webinars, held October 20 and 22, were conducted virtually on Zoom, and featured a combination of presentation, IBE demonstrations, a participant exercise, and a question and answer period. The session opened with project context and an overview of the key lenses of the Boundary Analysis.

After the consultant team presented an overview of the Boundary Analysis, the remainder of the session focused on showing attendees how the Interactive Boundary Explorer tool worked through three demonstrations:

- **Learning about my school.** The first demonstration reviewed three basic tools for users: the Search, Click, and Summary Table tools. These three features help a user search for schools, reveal key information about a school, and allow comparisons to be seen between the school's statistics and district or cluster averages.
- **Comparing my school to nearby schools.** The second demonstration reviewed the Summary Table, Search by Address, and Custom Compare tools. These three features allow a user to compare a school to three close-by schools, to cluster and/or district averages, and to compare groups of schools side by side.
- **Exploring wider boundary challenges in the school system.** The final demonstration introduced four ways to explore wider trends: the Choropleth, Filter, Histogram, and Scatterplot features. Among the tasks a user can undertake are to observe trends on a color-coded map, analyze a particular range within a dataset, see how different datasets distribute across the school district, and to examine relationships between a pair of variables.

Summary of Insights

- 280 residents participated in live webinars, and an additional 430+ watched the live or recorded live stream.
- Attendees of the public webinars were disproportionately White (50%) and from the Southwest part of the county (over 40%). Most had participated in Phase 1 of this process in some way.
- Attendees asked a variety of questions at the webinars, including questions about the IBE interface, how the tool would be use in future planning, and specific questions about the metrics used in the tool.
- The great majority of webinar attendees used the IBE during the webinar (90%) and said they felt prepared to open and use the tool on their own (70-75%).

After the demonstrations, attendees participated in a ten-minute, Participant Exercise for attendees where they learned about their school (specifically about its utilization rate), saw how it compared with the school district's average, and compared its utilization rate with two neighboring schools.

The webinars concluded with a brief Q&A segment, in which both MCPS senior staff and WXY consultants responded to audience questions. The questions touched a wide range of topics including:

- More specifics about how to use the tool
- What data was used to develop the tool
- How frequently the data for the tool will be updated
- How enrollment patterns from the pandemic will be factored in going forward
- How to develop a clearer understanding of racial dissimilarity and what it means for the analysis
- How walk zones were factored in
- What the linkage will be between the boundary tool and future boundary changes

At the end of the webinar, the consultant team requested everyone who attended both to continue to use the tool and provide feedback and to join a follow-up, interactive dialogue session on October 28 to discuss their insights with fellow residents.

Webinars were also streamed live on the MCPSTV YouTube channel and remained available online throughout the engagement period.

Who attended the webinars?

A total of 280 attendees participated in the public webinars. More than ¾ of attendees were current MCPS parents or guardians. MCPS students and MCPS teachers and grandparents comprised another nearly 20% combined. Remaining attendees were primarily former or future parents or guardians or current MCPS grandparents.

Residents representing the Southwest (Bethesda, Chevy Chase, Potomac area) part of the county comprised a plurality of participants (more than 40%) and attendees from Central (Rockville, Derwood area), East (Sandy Spring, Olney area), and South (Silver Spring, Takoma Park, Wheaton area) each comprised between 10 and 15% of the participants across the two nights. The other regions – Northwest, Northeast, North Central, and Southeast – each comprised between 2% and 8% of the attendees across the two meetings.

White residents made up more than half of the attendees on both nights, representing almost double the percentage of White students in the MCPS school system (26.9%). Of the participants willing to identify by race/ethnicity (16% were not), Asian and Pacific Islander residents made up between 11-12% of the attendees and Black, Latino, and residents of more than one race each comprised less than 10%.

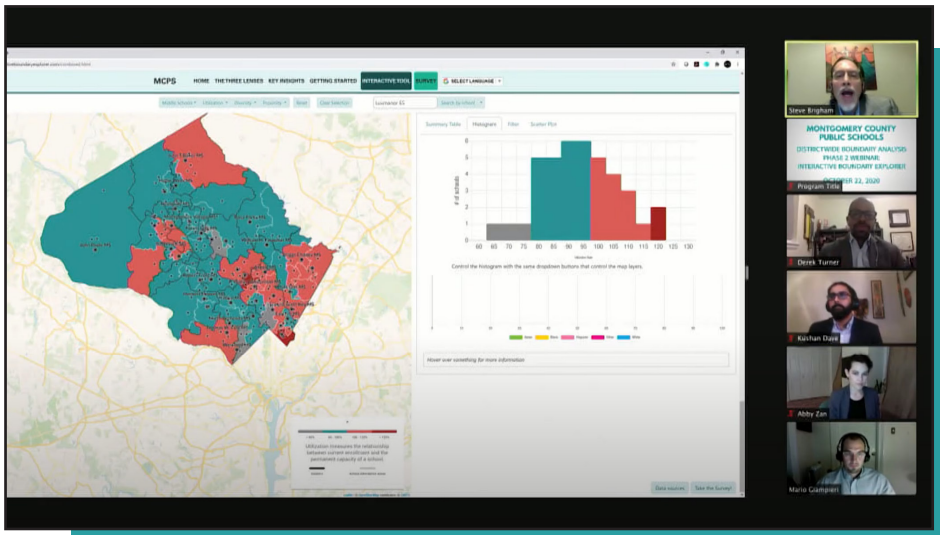
More than 40% of the webinar participants had attended at least one of the large community meetings during Phase 1 earlier in the winter of 2020. More than 40% had also read the interim report published in April 2020. Approximately 15% of attendees had not participated at all during Phase 1.

During the webinars, nearly all participants (90%) were able to open and use the IBE Tool, and most participants (between 70-75%) either agreed or strongly agreed that they felt prepared to open and use the IBE tool following the webinar.

An overview of the polling data for the public webinars can be found in ***Appendix 2. Community Engagement****.*

Recruitment

Given a condensed timeline for Phase 2 and other pressing priorities in the school system, recruitment was a challenge for public webinars (as well as other engagement activities during this phase). At both webinars and the Community Feedback and Discussion Session, many participants expressed concern about low turnout and about meetings not being sufficiently publicized. Other participants and community outreach contacts expressed that COVID-19 and school reopening were more pressing concerns for themselves and other community members, and that time and attention should be directed to that instead.



Presenters respond to attendee questions during the second Public Webinar

Community Feedback and Discussion Session

Taking place the week following the public webinars, the Community Feedback and Discussion Session was intended to provide residents an opportunity to share findings, insights, and questions after having spent some time using the IBE. Prior to attending, those who registered were asked to have completed an "assignment" in which they would use the IBE and be prepared to speak to the following three questions:

- When you explored the tool, what interesting insights did you learn about your school?
- How well do you think utilization, diversity, and proximity are balanced between your school and its nearby schools?
- Are there clusters or parts of the district where you see significant challenges with school boundaries between nearby schools? If so, where and what kinds of challenges?

The October 28th Community Feedback and Discussion session was designed to be highly interactive, primarily in simultaneous and virtual small group, breakout discussions (18 breakouts total with an average of six attendees per breakout). After the consultant team conducted a few initial polls to gain an understanding of who was in attendance, the meeting was centered around two discussion periods:

1. **Insights about my school and nearby schools.** The first discussion was designed to elicit responses from participants about what they learned about their school using the IBE tool and what they thought about the level of balance among the lenses of utilization, diversity, and proximity between their school and two nearby schools.

Summary of Insights

- The event was attended by 115 residents, most of whom (78%) were parents or guardians of current MCPS students.
- Approximately 51% of attendees identified as White, and 47% were residents of the Southwest part of the county (Bethesda, Chevy Chase, Potomac).
- The main themes from participant comments were data and the IBE tool, diversity, and proximity. There were also lingering questions and concerns about the purpose of the tool and how it will be used post-analysis.
- The most recurring theme was parents advocating for an emphasis on proximity for boundary changes.

2. **Insights about challenges in other clusters or areas in the school system**. The second discussion concentrated on where in the district (clusters or geographic regions) attendees had identified potential challenges about any of the lenses or combination of lenses.

Each breakout discussion lasted for approximately 30 minutes. They happened in succession with a brief return to the plenary session in between the two to quickly share insights in the Zoom chat box.

All eighteen breakouts were facilitated by an experienced volunteer facilitator recruited for the meeting. The facilitators used a web-platform called Covision to enter the full range of ideas from the attendees from both breakout sessions. A small group of WXY consultants scanned the input from the Covision platform during the meeting and compiled a sampling of ideas responding to the questions from both discussions.

After the second and final discussion, the moderator of the session read several dozen ideas from that compilation and requested that attendees type in the chat: **What is your most important insight about challenges we face and/or opportunities that we have as a county and as a school system about school boundaries?**

Who attended the Community Feedback and Discussion Session?

One-hundred-fifteen residents attended the session. More than ¾ of attendees were current MCPS parents or guardians. MCPS students and MCPS teachers and guardians comprised another 18% combined. Remaining attendees were former or future parents or guardians or current MCPS grandparents, including more than 15% interested community members.

Residents representing the Southwest region of the county comprised a plurality of participants (47%) and attendees from South (17%), East (12%), North Central (12%) and Central (10%) all showed up in double digits. The other regions – Northwest, Northeast, and Southeast – each comprised between 1-2% at the meeting.

White residents, again made up more than half of the attendees, continuing to show up in far larger numbers than White students in the school system. Of the participants willing to identify by race/ethnicity (20% were not), Black/African American residents made up 13%, Asian and Pacific Islander residents made up 8%, Hispanic/Latino residents made up 5%, Native American and Indigenous residents comprised 2%, and residents identifying as of more than one race comprised 1%.

Because the school system had strongly encouraged that participants only attend the interactive session if they had attended one of the two webinars from the week before or watched one of them online, it was important to inquire who in attendance had that basic baseline. Sixty percent had participated in the webinars, another 12% had watched one on YouTube, but more than a quarter (28%) had not done

either. Nevertheless, they were encouraged to share their ideas and concerns about boundaries and the analysis over the course of the evening.

An overview of the polling data for the October 28th session can be found in ***Appendix 2. Community Engagement.***

Feedback Themes from the Community Feedback and Discussion Session

The most common comments from participants during this session were about data and the IBE tool, diversity, and proximity. There were also lingering questions and concerns about the purpose of the tool and how it will be used, post-analysis. Questions or comments included misinformation about the purpose of the analysis, lack of clarity about how the analysis will be used, concern that "squeaky wheels" may end up influencing future boundary decisions, why the analysis continues as a priority in the midst of the pandemic, and perhaps most importantly, how and when the school system will use the analysis and the tool, and the need for the system to be transparent about the "what, the when, and the how."

Data & Interactive Boundary Explorer Tool

- Interest in a richer data set going forward that might include forecast data as well as current school year data; the impacts of COVID-19 on enrollment data.
- Ensure that the data is updated regularly going forward.
- Lack of clarity on the purpose of the data and of the tool-- in particular, how they would be used to establish boundaries in the future.
- Limitations of the IBE, including: comparability, usefulness of metrics, confusing legends, uninformative headers, the use of medians instead of averages, and the ability to investigate larger geographic areas.

Student Diversity

- Lack of clarity about the definition of racial dissimilarity and how this can inform residents in the analysis; also, whether the data was sufficient to understand racial dissimilarity in different areas
- Concern that the definitions being used for diversity were too narrow
- Concern that redrawing boundaries would not accomplish greater diversity and the recommendation to find ways to achieve greater diversity outside of boundary changes

- Desire to see greater integration across race and class (because schools are currently too segregated based on income and race); concern that school systems cannot address the underlying causes in the county for why that integration doesn't exist
- Disagreement on whether there is evidence for increased diversity positively impacting student performance with arguments for and against

Proximity

- The most recurring theme was parents advocating for an emphasis on proximity for boundary changes. Concerns included: proximity incentivizes parental involvement, shortened parental commutes, shortened student time on the bus, greater student involvement in extracurriculars, and enhanced community-building
- The importance of walkability for students both in terms of reasonable distance and safety and for children using public transportation to commute; participants urged MCPS to promote walking over buses wherever possible
- Observation that many students attend schools that are further away than their nearest school
- Proximity gets complicated in areas that are between up county (more rural) and down county (denser). Decisions about boundaries will get more challenging when that dynamic is in play
- Desire to factor in traffic and traffic patterns when making boundary decisions rather than purely focusing on distance

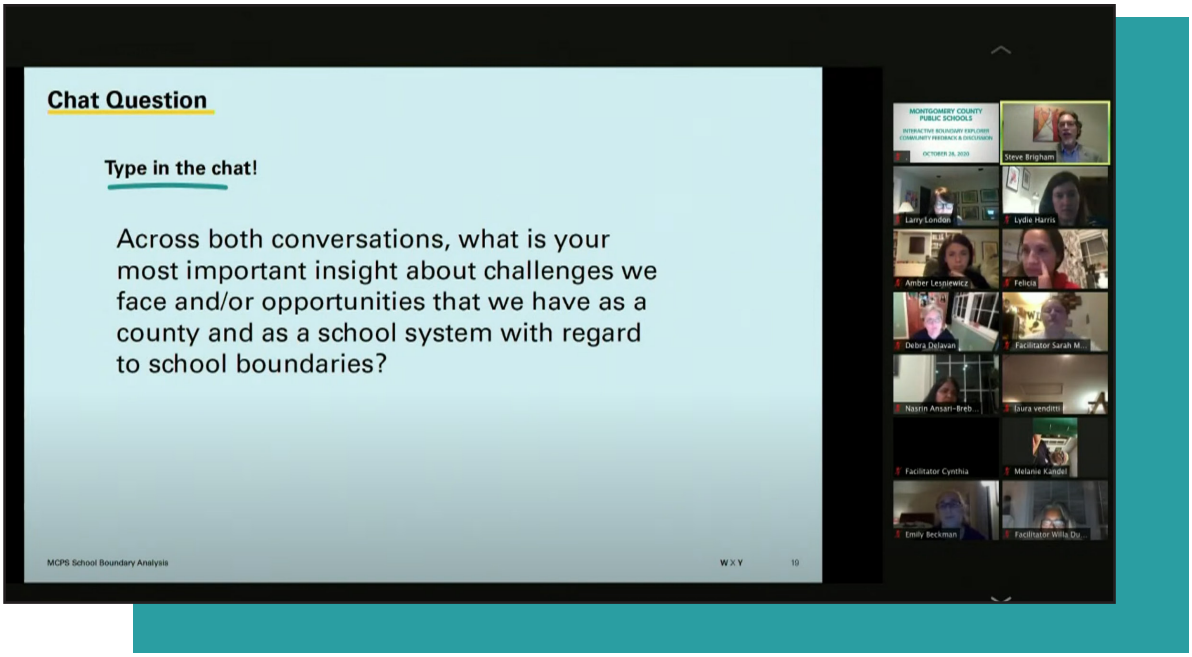
Utilization

- Comments about the sheer number of schools that are overutilized:
    - This was most noticeable with high schools, with all either at or over-capacity
    - Several commented that overutilized schools are not well suited for children
    - Overutilization is particularly a problem in the southern part of the district because of population density
    - Major roadways and other geographic barriers might play a role in imbalances in utilization
- The tool will need to account for the new capacity that has been built in up county
- There is a need to build more housing in the county

Island Assignments

- Concerns about island assignments (i.e. Why does MCPS have them? Do they work? How do their demographics compare to the schools around them?)
- Sentiment that it made no sense to "zone" schools this way; concern about the mental health of young children adversely affected by island assignments

Note: a full copy of all comments logged by facilitators during this event was provided to the BOE along with this report.



Participants at the 10/28 Community Feedback and Discussion Session share their responses to a prompt in the Zoom chat window.

What did we learn?

Insights from Small Group Meetings

Small Group Meetings

Some segments of the Montgomery County population--especially Latino/Hispanic and African American residents-- were significantly underrepresented in the two public webinars and the feedback session held in October. In order to provide additional opportunities for Latino and African American parents to get involved, five additional small group meetings were held in late November and early December. Three meetings were conducted in English and two were conducted in Spanish. These meetings were conducted on zoom and were kept small (they averaged seven to nine people per meeting) in order to allow opportunity to ask questions about the boundary analysis. The small group format also allowed for a more hands-on approach to explaining how to use the IBE.

The small group meetings were similar to the public webinars and covered much of the same content. They were generally 75-90 minutes in length. They began with a brief overview of what has happened so far in the boundary analysis and then moved quickly to an introduction of the Interactive Boundary Explorer. The small group setting made it possible to personalize the demonstrations and participants were directly engaged in choosing which schools to look at and which data to compare. Two discussions--one before and one after the demonstration of the IBE-- were also built into the program. This was important since some participants in these meetings were not very experienced using online data tools.

Recruitment

Our outreach process included sending invitations to numerous groups and organizations that are well established in the Latino and African American communities as well as some organizations that work primarily with immigrants. A special effort was made to reach out to leaders of these organizations and parents that are active on education issues. The goal was to engage representatives from as many organizations as possible, so that they would be knowledgeable about the boundary analysis and familiar with the IBE. Email invitations were also sent directly to previous small group attendees from Phase I who provided email information to PEA.

Summary of Insights

- A total of 51 people attended the Small Group meetings. About 60% were African American, 30% were Latino, and the rest were from other racial groups.
- Key feedback around the data in the IBE focused on questions about the meaning of "racial dissimilarity," including how this metric is calculated and its implications for this analysis.
- Many parents who used the tool were surprised to see how much overutilization of schools there was in their area.
- Most participants found the information in the IBE very helpful, but worried about how accessible and understandable it was for the average parent.

Outreach efforts were coordinated with the MCPS Family and Social Services Office as well as other MCPS staff. African American-led organizations that helped promote the small groups meetings include the NAACP Parents Council, the African American Student Achievement Action Group, the 1977 Group, and the Office of Community Partnerships African Liaison. The NAACP Parents Council was particularly active and recruited representatives from numerous schools around the county. In the Latino community, CHEER of Takoma Park and Impact Silver Spring were most involved in recruitment and invitations were also sent to CASA, Identity, the Gilchrist Center, Linkages for Learning, the Latino Student Achievement Action Group, and other organizations.

In general, it was very challenging to recruit participants for small group meetings during Phase 2 of this process. Many contacts during the outreach process cited the unusual nature of the current distance learning as the primary reason for low turn-out. Parents and others involved with the school system are wrestling with other more basic issues and have other priorities in the context of the COVID-19 pandemic. Since small group meetings took place online they also required a level of comfort with technology than many in the Latino and other immigrant communities do not have. Two meetings were postponed in order to allow additional time for recruitment.

Despite these challenges, the meetings were successful in engaging and educating several dozens of parents and other individuals who are actively engaged in school issues. These individuals were asked to share what they learned about the IBE with others in their communities and to encourage others to engage with the tool online and fill out the survey.

Summary of Participants

A total of 51 people attended the five small group zoom meetings and identified as follows: 30 African American, 13 Latino, five Asian American and three White. The Latino residents were primarily from the Silver Spring and Takoma Park communities and the African American participants were more equally divided between residents of the northern, central, and southern parts of Montgomery County. More than 80% of participants were parents of students currently in MCPS and most of the others had previously had children in the school system. About 70% of the African American residents had attended Phase 1 community engagement programs, but only 20% of Latino parents had been part of one of those meetings

Themes and Questions from Small Group Meetings

While these meetings were not focused on discussion, they did make time for feedback and conversation between the presentation of content related to the IBE. Some of the themes and questions that emerged include:

Data and Content in the IBE

- Overutilization is the main issue in the schools I looked at
- Significant use of private schools is a reason some schools are underutilized--like Laytonsville
- There is a concern that COVID-19 presents added challenges and threats for bus transportation.
- The use of "racial dissimilarity" as a metric is difficult to understand.
- The data around Springbrook High School shows how "nutty" some of this is since Springbrook has three attendance islands and it's hard to know which ones to compare as adjacent.
- Maybe they should do an analysis by each cluster or parts of the county and explain that to parents and students.
- Why are there no metrics for economic dissimilarity included in the IBE interface? I see that there are huge disparities with adjacent schools.
- I think you should look at socio-economic dissimilarity and all of the schools that are adjacent--not just the three that are "closest."
- What are you ultimately going to illustrate to the BOE with this? The Board already knows which schools are underutilized, where there are FARMS and racial dissimilarities, etc.
- I looked at data for Oakview school and know we raised some of these things five years ago and there have been limited or no action. I would like to see changes, but it seems like upper county typically gets more resources and opportunities for their students than we do.
- How do we measure the value of proximity?
- Are we trying to evenly distribute FARMS? Is that a goal?
- I did learn a lot from looking at the tool and it gave me information about what my students are being exposed to with other racial and ethnic groups and different languages.

- The tool helps me understand some of the challenges that MCPS and my children are having.
- I think students should be encouraged to use this tool too and bring their voices to the table. That also helps them be leaders and advocate for their own needs.

Use of the IBE

- I feel a little overwhelmed by all of the data; many people will be intimidated by this tool when they first look at it.
- A good orientation in the basic uses of the IBE is needed or it seems too complicated.
- It is great to all this data in one place and I can see how this would be very helpful to people to look at their schools and others nearby.
- Are the data variables and level of detail in the tool sufficient for stakeholders to deliberate and ultimately recommend concrete changes?
- The tool needs to connect to the way decisions are made and conveyed.
- The small group really helped me understand the tool and allowed me to ask questions.
- It would be good to have an "at-a-glance" feature that is less intense and easier to use.
- I like that all the information is together and is helpful, but I have some questions about what will actually happen (at the end of beyond this analysis).
- Is this tool going to be used for many years? How often are you going to update the data?

What did we learn?

Insights from Student Engagement

Student Engagement

The perspectives and insights of MCPS students are vital to this analysis and Phase 2 presented an opportunity to deepen the engagement of current students. During Phase 1, many participants in areawide public meetings, including students themselves, expressed a desire to see more students participating in the Boundary Analysis.

To effectively reach as many students as possible, and to engage students themselves as leaders in the process, we worked closely with the Office of School Support and Improvement, the Montgomery County Regional SGA (MCR), and the Student Member of the Board of Education (SMOB). Students and staff at these organizations coordinated a series of engagements throughout the fall.

The overall strategy was to use shorter engagements and outreach efforts at existing meetings and programs to build up to two large, virtual student-led forums at the culmination of the process. At the earlier engagements, our objective was to introduce students to the IBE, introduce the "IBE Challenge" (a set of steps and questions to guide their use of the tool), and encourage them to attend one of the two discussion events to share what they had learned with other students.

The "IBE Challenge" and two culminating discussion events focused on the following set of key questions:

- How does the data about your school compare to your assumptions? Which lenses, if any, surprised you?
- Which parts of the district (clusters or groups of schools) have the greatest challenges with school boundaries?
- Looking back at your experiences in elementary and/or middle school, which school level(s) do you think are most impacted by challenges with utilization? Diversity? Proximity? Why?
- What do you want MCPS to know about how school boundaries impact students?

Summary of Insights

- Approximately 412 students from across the district participated in engagement across five different virtual events.
- Students expressed enthusiasm about the availability of the IBE and the need for student voice to be counted in the Boundary Analysis process.
- Students were especially interested in disparities between schools, and observed imbalances often between their school and its neighbors.
- In general, utilization and diversity were the two lenses student participants discussed and emphasized most often.
- Though most participants were high schoolers, they emphasized the importance of addressing challenges at the ES and MS level, due to educational and social impacts on younger students.

Altogether, the student engagement process consisted of:

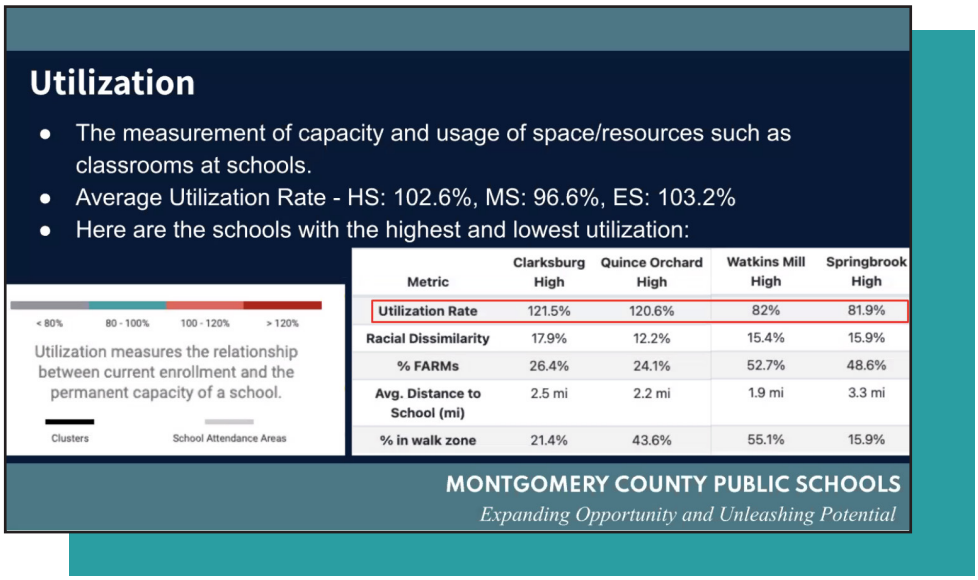
Outreach and shorter engagements

- MCR Officer meeting *(approx. 90 students attended)*
- SMOB Town Hall meetings
  1. SAC East County *(approx. 18 students attended)*
  2. SAC West County *(approx. 40 students attended)*

Culminating discussion events

- SMOB/Student Districtwide Boundary Analysis Event *(approx. 83 students attended)*
- Student Summit at the MCR General Assembly *(approx. 181 students attended)*

The enthusiasm and efforts of student leaders paved the way for robust and meaningful engagement during this phase. In addition to MCR and SMOB leaders coordinating and promoting the events, they also played an important role in hosting them. At the SMOB Student Districtwide Boundary Analysis Event and MCR General Assembly Student Summit, student leaders who had spent time exploring the IBE on their own presented findings to attendees, including explanations of how they had used the IBE and screenshots of interesting discoveries. At both meetings, student facilitators led break-out discussions and took detailed notes of discussion comments and themes. After break-out rooms, students reconvened to share highlights from their smaller discussions, and share remaining questions about the Districtwide Boundary Analysis.



Students at both culminating discussion events shared their findings from the IBE. Above is a screenshot from the student presentations at the December 9 SMOB meeting.

Feedback and Themes from Student Engagement

How does the data about your school compare to your assumptions? Which lenses, if any, surprised you?

- Surprise about the utilization rate for their school or other schools
    - Surprised at the utilization rates for current schools or past (i.e. ES, MS) schools
    - Observations that neighboring schools often have very different utilization rates
    - *"I learned that my school is 200 students over capacity while a next-door school is 200 students under capacity."*

- Surprise and interest in seeing diversity statistics for their school - and in seeing how this compares to other schools
    - Surprise and interest in the racial dissimilarity rates for their school
    - Some students remarked that the demographic data for their school indicated the school was more (or less) diverse than they realized.

- Surprise and interest in what struck students as a low degree of walkability (based on walk zones)
    - Interest in schools with low walkzone rates, including those with 0% of students in the walk zone

- Surprise and interest in the odd shapes of school boundaries, and in island assignments
    - Oddly shaped boundaries caught the attention of many participants
    - Students also observed specific sets of schools where they see an opportunity to better balance utilization and proximity, including an interest in island assignment schools (i.e. Banneker, White Oak, Briggs Chaney MS; Ridgeview and Lakeland MS)

Which parts of the district (clusters or groups of schools) have the greatest challenges with school boundaries?

- Opportunities to balance utilization between nearby schools
    - Observation of cases where overutilized and underutilized schools are very nearby or next to one another
    - Island assignment attendance areas may present opportunities to balance utilization and proximity.
    - It is interesting to see patterns where overutilization and high FARMS rates overlap.

  - *"I was surprised by how many schools are overutilized, especially considering that sometimes they directly neighbor underutilized schools."*

- Disparities in diversity metrics
  - *"I thought that the color-coded map of FARMS was interesting and that there were almost two halves of the county."*
  - *"It's crazy to see how school boundaries right next to each other have such drastic differences in (Racial dissimilarity)/FARMS/ ESOL"*

Looking back at your experiences in elementary and/or middle school, which school level(s) do you think are most impacted by challenges with utilization? Diversity? Proximity? Why?

- The importance of utilization at the elementary school level
  - ES "get a lot of the heat" with utilization since the county is constantly growing and more people are coming. ES have to adapt to that first; they have to deal with utilization first and most often.
  - Emphasis on the importance on attention and support for the learning of young students, with overutilization presenting a challenge.

- The important of diversity at the elementary and middle school level
  - It is important for ES and MS to be as diverse as possible as students are being shaped at these levels; exposure to diversity is especially important when you are young.
  - *"There needs to be more emphasis on accepting racial differences in middle school as that is where students start to learn that the most. Many stopped accepting/ embracing their culture during that time because of the lack of diversity in their schools."*

- Proximity is a challenge at the high school level
  - HS have the most difficulty with proximity because they have larger attendance areas, sometimes oddly shaped.
  - Affects high schoolers a lot because of how many special events happen in HS that will help you with your future. Sometimes the people who need it most miss out on those opportunities if they live far away.
  - A lot of students experience bus fatigue; some clusters have a very low percentage of students who walk.

What do you want MCPS to know about how school boundaries impact students?

- Impacts of overutilization on students
    - Higher utilization hurts learning as teachers can't interact directly with students.
    - *" Due to over utilization and overpopulation of students at school, students do not receive proper instruction from their teachers at times."*
    - Overutilization caused some schools to make students share lockers.
    - MS/HS utilization - not a lot of teachers for certain courses resulting in some courses being overcrowded and others undercrowded.
    - Teachers have to add chairs to classrooms - it is hard to focus.
    - Relocatable classrooms are a challenge for both learning and a sense of safety for younger students.

- Importance of diversity for students
    - Diversity gives us more perspectives and can inspire creativity, innovation, and more knowledge for educational environments.
    - School boundaries shifting to make school demographics more diverse would be beneficial.
    - Ensure that socioeconomic diversity is taken into account; better balancing socioeconomic diversity will "help students learn more."
    - *"Students notice the difference between the wealth of different schools more than adults think."*

- Importance of proximity, and some concern about being moved to schools farther away from home
    - Elementary school students usually have a difficult time adjusting to the further distances traveled to get to their middle schools
    - Concern about boundaries which cause students to go to a school that is not the closest one to their home
    - Importance of Increasing walkers, including environmental benefits of walking

Other Themes

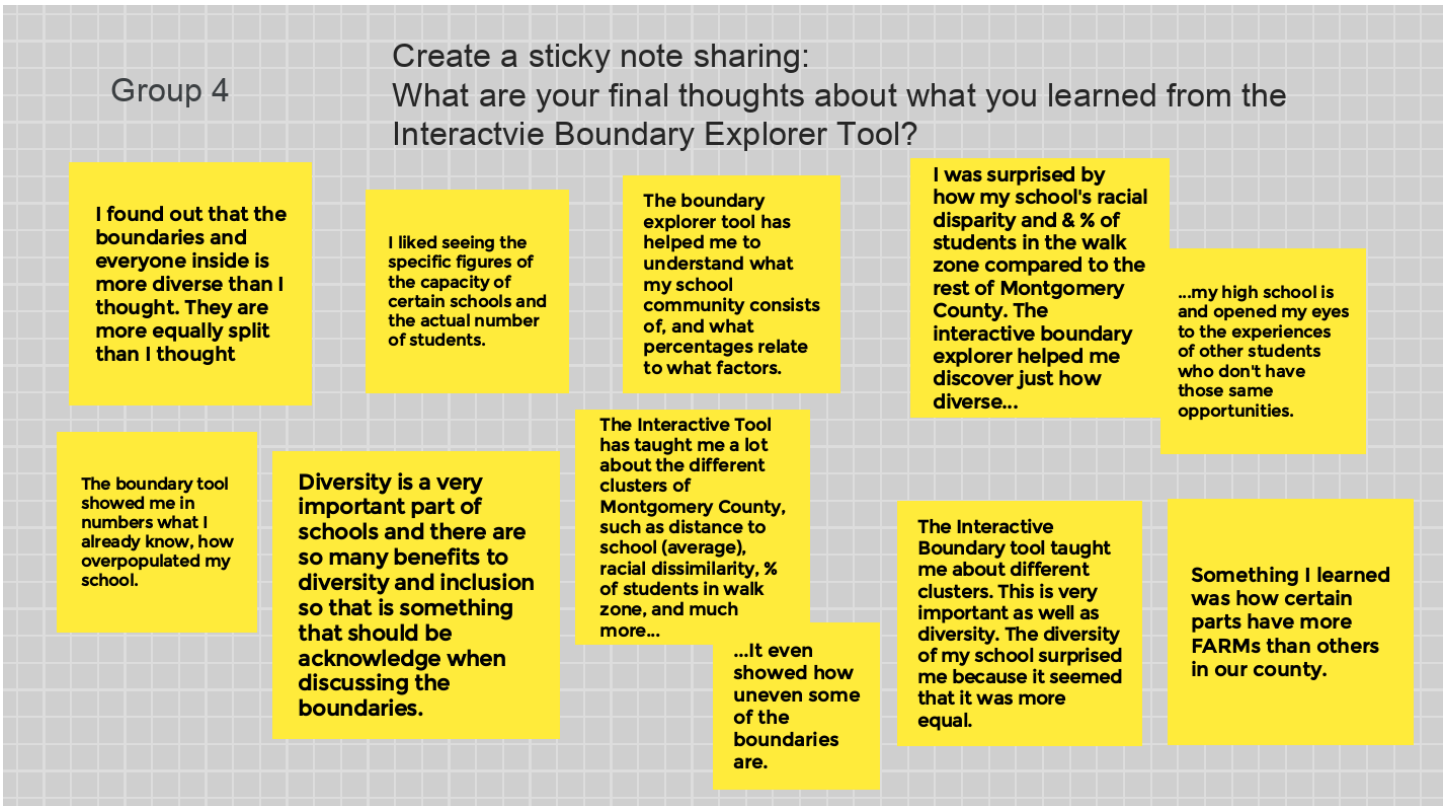
- Interrelationships between the lenses and underlying conditions
    - There appears to be a relationship between lower utilization rates and farther distances to school.
    - There seems to be a relationship between higher FARMS rates and overutilization.
    - There may be a relationship between utilization/diversity and factors such as housing and population density.

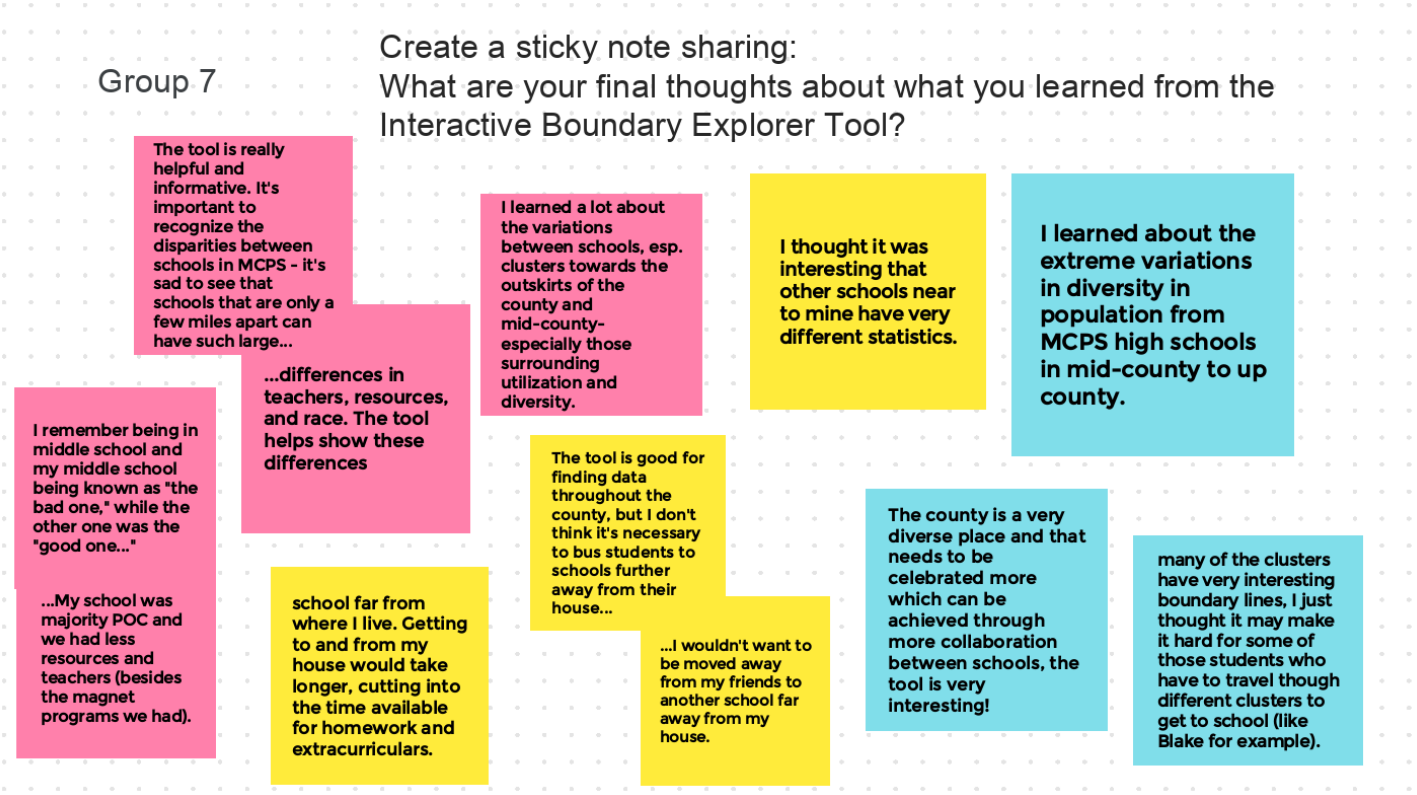
- Bullying and student safety as concerns that relate to school boundaries
    - Bullying related to ESOL in schools with lower ESOL rates
    - Less diversity in ES and MS means more bullying
    - School safety raised as a general concern
- Importance of staying with friends through school levels (cohort stability)
    - Concerns about being separated from their friends in the transition from ES to MS and MS to HS; a desire to not "split up friends"
- Disparities and disjointedness across regions of the county
    - Students in different regions of the county often have trouble understanding one another's' experiences.
    - Students observed larger trends that distinguish upcounty and downcounty; or east and west.
    - Students raised ideas such as a pen pal system or dual school field trips to connect students across the district.
- The importance of data access and transparency
    - Appreciation for getting to see this data in one place. Some reported challenges in the past trying to access various data sets.
    - Appreciation forgetting to see this data in one place. Some reported challenges in the past trying to access various data sets.
    - Students pointed to the opportunity to use this tool as an advocacy tool or advance more equity in the school system.

Concerns and questions

- Questions about how students would continue to be involved in future boundary changes and planning
- Questions about how proximity data considers magnet students
- Questions about quality control for the survey, since users can take it more than once

Note: a complete copy of all comments logged by student facilitators during the two areawide discussion events was provided to the BOE along with this report.





Sample closing comments submitted by students at the General Assembly meeting on 12/19 using Jamboard.

4. Glossary

ACD (policy): *(Policy ACD: Quality Integrated Education)* An MCPS policy that establishes guidelines for school integration, first adopted in 1983. The policy seeks to ensure equitable educational outcomes in an increasingly diverse school system, and mandates the BOE to evaluate diversity in MCPS schools on an annual basis, and determine programmatic and resourcing needs accordingly. The policy can be accessed online at: https://www.montgomeryschoolsmd.org/departments/policy/pdf/acd.pdf.

Assignment stability: Stability of school assignments over time is one of four factors outlined by Policy FAA to be considered in educational facility planning. MCPS attempts to minimize the number of times the same student(s) are impacted by reassignments leading to changing schools within a particular level of school. The policy states: "student reassignments should consider recent boundary or geographic student choice assignment plan changes, and/or school closings and consolidations that may have affected the same students."

Base school (also called home school): The school a student is assigned to, based on their residential address and school attendance boundaries.

Boundary study: The BOE's process for studying specific boundaries and considering a formal change. Boundary studies involve geographically-specific research of boundary options, within a certain scope set by the superintendent of schools. This research includes an analysis of factors such as travel time and traffic patterns, current and projected enrollment, and the articulation patterns of affected schools. Through a boundary study, MCPS staff develop boundary options to be considered by the BOE.

Capacity: The number of students who can be accommodated in the building, based on an allocation of space for different grades and types of programs.

Capital Improvements Master Plan (CIP): A six-year master plan for capital improvements in Montgomery County Public Schools. This plan is the mechanism through which the Board of Education requests funding from the County Council and the State of Maryland for county-wide and major planning projects. The most recent CIP plan covers fiscal years 2021-2026 and can be accessed online at: https://www.montgomeryschoolsmd.org/departments/planning/cipmaster.aspx

Choice programs: Through school choice programs, students in MCPS may apply districtwide to be a part of specialized programs at schools other than their base school. Choice programs are offered at the elementary, middle, and high school levels. They include competitive academic magnet programs, specialized academic programs (arts, science, communications, etc.), language immersion programs, the International Baccalaureate (IB), and others. Depending on the program, students may be admitted through a lottery process, an application process, and/or based on past academic achievement.

Cluster: The geographic grouping of schools within a defined attendance area that includes a high school and the elementary and middle schools which send students to that high school.

Consortium *(plural: consortia)*: Unlike a cluster, a consortium contains multiple high schools. Students residing within the geographic boundaries of the consortia enroll in a lottery to attend a school other than their base school. Assignment in the consortia lottery is based on student choice, sibling link, school capacity, and socio-economic factors. Students living within the geographic boundaries of the consortia are guaranteed a seat at their assigned home school and may enroll in the lottery to attend a school other than their home school. Students living outside of the geographic boundaries of the consortia may also enroll in a lottery to attend a school within the consortia, but they are not

guaranteed a spot at any consortia school.

Dissimilarity: A way to measure, statistically, how different one factor (i.e. a school) is from a group of its peers within a particular geographic area. In this report, dissimilarity provides a way to rate how unlike one school is from the average of that school and its five nearest neighbors. Looking at the five nearest schools to each school can be instructive to show whether a given school is an outlier relative to its neighbors, or better understand trends in a given area. Dissimilarity is expressed as a value between zero and one – where one is the most dissimilar.

Diversity: The range of differences between individuals, including aspects of identity, culture, ability, gender and sexuality, and more. While diversity is complex and carries many meanings, this analysis focuses on the three primary markers of diversity that MCPS draws upon in facilities planning: race and ethnicity, socio-economic status, and English language proficiency.

Downcounty Consortium (DCC): The Downcounty Consortium (DCC) is comprised of Montgomery Blair, Albert Einstein, John F. Kennedy, Northwood, and Wheaton high schools. Students entering high school participate in a choice process to rank, in order of preference, their choice of high school based on academy program. School assignments are made using a computerized lottery process that considers base school, sibling link, available space, and socioeconomic status.

English for Speakers of Other Languages (ESOL) enrollment: The English for Speakers of Other Languages (ESOL) enrollment is the percentage of students eligible for ESOL services, divided by the official total student enrollment.

Enrollment: The number of students enrolled in school as of the start of the school year. Total enrollment refers to total students countywide.

Ever-FARMS: The Ever-FARMS rate is a measure of students who are or ever have been enrolled in the FARMS (Free and Reduced-price Meals System) during their time in MCPS, from pre-Kindergarten on. A wide body of research has shown that FARMS is a good proxy measure for the concentration of low-income students within a school (see National Center for Education Statistics). Ever-FARMS provides a more complete picture of socio-economic levels than whether a student is currently FARMS eligible as it accounts for minor changes in need over time, enrollment trends across grade levels, and concerns related to social stigma and reporting. *See "FARMS" for more information about the FARMS program.*

Equity: The fair treatment, access, opportunity, and advancement of all people or students, which recognizes and works to eliminate the barriers that have prevented the full participation of some groups. "The principle of equity acknowledges that there are historically underserved and underrepresented populations and that fairness regarding these unbalanced conditions is needed to assist equality in the provision of effective opportunities to all groups." (source: University of Houston).[1]

Equity Initiatives Unit: Housed within MCPS, the purpose of this unit "is to support, coach, consult, and collaborate with schools and offices to design and implement efforts to address equity and cultural competency." They work with MCPS employees to address the racial achievement gap in the school system. (Link: https://www.montgomeryschoolsmd.org/departments/clusteradmin/equity/whoweare.aspx)

FAA (Policy): Policy FAA is the Educational Facilities Planning policy of the Montgomery County Board of Education adopted in 1986. The policy seeks to establish standards and

1 "Diversity, Equity, and Inclusion Terms." n.d. University of Houston Center for Diversity and Inclusion. https://www.uh.edu/cdi/diversity_education/resources/pdf/terms.pdf.

procedures for long range educational facilities planning, and to this day it governs the Board's planning and decision-making related to school facilities, including school construction, boundary changes, and assignment patterns. FAA establishes the four factors to be considered when developing facility and assignment recommendations, including school boundaries: demographic characteristics of the student population, geography, stability of school assignments over time, and facility utilization. (Note: No, FAA is not an acronym! All Board of Education policies are titled with a series of letters. Policy FAA falls under "Section F" of MCPS policies, "Facilities Development", sub-section FA, "Facility Development Goals"). Policy FAA can be accessed online at: https://www.montgomeryschoolsmd.org/departments/policy/pdf/faa.pdf.

FAA-RA (Regulation): Policy FAA-RA established the processes to implement Policy FAA. This includes the development of the Capital Improvement Program (CIP), Educational Facilities Master Plan (EFP), and non-capital strategies including school site selection, boundaries, geographic student choice assignment plans, and school closures/consolidations. This policy offers guidelines for developing and considering both capital and non-capital strategies, as well as for the implementation of the four key considerations outlined in Policy FAA. Policy FAA-RA can be accessed online at: https://www.montgomeryschoolsmd.org/departments/policy/pdf/faara.pdf.

Facility Utilization: The total number of students divided by program capacity. Program capacity is calculated based on available seats, adjusted for optimal utilization. MCPS aims for schools to be utilized between 80-100% of school capacity.

FARMS: The Free and Reduced-price Meals System (FARMS) is a federal program to lower or waive the cost of cafeteria lunches in public schools. Students may qualify for free or reduced-price meals based on household size and income. They may also qualify if they are receiving Food Supplement Program or Temporary Cash Assistance benefits. Families must apply every year to determine if they are eligible for FARMS. A wide body of research has shown that FARMS is a good proxy measure for the concentration of low-income students within a school (see National Center for Education Statistics). The FARMS rate is the percentage of students in the county or a given school that are enrolled in FARMS, divided by total students.

Feeder school: A school that sends its students to another school for the next grade level (e.g., a middle school that feeds a high school by sending its eighth graders to the high school for ninth grade). Most schools "feed" 100 percent of their students to the same school. Those in which the population goes on to more than one school are shown in the profiles of each school.

Island Assignment: A geographically non-contiguous school attendance area (broken up into two or more parts). MCPS has drawn non-contiguous school service areas for a variety of reasons over the course of its history.

KFI (Key Facility Indicator): KFI's are the components of school facilities that help to provide MCPS a summary of the facility's overall condition. KFI's allow MCPS to rate and benchmark the quality of schools' major infrastructural elements against industry standards. KFI's are one measure that informs the school system's capital planning process.

Middle School Magnet Consortium (MSMC): The Middle School Magnet Consortium (MSMC) is comprised of Argyle, A. Mario Loiederman, and Parkland middle schools. MSMC students entering middle school participate in a choice process to rank, in order of preference, their choice of middle school based on magnet program. Rising Grade 6 and 7 students from outside the consortium also may enter the lottery

process. School assignments are made by using a computerized lottery process that considers sibling link, available space, and socioeconomic status.

Model: A set of mathematical operations that transforms some input data into something new. The models discussed in this report transform MCPS's current school boundaries into a new set of school boundaries, each in slightly different ways in order to target different criteria.

Northeast Consortium (NEC): The Northeast Consortium (NEC) is comprised of James Hubert Blake, Paint Branch, and Springbrook high schools. NEC students entering high school participate in a choice process to rank, in order of preference, their choice of high school based on signature program. School assignments are made by using a computerized lottery process that considers base school, sibling link, available space, and socioeconomic status.

Paired schools: In some cases, MCPS has created paired schools to address shifting enrollment needs and better integrate communities at the elementary level. In paired schools, students attend both a primary (kindergarten-2nd grade) and secondary (3rd-5th grade) elementary school, allowing for adjustments to enrollment across more schools.

Proximity: This has to do with how close or far students live from school. Proximity is one of the key lenses in this report, and it corresponds to the consideration under Policy FAA of geography. Under this consideration, the BOE policy encourages a continued commitment to community schools, with an emphasis on students attending schools close to their place of residence.

Relocatable classrooms (commonly called portables): Mobile classrooms used as a short-term strategy by MCPS to accommodate overcrowding in schools, while necessary capital improvements are taking place.

Special Education (SPED) enrollment: The Special Education (SPED) enrollment is the percentage of students eligible for special education services, divided by the official total student enrollment.

Student/Instructional Staff Ratio: The Student/Instructional Staff Ratio is calculated by dividing the weighted enrollment, by the number of instructional staff. Weighted enrollment includes full-day kindergarten enrollment plus 1/2 times pre-K enrollment plus enrollment in Grades 1–12. Instructional staff is determined as all school-based instructional Full-time Equivalent positions (includes staff under the Teachers, Other Professional, and Instructional Support categories).

Split articulations: This refers to elementary or middle schools where not all students attend the same secondary school. 26 elementary and six middle schools in MCPS have split articulations.

Title I: A federal funding program intended to address achievement gaps in schools with high economic needs. This funding goes toward supplemental academic programs and other services and support. Title I schools in MCPS receive technical assistance from an instructional specialist, additional teaching professionals/para-educators, the Extended Learning Opportunities Summer Adventures in Learning program (ELO-SAIL), and family involvement funds. Title I falls under the Elementary and Secondary Education Act (ESEA), amended by the Every Student Succeeds Act (ESSA) in 2015.

5. Works Cited

Works Cited

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6. Appendix

1. Appendix School Boundary Models

Model 1: High School Utilization Improvements

The Utilization A model is designed to make improvements to utilization within existing cluster boundaries. As such the model is only able to make improvements at the high school level between high schools in Consortia. The table below summarizes estimated improvements to Consortia high schools when 0-2.5% of high school students are rezoned.

Table 3 — High School Utilization by Percent of Students Rezoned to New Base School

School Name	Utilization With No Change	Utilization if 0-2.5% Rezoned	Utilization Difference
Einstein	112%	112%	No change
Kennedy	101%	101%	No change
Paint Branch	99%	96%	-3 **pp***
Springbrook	82%	90%	8
Blair	111%	111%	No change
Wheaton	98%	102%	4
Blake	103%	96%	-7
Northwood	120%	113%	-7

** pp = percentage points.*

Model 1: Local Assignment Stability Impacts

The Utilization A model was designed to understand the potential benefits to utilization if boundary changes are made between neighboring schools within Cluster boundaries. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas between two school attendance areas. Table 7, below, examines the frequency of these swaps between attendance areas.

Table 4 — Overall Share of Swaps Between Elementary School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Clarksburg	William B. Gibbs Jr.	39%	114% **pp***	Yes
Summit Hall	Rosemont	36	47%	Yes
South Lake	Stedwick	35	51%	Yes
Somerset	Westbrook	30	51%	Yes
Watkins Mill	Stedwick	28	36%	Yes
Page	Fairland	27	66%	Yes
Mill Creek Towne	Candlewood	26	75%	Yes
Rosemont	Washington Grove	23	35%	Yes
Goshen	Laytonsville	23	8%	Yes
William B. Gibbs Jr.	Snowden Farm	22	2%	Yes
Great Seneca Creek	Darnestown	19	32%	Yes
Poolesville	Monocacy	18	22%	Yes
Matsunaga	Darnestown	18	47%	Yes
Roscoe Nix	Cannon Road	17	24%	Yes
Mill Creek Towne	Sequoyah	16	77%	Yes
Bannockburn	Wood Acres	16	37%	Yes
Page	Cannon Road	15	77%	Yes
Clarksburg	Snowden Farm	15	116%	Yes
Luxmanor	Ashburton	15	49%	Yes
Lake Seneca	Waters Landing	14	35%	Yes

** pp = percentage points.*

Table 5 — Overall Share of Swaps Between Middle School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Per 1000 Swaps	Utilization Difference	Swap Within Cluster
Newport Mill	Sligo	183%	6% **pp***	Yes
Silver Creek	Westland	128	22%	Yes
Loiederman	Newport Mill	110	32%	Yes
Lee	Sligo	63	29%	Yes
Baker	Hallie Wells	55	23%	Yes
Sligo	Newport Mill	53	6%	Yes
Lakelands Park	Ridgeview	48	24%	Yes
Briggs Chaney	Farquhar	39	13%	Yes
Key	White Oak	38	19%	Yes
Silver Spring International	Sligo	36	28%	Yes
Lee	Newport Mill	36	23%	Yes
Takoma Park	Eastern	35	24%	Yes
Banneker	Key	30	5%	Yes
Banneker	Briggs Chaney	27	8%	Yes
Briggs Chaney	White Oak	21	16%	Yes
Redland	Shady Grove	18	15%	Yes
Takoma Park	Silver Spring International	17	20%	Yes
Forest Oak	Gaithersburg	13	13%	Yes
White Oak	Farquhar	10	3%	Yes
Cabin John	Hoover	8	7%	Yes

Table 6 — Overall Share of Swaps Between High School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Per 1000 Swaps	Utilization Difference	Swap Within Cluster
Blake	Springbrook	50.0%	21 **pp***	Yes
Paint Branch	Springbrook	25.3	17	Yes
Northwood	Wheaton	20.6	22	Yes
Paint Branch	Blake	3.0	4	Yes
Blake	Paint Branch	0.7	4	Yes
Springbrook	Paint Branch	0.2	17	Yes
Springbrook	Blake	0.2	21	Yes

** pp = percentage points.*

Model 2: Local Assignment Stability Impacts

The Utilization B model was designed to understand the potential benefits to utilization and assignment stability impacts if existing Cluster boundaries and articulation patterns were removed. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas between two school attendance areas. Table 7, below, examines the frequency of these swaps between attendance areas.

Table 7 — Overall Share of Swaps Between Elementary School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Clarksburg	Monocacy	10.6%	131 **pp***	No
Summit Hall	Rosemont	5.0	47	Yes
Page	Cannon Road	3.6	77	Yes
Clarksburg	William B. Gibbs Jr.	3.4	114	Yes
Mill Creek Towne	Candlewood	2.6	75	Yes
Rosemont	Washington Grove	2.4	35	Yes
Clarksburg	Little Bennett	2.4	98	Yes
Luxmanor	Garrett Park	2.2	62	Yes
Page	Fairland	2.2	66	Yes
Potomac	Travilah	2.1	23	No
Burnt Mills	Roscoe Nix	2.0	44	Yes
Rosemont	Stone Mill	1.9	26	No
Wood Acres	Westbrook	1.6	27	No
Highland View	Sligo Creek	1.6	48	Yes
Mill Creek Towne	Sequoyah	1.5	77	Yes
Somerset	Westbrook	1.4	51	Yes
Burnt Mills	Jackson Road	1.3	43	Yes
Clarksburg	Waters Landing	1.2	115	No
South Lake	Stedwick	1.2	51	Yes
Clarksburg	Snowden Farm	1.2	116	Yes

** pp = percentage points.*

Together, the exchanges in small geographic areas (swaps) between these twenty pairs of schools account for slightly more than half of all swaps made by all Utilization B elementary school model runs.

Across all Utilization B elementary school model runs, swaps between schools in the same Cluster accounted for 61% of all swaps. This suggests there is ample opportunity to redress utilization challenges within Cluster boundaries, at the ES level, as suggested by the Utilization A model. Thus, the Utilization B model is able to maintain articulation patterns to existing Cluster boundaries in large part. However, 39% of swaps occurred across Cluster boundaries, a significant proportion, and were integral to the utilization improvements achieved.

The twenty most frequent swaps at the MS and HS levels are included in Tables Table 8 and Table 9, respectively. At the MS and HS level, swaps between Clusters account for the large majority of swaps made by the model runs. This comes as no surprise, given that eight of 19 Clusters contain only one middle school and only two Clusters are a Consortia of high schools rather than a single high school.

Table 8 — Overall Share of Swaps Between Middle School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Pyle	Westland	9.2%	46 **pp***	No
Forest Oak	Shady Grove	6.2	32	No
Takoma Park	Silver Spring International	5.5	20	Yes
Silver Creek	Westland	5.2	22	Yes
Takoma Park	Eastern	4.3	24	Yes
Redland	Shady Grove	3.8	15	Yes
Argyle	Farquhar	3.5	26	No
West	Shady Grove	3.5	29	No
Loiederman	Newport Mill	3.4	32	Yes
Loiederman	Tilden	3.2	16	No
Wood	Redland	2.8	22	No
Parkland	Argyle	2.5	6	Yes
Argyle	Wood	2.4	9	No
Shady Grove	Redland	2.3	15	Yes
Argyle	Lee	2.1	8	Yes
Parkland	Tilden	2.1	22	No
Silver Creek	Sligo	2.0	18	No
Gaithersburg	Redland	2.0	4	No
Lee	Sligo	1.8	29	Yes
Lakelands Park	Ridgeview	1.5	24	Yes

** pp = percentage points.*

Table 9 — Overall Share of Swaps Between High School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Per 1000 Swaps	Utilization Difference	Swap Within Cluster
Blake	Springbrook	11.3%	21 **pp***	Yes
Northwood	Blair	7.1	8	Yes
Gaithersburg	Magruder	6.7	11	No
Clarksburg	Watkins Mill	6.2	40	No
Clarksburg	Damascus	6.0	34	No
Gaithersburg	Watkins Mill	5.8	16	No
Northwood	Einstein	4.1	8	Yes
Northwood	Springbrook	2.8	38	No
Montgomery	Magruder	2.7	24	No
Blake	Sherwood	2.6	13	No
Kennedy	Springbrook	2.3	19	No
Quince Orchard	Gaithersburg	2.2	22	No
Clarksburg	Seneca Valley	1.9	29	No
Einstein	Bethesda Chevy Chase	1.9	20	No
Magruder	Sherwood	1.8	3	No
Gaithersburg	Damascus	1.7	10	No
Gaithersburg	Sherwood	1.7	8	No
Northwood	Wheaton	1.5	22	Yes
Rockville	Magruder	1.5	6	No
Quince Orchard	Watkins Mill	1.5	38	No

** pp = percentage points.*

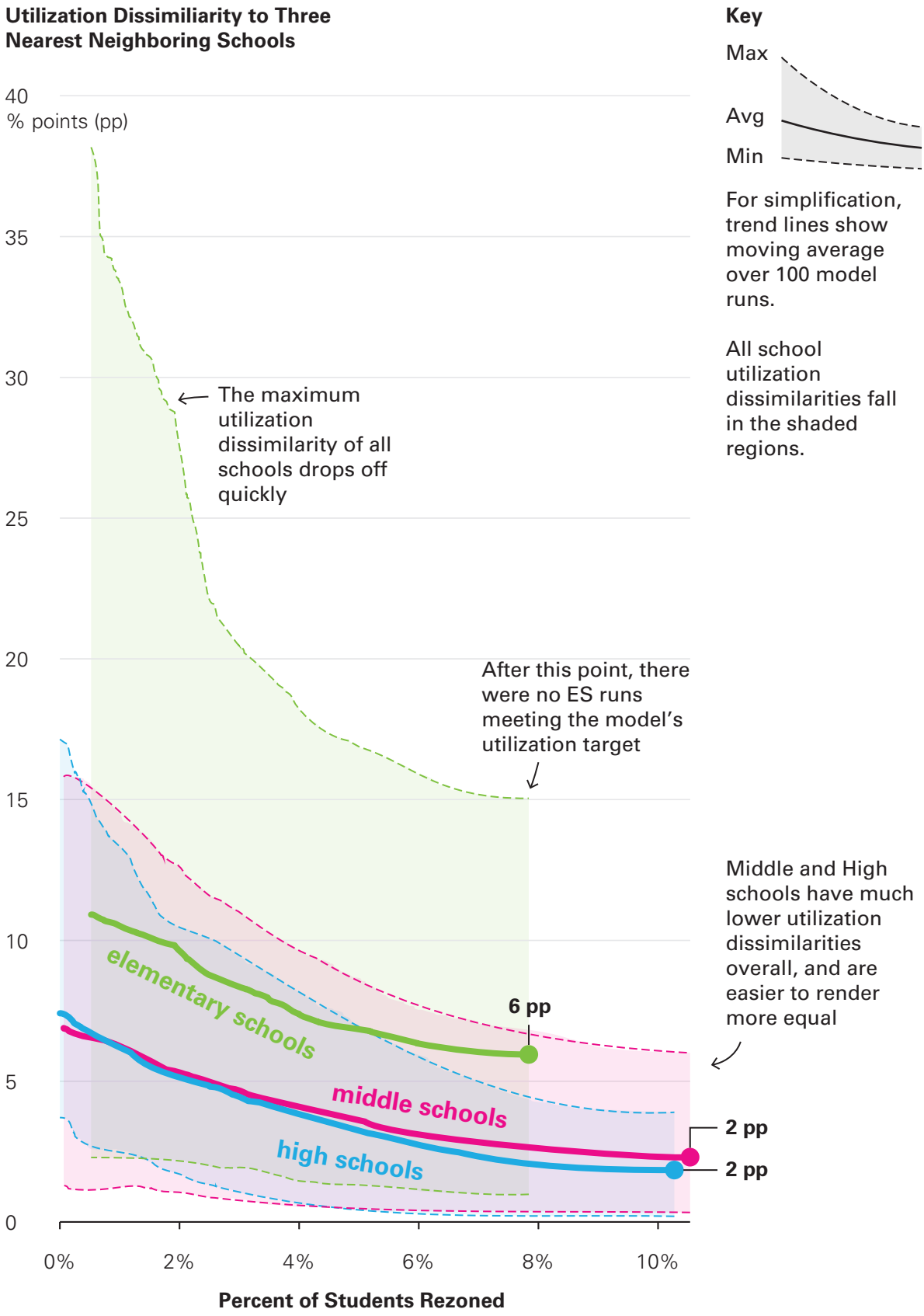
Model 2: Utilization Dissimilarity to Neighboring Schools

The Utilization B model can help us understand the extent to which school utilizations can be made more equal between neighboring schools. The model tries to identify pairs of schools that neighbor one another but have very different utilizations. Boundary changes between highly over-utilized and highly under-utilized neighboring schools are able to make the biggest improvement to utilization with the least cost since both schools will see their utilizations move in the right direction, towards the countywide average.

The tables above illustrate how this works. Note that boundary changes between neighboring schools are more common the more of a difference there is in there utilization rates.

As a result, we see the dissimilarity in utilization rates between schools and their three nearest neighboring schools (by driving distance) decrease significantly the more boundary changes made. Figure 46 shows the maximum, minimum, and average utilization dissimilarity between schools and their nearest three neighboring schools' utilizations. The Figure shows that there is significant potential to reduce utilization dissimilarities in the District, thereby improving equity in educational experiences.

Figure 46 — Utilization B Model Run Utilization Dissimilarity to Three Nearest Schools by School Level



Model 3: Local Assignment Stability Impacts

The Diversity model was designed to understand the potential to improve utilization and diversity simultaneously while changing boundaries between neighboring schools. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas between two school attendance areas. The table below examines the frequency of these swaps between attendance areas.

Table 10 — Overall Share of Swaps Between Elementary School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Luxmanor	Farmland	11.0%	46 **pp***	Yes
Clarksburg	Monocacy	9.9	131	No
Clarksburg	Lake Seneca	6.9	80	No
Clarksburg	William B. Gibbs Jr.	5.9	114	Yes
Summit Hall	Rosemont	5.4	47	Yes
Mill Creek Towne	Candlewood	5.3	75	Yes
Page	Fairland	5.2	66	Yes
Burnt Mills	Kemp Mill	4.9	41	No
Jones Lane	Travilah	3.3	20	No
Somerset	Westbrook	3.0	51	Yes
Farmland	Twinbrook	2.3	18	No
Brookhaven	Wheaton Woods	2.2	34	Yes
Burnt Mills	Roscoe Nix	2.0	44	Yes
Highland View	Sligo Creek	2.0	48	Yes
Forest Knolls	Sligo Creek	1.6	40	Yes
Gaithersburg	McAuliffe	1.6	46	No
Page	Cannon Road	1.4	77	Yes
Laytonsville	Sequoyah	1.4	14	No
Strawberry Knoll	Goshen	1.4	46	Yes
Sligo Creek	New Hampshire Estates	1.3	7	Yes

** pp = percentage points.*

Table 11 — Overall Share of Swaps Between Middle School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Per 1000 Swaps	Utilization Difference	Swap Within Cluster
Silver Creek	Westland	17.5%	22 **pp***	Yes
Pyle	North Bethesda	7.1	19	No
Forest Oak	Shady Grove	6.7	32	No
Westland	Silver Creek	6.0	22	Yes
Argyle	Farquhar	5.6	26	No
Pyle	Westland	3.8	46	No
Newport Mill	Sligo	3.2	6	Yes
Takoma Park	Eastern	3.2	24	Yes
Lee	Sligo	3.1	29	Yes
Takoma Park	Silver Spring International	3.0	20	Yes
West	Shady Grove	2.8	29	No
Wood	Farquhar	2.6	17	No
Baker	Gaithersburg	2.3	25	No
Loiederman	Tilden	2.2	16	No
Parkland	Tilden	2.1	22	No
Argyle	Wood	2.1	9	No
North Bethesda	Newport Mill	1.8	17	No
Loiederman	Newport Mill	1.7	32	Yes
Gaithersburg	Parks	1.7	3	No
Frost	Ridgeview	1.5	13	No

** pp = percentage points.*

Table 12 — Overall Share of Swaps Between High School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Per 1000 Swaps	Utilization Difference	Swap Within Cluster
Gaithersburg	Sherwood	15.3%	8 **pp***	No
Sherwood	Springbrook	9.8	8	No
Northwood	Blair	8.4	8	Yes
Magruder	Sherwood	7.7	3	No
Einstein	Bethesda Chevy Chase	6.1	20	No
Sherwood	Magruder	5.5	3	No
Paint Branch	Sherwood	4.0	9	No
Quince Orchard	Watkins Mill	3.3	38	No
Clarksburg	Damascus	3.0	34	No
Wootton	Gaithersburg	2.8	1	No
Gaithersburg	Magruder	2.6	11	No
Blake	Sherwood	2.6	13	No
Clarksburg	Watkins Mill	2.6	40	No
Johnson	Wheaton	2.4	21	No
Einstein	Johnson	2.4	7	No
Churchill	Johnson	2.2	4	No
Northwood	Einstein	2.0	8	Yes
Northwest	Wootton	1.9	16	No
Clarksburg	Poolesville	1.6	18	No
Rockville	Sherwood	1.5	4	No

** pp = percentage points.*

Model 4: Local Assignment Stability Impacts

The Proximity model was designed to understand the potential to improve utilization and proximity simultaneously while changing boundaries between neighboring schools. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas between two school attendance areas. Table 13, below, examines the frequency of these swaps between attendance areas.

Table 13 — Overall Share of Swaps Between Elementary School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Summit Hall	Rosemont	2.8%	47 **pp***	Yes
Clarksburg	Monocacy	2.7	131	No
Clarksburg	Little Bennett	2.0	98	Yes
Clarksburg	William B. Gibbs Jr.	1.8	114	Yes
Page	Fairland	1.5	66	Yes
Clarksburg	Waters Landing	1.3	115	No
Mill Creek Towne	Candlewood	1.3	75	Yes
Clarksburg	Snowden Farm	1.3	116	Yes
Burnt Mills	Roscoe Nix	1.2	44	Yes
Luxmanor	Farmland	1.2	46	Yes
Luxmanor	Garrett Park	1.1	62	Yes
Somerset	Westbrook	1.1	51	Yes
Burnt Mills	Jackson Road	1.1	43	Yes
Bannockburn	Westbrook	1.0	64	No
Luxmanor	Ashburton	1.0	49	Yes
Mill Creek Towne	Washington Grove	1.0	75	No
Page	Galway	1.0	54	Yes
Potomac	Travilah	1.0	23	No
Page	Cannon Road	0.9	77	Yes
Mill Creek Towne	Sequoyah	0.9	77	Yes

** pp = percentage points.*

Table 14 — Overall Share of Swaps Between Middle School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Pyle	Westland	4.3%	46 **pp***	No
Takoma Park	Silver Spring International	4.0	20	Yes
Wood	Shady Grove	3.5	38	No
North Bethesda	Westland	2.8	27	No
Silver Creek	Westland	2.8	22	Yes
West	Shady Grove	2.7	29	No
Argyle	Farquhar	2.6	26	No
Loiederman	Newport Mill	2.5	32	Yes
Forest Oak	Shady Grove	2.5	32	No
Redland	Shady Grove	2.5	15	Yes
Wood	Redland	2.4	22	No
Argyle	Wood	2.2	9	No
Loiederman	Tilden	2.0	16	No
Baker	Hallie Wells	1.9	23	Yes
Argyle	Lee	1.8	8	Yes
Takoma Park	Eastern	1.8	24	Yes
Silver Spring International	Sligo	1.7	28	Yes
Parkland	Argyle	1.6	6	Yes
Shady Grove	Redland	1.6	15	Yes
Gaithersburg	Redland	1.5	4	No

** pp = percentage points.*

Table 15 — Overall Share of Swaps Between High School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Clarksburg	Damascus	4.8%	34 **pp***	No
Clarksburg	Watkins Mill	3.7	40	No
Northwood	Springbrook	3.6	38	No
Blake	Sherwood	3.5	13	No
Gaithersburg	Sherwood	3.3	8	No
Magruder	Sherwood	2.8	3	No
Gaithersburg	Damascus	2.8	10	No
Montgomery	Magruder	2.7	24	No
Quince Orchard	Watkins Mill	2.7	38	No
Blair	Springbrook	2.6	30	No
Gaithersburg	Magruder	2.6	11	No
Paint Branch	Sherwood	2.5	9	No
Blake	Springbrook	2.4	21	Yes
Rockville	Magruder	2.3	6	No
Northwood	Blair	2.3	8	Yes
Kennedy	Springbrook	2.3	19	No
Northwood	Kennedy	2.2	18	Yes
Gaithersburg	Watkins Mill	2.2	16	No
Northwood	Einstein	2.1	8	Yes
Northwood	Wheaton	2.0	22	Yes

** pp = percentage points.*

Model 5: Local Assignment Stability Impacts

The Proximity B model was designed to understand the potential to improve proximity if we allow large impacts to assignment stability. To achieve this end, each model run takes a slightly different path and targets a more-or-less aggressive utilization goal. In sum, however, many of the model runs will make similar decisions, exchanging (or "swapping") small geographic areas between two school attendance areas. The table below examines the frequency of these swaps between attendance areas.

Table 16 — Overall Share of Swaps Between Elementary School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Twinbrook	Bayard Rustin	4.0%	5 pp*	Yes
Burnt Mills	Cannon Road	3.1	68	Yes
Greencastle	Galway	3.0	19	Yes
Burnt Mills	Kemp Mill	2.0	41	No
Germantown	Great Seneca Creek	1.6	0	Yes
Clarksburg	William B. Gibbs Jr.	1.5	114	Yes
Luxmanor	Ashburton	1.4	49	Yes
Summit Hall	Washington Grove	1.2	82	Yes
Westover	Kemp Mill	1.0	13	No
Gaithersburg	Washington Grove	0.8	42	Yes
South Lake	Stedwick	0.7	51	Yes
South Lake	Whetstone	0.7	30	Yes
Damascus	Laytonsville	0.6	14	No
Luxmanor	Kensington Parkwood	0.5	81	Yes
Clarksburg	Little Bennett	0.5	98	Yes
Germantown	McAuliffe	0.5	35	No
Burnt Mills	Roscoe Nix	0.4	44	Yes
Forest Knolls	Woodlin	0.4	30%	Yes
Greencastle	Fairland	0.3	31%	Yes
Highland View	Sligo Creek	0.3	48%	Yes

** pp = percentage points.*

Table 17 — Overall Share of Swaps Between Middle School Attendance Areas in Model Runs

School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Gaithersburg	Redland	15.0%	4 pp	No
Loiederman	Argyle	11.2	1	Yes
Loiederman	Newport Mill	8.7	32	Yes
Cabin John	Pyle	7.1	21	No
Loiederman	Lee	7.0	9	Yes
Cabin John	North Bethesda	4.6	2	No
Ridgeview	Clemente	4.6	22	No
Westland	North Bethesda	4.5	27	No
Loiederman	Tilden	4.3	16	No
Parkland	Wood	3.1	15	No
Briggs Chaney	Farquhar	3.0	13	Yes
Montgomery Village	Clemente	2.4	13	No
Westland	Pyle	2.2	46	No
Kingsview	Poole	2.2	11	No
Frost	Hoover	2.1	3	No
Rocky Hill	Hallie Wells	1.9	2	No
Tilden	Hoover	1.7	7	No
Argyle	Farquhar	1.7	26	No
Newport Mill	Silver Creek	1.6	12	No
Briggs Chaney	White Oak	1.4	16	Yes

** pp = percentage points.*

Table 18 — Overall Share of Swaps Between High School Attendance Areas in Model Runs

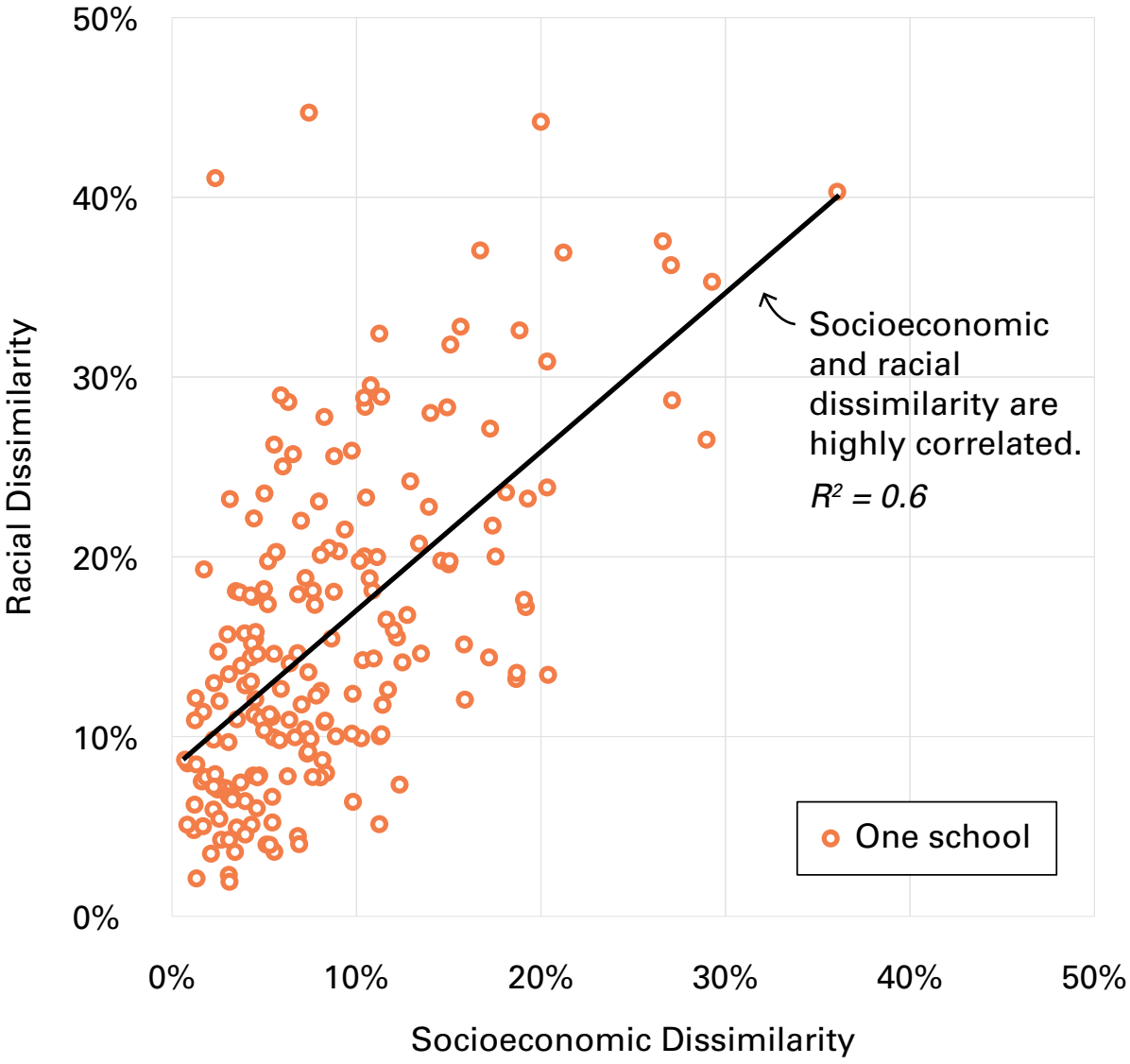
School Sender Name	School Receiver Name	Share of Swaps	Utilization Difference	Swap Within Cluster
Quince Orchard	Poolesville	25.3%	**17 pp***	No
Blake	Sherwood	18.9	13	No
Gaithersburg	Montgomery	16.1	14	No
Watkins Mill	Damascus	12.9	6	No
Watkins Mill	Magruder	5.0	6	No
Blair	Northwood	3.4	8	Yes
Wheaton	Kennedy	2.0	4	Yes
Magruder	Sherwood	1.4	3	No
Rockville	Sherwood	1.4	4	No
Wheaton	Johnson	1.0	21	No
Gaithersburg	Northwest	1.0	17	No
Damascus	Sherwood	0.8	3	No
Wheaton	Einstein	0.4	14	Yes
Watkins Mill	Sherwood	0.2	9	No
Wheaton	Rockville	0.1	4	No
Blair	Bethesda Chevy Chase	0.1	20	No
Wheaton	Sherwood	0.1	7	No
Seneca Valley	Northwest	0.1	23	No
Blake	Northwood	0.1	17	No
Blake	Springbrook	0.0	21	Yes

** pp = percentage points.*

Correlation Between Socioeconomic and Racial Dissimilarity

There is a correlation between socioeconomic and racial dissimilarity of schools to their nearest three neighboring schools, especially for schools with racial dissimilarities below 30% (which accounts for nearly all schools). For schools with high racial dissimilarities, above 30%, there is a wider range of socioeconomic dissimilarities, between 3% and 35%.

Figure 47 — The Relationship Between Socioeconomic and Racial Dissimilarity



As noted in the Model 3 (Diversity) section, we use socioeconomic dissimilarity only when running the model. The Diversity Model was most efficient and effective when only socioeconomic dissimilarity was calculated so only one of the two diversity metrics was used in the model.

Capital Action Requirements by Model

The CIP identifies thresholds for addressing overutilization, based on number of students enrolled in excess of a school's capacity. This threshold is one way to understand how imbalances in utilization affect the school system.

When an elementary school is more than 92 students overutilized, the school is considered for an addition. The threshold for middle schools is 150 students. For high schools, the threshold is 200 students.

Table 19 — Average Percentage of Schools Above Capital Action Threshold in Model Runs

Model	Elementary	Middle	High
Existing Schools (SY 19-20)	20%	8%	32%
1. Utilization A	9%	6%	29%
2. Utilization B	13%	0%	0%
3. Diversity	20%	0%	1%
4. Proximity A	12%	0%	0%
5. Proximity B	34%	13%	32%

Using these thresholds we can estimate the average number of schools meeting the capital action requirements identified by the CIP for the five diferent models. These statistics are presented in the table above. These statistics are for model runs where the best benefits to utilization (or utilization and proximity in the case of Model 5) were found. The number of students rezoned in these model runs is between 7.5% to 10% for the first four models. The share varies by school level for Model 5, as summarized in the model comparison table on page 11 in the report introduction.

We find that Models 2, 3, and 4 obtain the best results on average across school levels. However, the best results for elementary schools alone were found in Model 1 runs. Model 5 performed worse from the perspective of capital action requirements than any other model and existing boundaries.

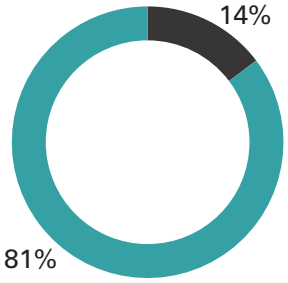
Table 20 — Average Number of Schools Above Capital Action Threshold in Model Runs

Model	Elementary	Middle	High
Existing Schools (SY 19-20)	27	3	8
1. Utilization A	12	2	7
2. Utilization B	18	0	0
3. Diversity	27	0	0
4. Proximity A	16	0	0
5. Proximity B	46	5	8

2. Appendix Community Engagement

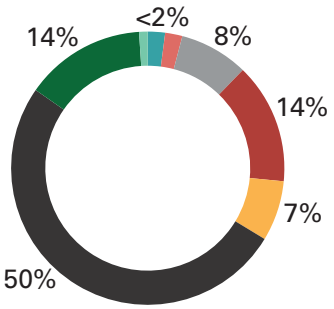
Polling Summary: Public Webinars (Oct. 20)

Q1. Select all of those that apply to you:



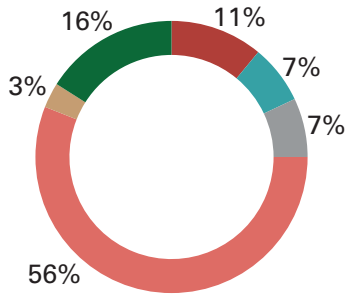
- I am a K-12 student in MCPS
- I am a teacher/staff member at MCPS
- I am a parent/guardian with kids currently in MCPS
- I am a parent/guardian with kids who will attend MCPS
- I am a parent/guardian who used to have children in MCPS
- I don't have children but care about our county

Q2. Which of these best describes where you live:



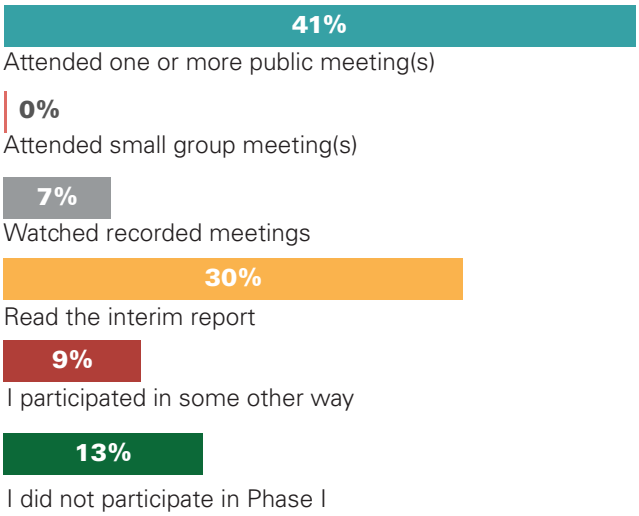
- North Central: In the vicinity of Gaithersburg and Montgomery Village
- Northeast: In the vicinity of Damascus and Clarksburg
- Northwest: In the vicinity of Poolesville, Dickerson, Boyds and Germantown
- Central: In the vicinity of Rockville and Derwood
- East: In the vicinity of Colesville, Fairland and Burtonsville
- South: In the vicinity of Sliver Spring, Takoma Park, Wheaton and White Oak
- Southwest: In the vicinity of Bethesda, Chevy Chase and Potomac
- I live outside Montgomery County, but connected to the county in other ways

Q3. I consider myself:



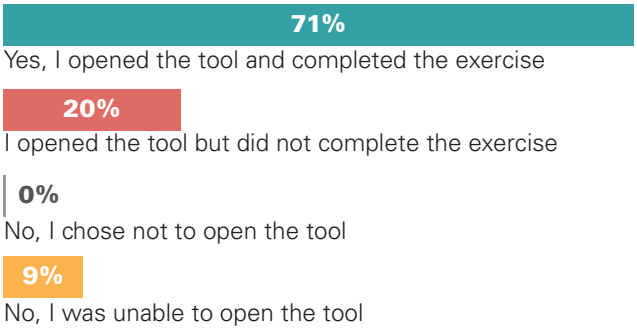
- African American/Black
- Caucasian/ White
- Hispanic or Latino
- Asian American or Pacific Islander
- Native American
- More than one race
- I don't care to say

Q4. Did you participate in Phase 1 in any of the following ways?:

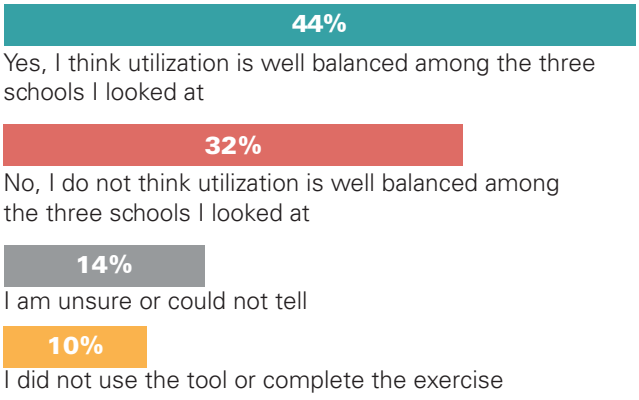


10/20 Public Webinar polling summary (continued)

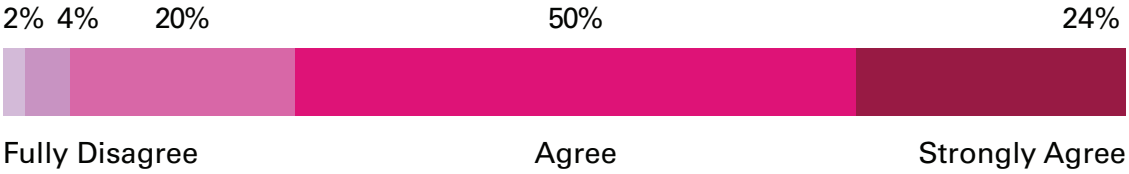
Q5. Did you open and use the IBE during the participant exercise?:



Q6. Was utilization well-balanced among the schools you looked at during the exercise?:

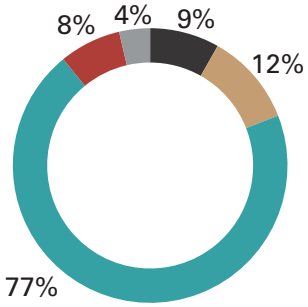


Q7. Rate your agreement with this statement: I feel comfortable opening and using the Interactive Boundary Explorer:



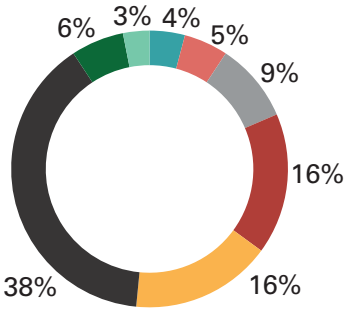
Polling Summary: Public Webinars (Oct. 22)

Q1. Select all of those that apply to you:



- I am a K-12 student in MCPS
- I am a teacher/staff member at MCPS
- I am a parent/guardian with kids currently in MCPS
- I am a parent/guardian with kids who will attend MCPS
- I am a parent/guardian who used to have children in MCPS
- I don't have children but care about our county

Q2. Which of these best describes where you live:



- North Central: In the vicinity of Gaithersburg and Montgomery Village
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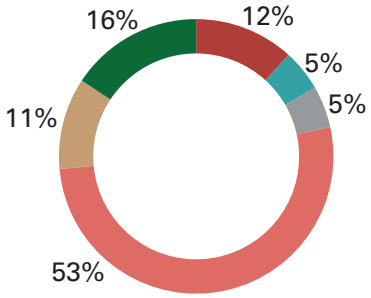
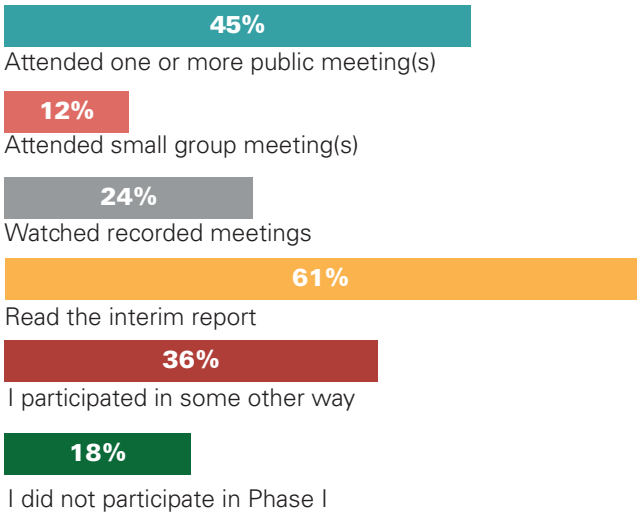
- Central: In the vicinity of Rockville and Derwood
- East: In the vicinity of Colesville, Fairland and Burtonsville
- South: In the vicinity of Sliver Spring, Takoma Park, Wheaton and White Oak
- Southwest: In the vicinity of Bethesda, Chevy Chase and Potomac
- I live outside Montgomery County, but connected to the county in other ways

Q3. I consider myself:



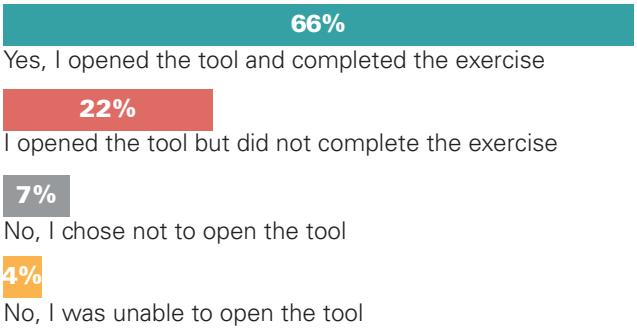
- African American/Black
- Caucasian/ White
- Hispanic or Latino
- Asian American or Pacific Islander
- Native American
- More than one race
- I don't care to say

Q4. Did you participate in Phase 1 in any of the following ways?:

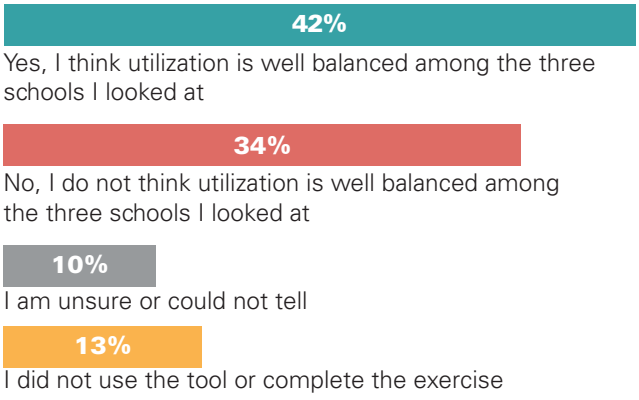


10/22 Public Webinar polling summary (continued)

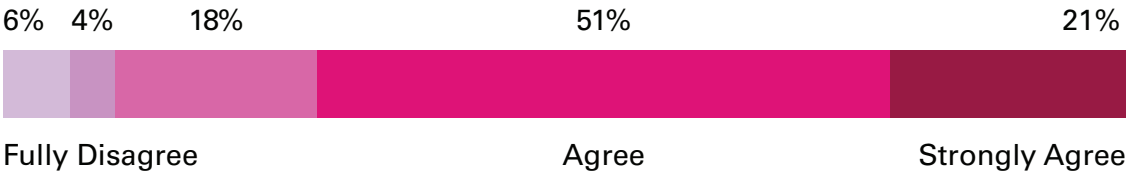
Q5. Did you open and use the IBE during the participant exercise?:



Q6. Was utilization well-balanced among the schools you looked at during the exercise?:

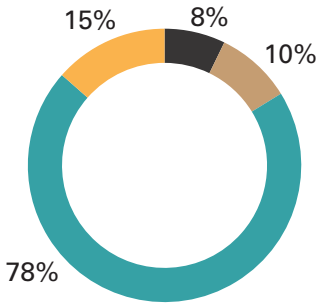


Q7. Rate your agreement with this statement: I feel comfortable opening and using the Interactive Boundary Explorer:



Polling Summary: Community Feedback and Conversation

Q1. Select all of those that apply to you:



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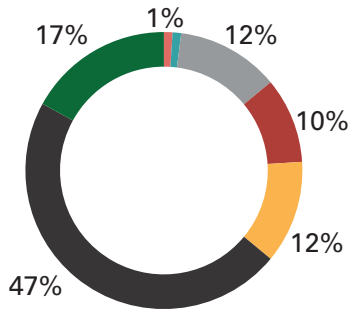
- I am a parent/guardian who used to have children in MCPS
- I don't have children but care about our county

Q2. Which of these best describes where you live:



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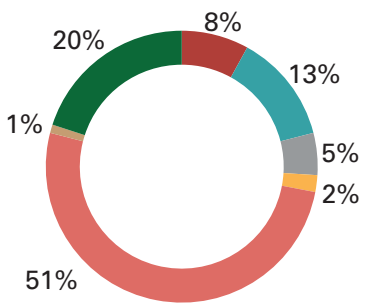
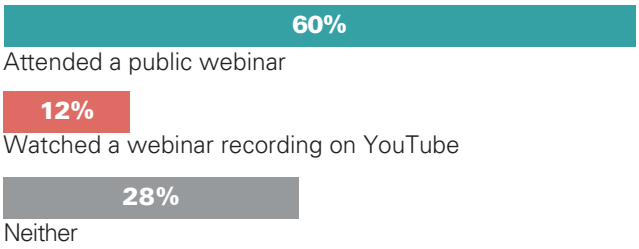
- Southwest: In the vicinity of Bethesda, Chevy Chase and Potomac
- I live outside Montgomery County, but connected to the county in other ways

Q3. I consider myself:

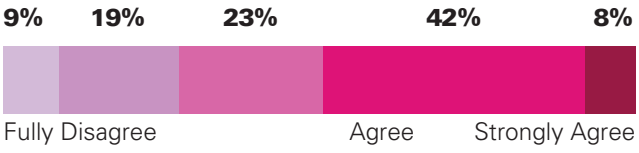


- African American/Black
- Caucasian/ White
- Hispanic or Latino
- Asian American or Pacific Islander
- Native American
- More than one race
- I don't care to say

Q4. Did you participate in Phase 1 in any of the following ways?:



Q5. Rate your agreement with this statement: I feel comfortable opening and using the IBE:



MCPS Districtwide Boundary Analysis

Final Report