

THE GEOGRAPHY OF SCHOOL COMMUNITIES: HOW LAND USE, DEMOGRAPHICS, AND PLANNING FRAMEWORKS SHAPE ELEMENTARY ATTENDANCE ZONES

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Michael's work spans planning, education, and community development, informed by experience supporting community organizing and environmental campaigns across the SF Bay Area, Washington, D.C., Maryland, Virginia, Pennsylvania, and Rhode Island. He has contributed to projects integrating demographic allocation, parcel-level land-use analysis, and place-based assessment.

Abstract

School attendance zones are often treated as administrative boundaries, yet they contain distinct neighborhood histories, housing patterns, and socioeconomic conditions that shape the lived experiences of students and families. This article analyzes demographic, land-use, zoning, and housing patterns across four elementary school attendance zones in Chillum, Maryland—Carole Highlands, Lewisdale, Ridgecrest, and Rosa L. Parks—to examine how built-environment characteristics align with social vulnerability and long-term enrollment capacity. Using area-weighted allocation of ACS indicators, parcel-level land-use classification, and zoning capacity analysis based on Subtitle 27 of the Prince George’s County Zoning Ordinance, the study reveals substantial variation in poverty, linguistic isolation, housing typologies, and allowable residential density across zones. Notably, Lewisdale is nearly built out under current zoning, while Carole Highlands contains significant underutilized high-density zoning, illustrating how zoning policies shape the uneven capacity of school communities to accommodate future families.

The analysis is situated within the planning framework established by the Prince George’s County Public Schools (PGCPS) Educational Facilities Master Plan (EFMP). While the EFMP references Plan 2035 extensively and relies on pupil yield factors derived from existing dwelling units, it does not incorporate parcel-level land use, zoning capacity, or attendance-area demographic variation. By demonstrating how these datasets can be integrated, this article highlights analytic gaps in current school planning practice and offers a replicable workflow aligned with recommendations from the American Planning Association’s Cities–Schools Collaboration framework and the PGC Planning Department’s Pupil Yield Factors & Public School Clusters methodology. The findings underscore the importance of treating attendance zones as meaningful planning geographies and illustrate how spatial analysis can support community school planning under Maryland’s Blueprint for the Future.

Introduction

Community schools operate at the intersection of education, neighborhood conditions, and social support. Under Maryland's Blueprint for the Future, schools serving high-need communities must complete an Assets and Needs Assessment (ANA) to understand the structural factors shaping student well-being (Maryland State Department of Education, 2022). While ANAs document programs, partnerships, and service gaps, they rarely incorporate spatial context. Neighborhood conditions—housing types, land-use patterns, zoning, transportation access, and demographic composition—are often treated as background information rather than central determinants of school community needs.

Yet these spatial conditions profoundly shape the lived experiences of students and families. Attendance zones are not abstract administrative boundaries; they reflect decades of subdivision patterns, zoning regulations (Prince George's County Subtitle 27), transportation investments, and demographic change. They encode the history of housing development and immigration, all of which continue to influence who lives where and under what conditions. Understanding these geographies is essential for community school planning, particularly in places like Prince George's County, where immigrant communities, multifamily housing, and mixed-use corridors define everyday life.

At the same time, Maryland's school planning framework reveals a persistent capacity gap. State and county agencies possess extensive datasets, yet school districts can't be expected to assemble and interpret these datasets with limited staff and technical resources. The PGCPs Educational Facilities Master Plan (EFMP) illustrates this challenge. Although the EFMP references Plan 2035 repeatedly and relies on pupil yield factors derived from existing dwelling units (PGC Planning Department, 2024–2025), it does not incorporate parcel-level land use, zoning capacity, or attendance-area demographic variation. Enrollment projections are driven primarily by birth rates and immigration trends, with limited attention to the uneven redevelopment potential across neighborhoods. These gaps mirror concerns raised in the American Planning Association's Cities–Schools Collaboration framework, which emphasizes the need for integrated land-use and school planning.

This article originated as part of a joint final project for URSP688L: Planning Technology and URSP688X: Planning, Policy, and Public Education at the University of Maryland. In URSP688L, I developed the technical workflow that allocated Census indicators to elementary school attendance zones and summarized parcel-level land use, zoning, and housing characteristics. That technical foundation supported the broader URSP688X project, which incorporated historical research, walking tours, and asset mapping to produce a comprehensive Neighborhood Assets and Needs Assessment for community school partners. The combined work demonstrated how spatial analysis, qualitative fieldwork, and community-school frameworks can be integrated to understand the “place” of schooling within neighborhoods.

This article distills the spatial analysis component of that larger project into a school-centered, place-based narrative intended for a wider planning audience. By focusing on the built environment, zoning capacity, and demographic composition of four elementary school attendance zones in Chillum, Maryland, the analysis highlights how neighborhood form shapes the social conditions that community schools must navigate. It also illustrates how planners can use spatial tools to supplement EFMP methodologies and support educational equity—an increasingly important intersection as community schools take on expanded roles in family support, health access, and community development.

Two guiding questions frame the analysis:

How do demographic, land-use, and zoning characteristics vary across school attendance zones?

What do these spatial patterns reveal about neighborhood conditions relevant to community school planning and EFMP implementation?

By integrating demographic, land-use, and zoning data, the article demonstrates how attendance zones embody neighborhood histories and structural conditions that shape educational equity. The findings underscore the importance of treating attendance zones as meaningful planning geographies where policy, land use, and lived experience converge.

Attendance Area	% Limited English	% Uninsured	% Poverty	% Foreign-Born	% Hispanic	% Black
Carole Highlands	53	34	22	53	47	18
Lewisdale	43	21	10	56	48	22
Ridgecrest	39	24	17	48	39	46
Rosa L. Parks	47	27	12	56	44	30

[Figure 1] Demographic and Social Vulnerability Indicators by Attendance Area (2016-2020 ACS 5-year estimates)

Results

This section presents the outputs of a demonstration analysis designed to show how school planners can use ArcGIS, parcel-level datasets, zoning codes, and area-weighted demographic allocation to better understand school communities. The results are not intended as a definitive empirical assessment of the four attendance areas; rather, they illustrate how different datasets can be integrated to support school planning, facilities master planning, and community analysis.

Economic and Social Vulnerability Indicators (Attendance Area-Weighted Allocation of ACS 5-Year Estimates)

To demonstrate how demographic data can be aligned with school attendance boundaries, 2016–2020 ACS tract-level indicators were allocated to the four elementary attendance areas using an area-weighted method. This approach assigns each tract's population and socioeconomic characteristics proportionally to the share of its area falling within each attendance zone. Figures 1 and 2 illustrate how school planners can quickly generate attendance area economic and social vulnerability indicators using area-weighted census tract allocations.

The demographic outputs show that even within a relatively compact geographic area, the social composition of households varies significantly, with potential program implications for language access, health support, and family engagement strategies:

Carole Highlands has the highest poverty rate, highest uninsured rate, and largest concentration of limited-English households.

Lewisdale has the lowest poverty and uninsured rates and, along with Rosa L. Parks, the highest foreign-born population shares.

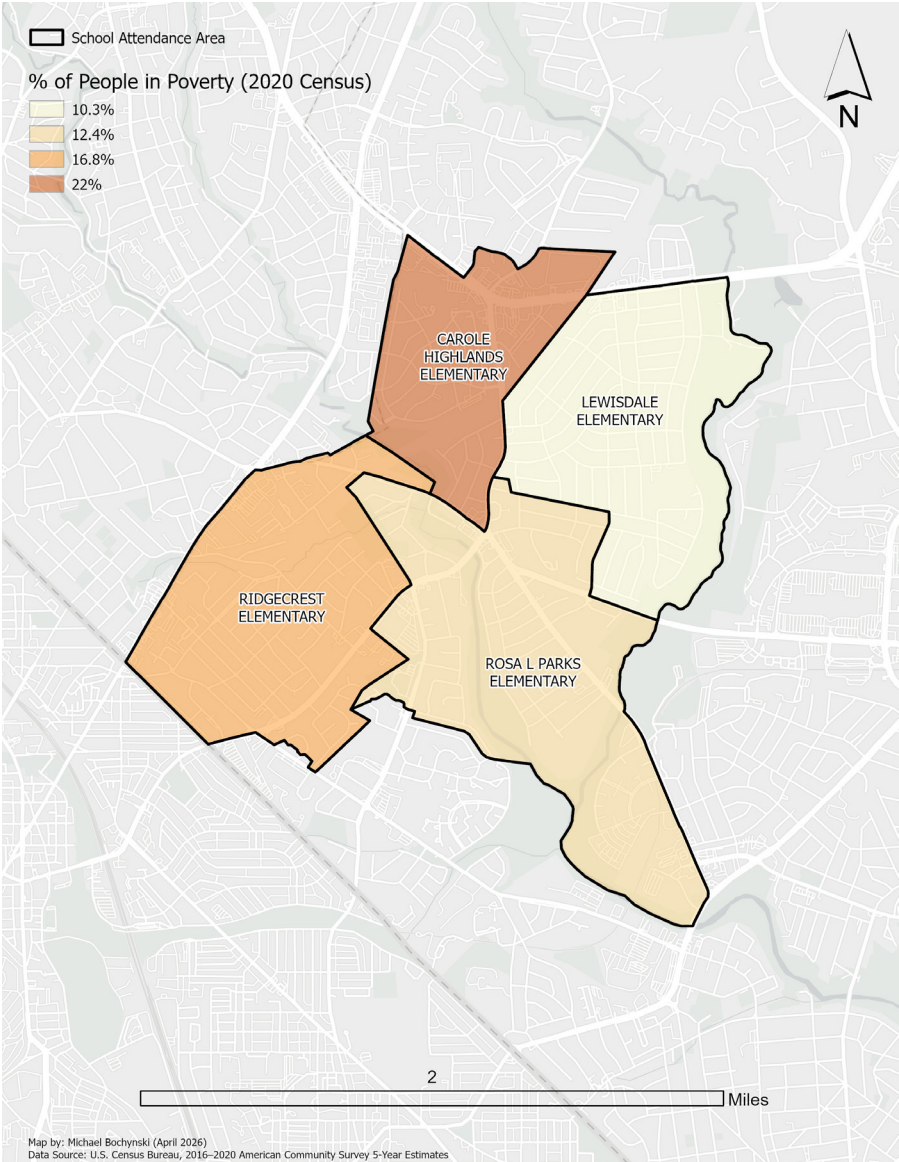
Ridgecrest has the highest Black population share and moderate levels of poverty and limited-English households.

Rosa L. Parks has lower poverty than Carole Highlands and Ridgecrest, with high immigrant and limited-English populations similar to Lewisdale.

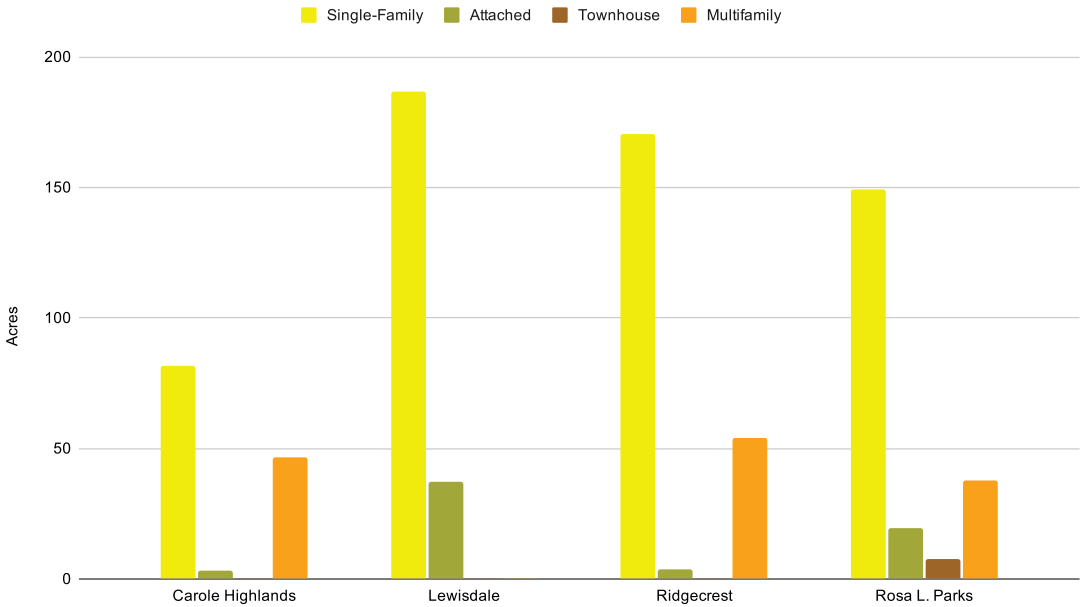
These results provide a snapshot of relative social vulnerability across the four school communities. Attendance areas with larger shares of high-poverty or limited-English households exhibit elevated economic and social vulnerability, while areas with majority foreign-born populations exhibit lower vulnerability. School planners can use this information to visualize the most vulnerable school communities and design targeted programs for language access, health support, and family engagement.

Land Use Composition and Dwelling Units (Parcel-Level Land-Use Classification and Dwelling Unit Extraction)

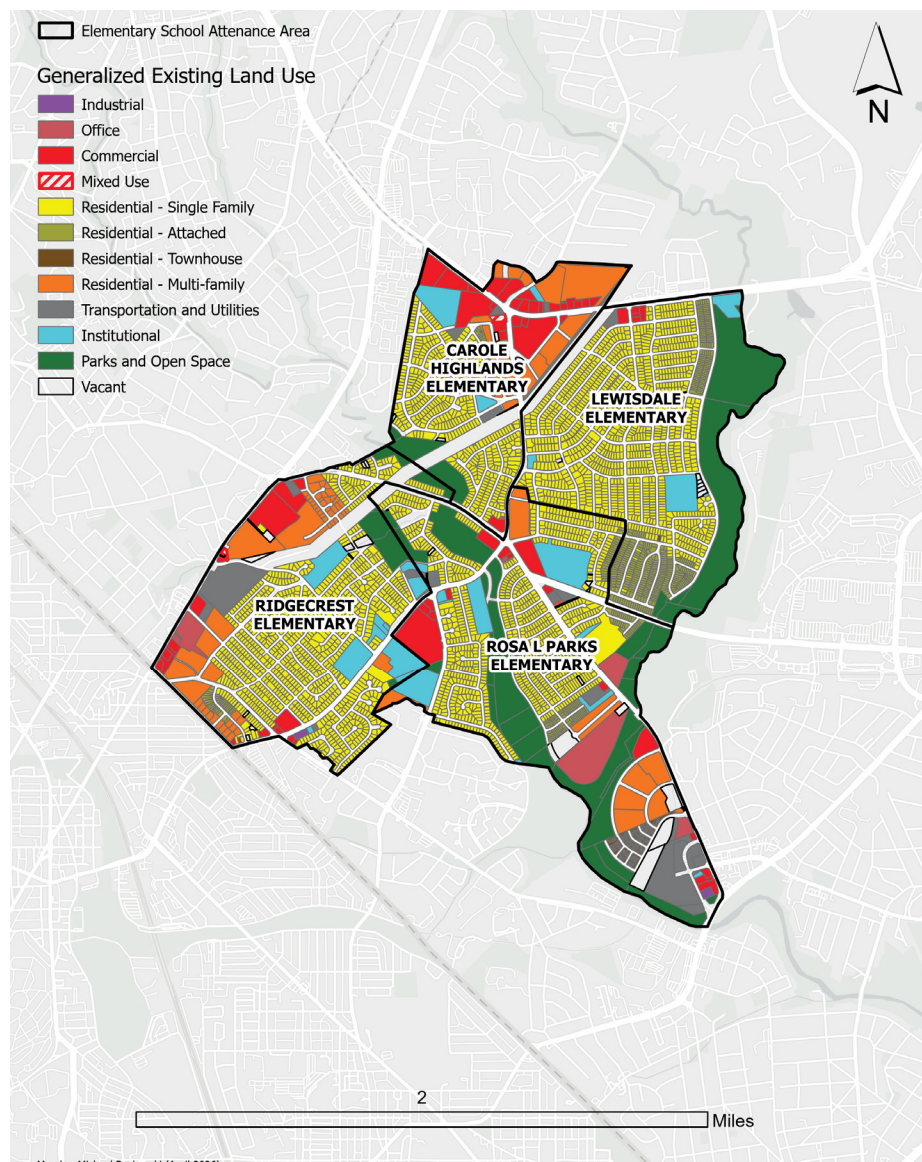
Parcel-level land-use data were used to summarize the composition of each attendance area and quantify the number of dwelling units (DUS) associated with each residential land-use category. Figures 3–5 illustrate how land-use patterns and housing stock vary across the four attendance areas.



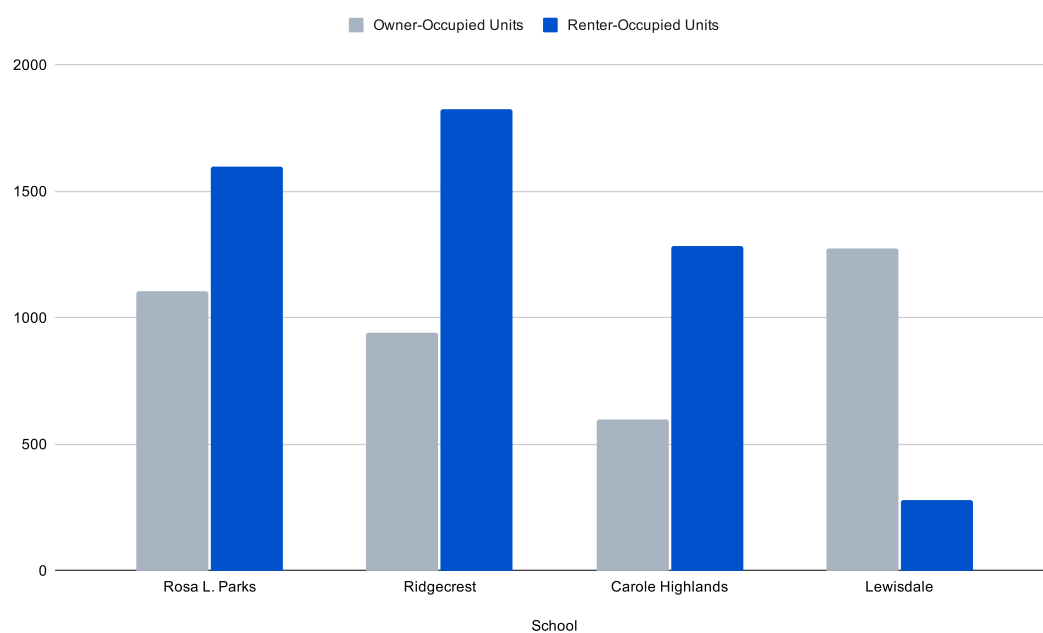
[Figure 2] Poverty Rate by Attendance Area (2016-2020 ACS 5-year estimates)



[Figure 3] Housing Composition by Land Area



[Figure 4] Generalized Land Use by Attendance Area



[Figure 5] Renter-Occupied vs. Owner-Occupied Dwelling Units by Attendance Area

School	Existing DU/acre (avg)
Rosa L. Parks	14.9
Ridgecrest	12.4
Carole Highlands	17.8
Lewisdale	7.1

[Figure 6] Existing Density (DU/acre) by Attendance Area

Across the four attendance areas, single-family residential land occupies the largest share of total acreage, reflecting the county's suburban development pattern. However, multifamily parcels, while limited in area, contain a disproportionately large share of dwelling units.

This pattern illustrates a key insight for school planning: a small number of multifamily parcels house more people than large expanses of single-family zoning, and some school attendance areas have a disproportionate share of renter-occupied units compared to adjacent areas with predominately owner-occupied single-family homes.

Existing Residential Density (DU/acre)

(Parcel-Level Density Calculation Using Dwelling Units and Parcel Acreage)

Existing residential density (DU/acre) was calculated for each land-use category within each attendance area.

Across all four attendance areas, multifamily parcels exhibit the highest densities (approximately 29–38 DU/acre), followed by attached/townhouse parcels (8–24 DU/acre). Single-family parcels consistently fall between 5 and 6.5 DU/acre. These density profiles reveal that the majority of enrollment potential is concentrated in a relatively small number of high-density parcels, while large areas of single-family land contribute comparatively few dwelling units.

Zoning Composition and Maximum Allowable Density

(Zoning Capacity Analysis Using Zoned DU/Acre × Zoning Acreage)

Zoning data were used to calculate the theoretical maximum number of dwelling units permitted under current zoning for each attendance area. Figures 7–9 present zoning composition and zoning capacity results.

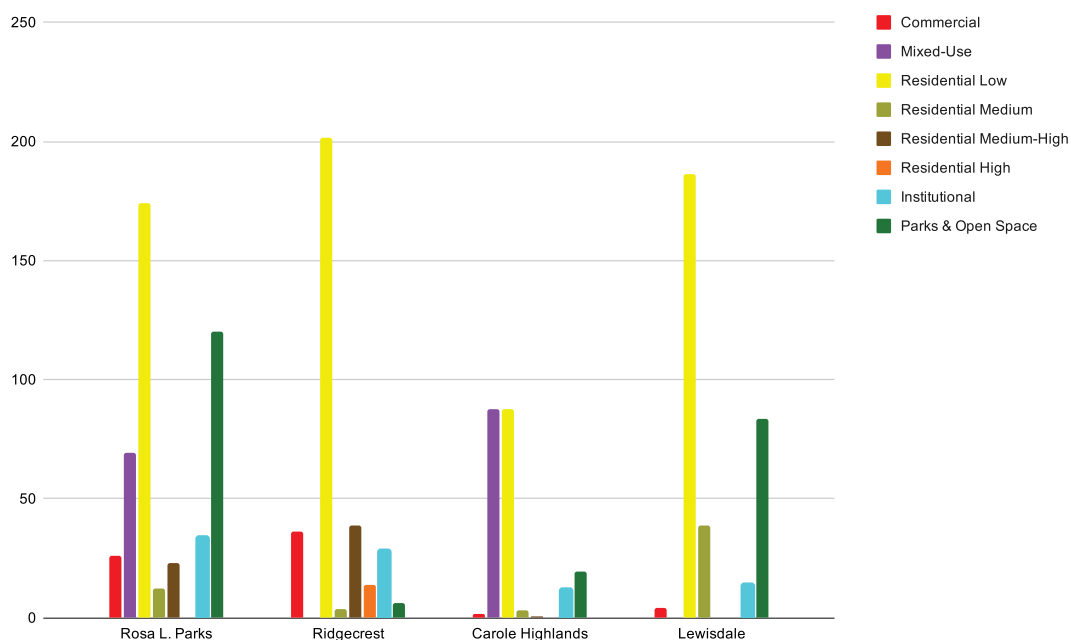
The zoning capacity analysis reveals substantial variation across attendance areas:

- Lewisdale and Ridgecrest are nearly built out under current zoning, with existing densities approaching zoned limits.
- Carole Highlands is dramatically underbuilt relative to zoning, with high-density or mixed-use zones containing far fewer units than permitted.
- Rosa L. Parks falls between these extremes, with moderate unused capacity depending on the distribution of commercial, mixed-use, and multifamily zones.

These comparisons illustrate how zoning policies shape the long-term capacity of school communities and underscore the importance of integrating zoning analysis into school facility planning, particularly in built-out communities where redevelopment potential, not greenfield development, will shape future enrollment.

Discussion

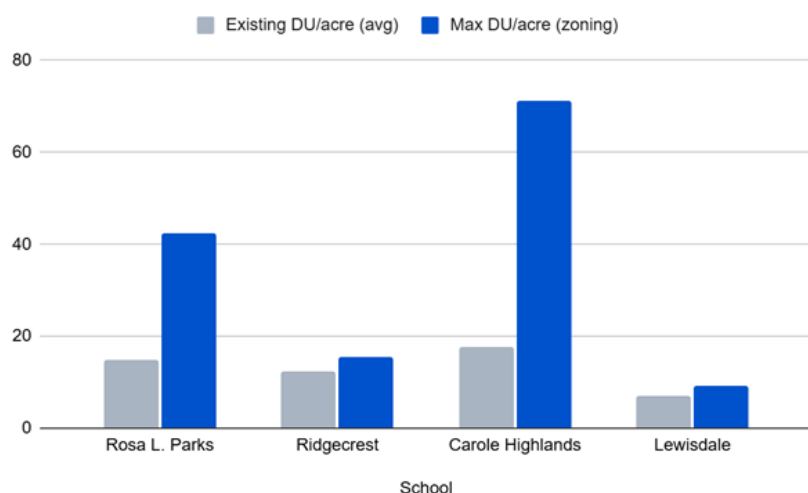
The demonstration analysis presented in this article illustrates how demographic, land-use, and zoning datasets can be integrated to produce a more spatially grounded understanding of school communities than what is currently available through the Prince George's County Public Schools (PGCPS) Educational Facilities Master Plan (EFMP). While the EFMP provides valuable countywide context, its analytic tools remain limited in three key areas: demographic resolution, land-use integration, and enrollment forecasting. The results of this study highlight how GIS-based methods can supplement these gaps and support more equitable, place-based school planning.



[Figure 7] Generalized Future Land Use Composition by Attendance Area

School	Existing DU/acre (avg)	Max DU/acre (zoning)	% of Zoning Capacity Used
Rosa L. Parks	14.9	42.45	35%
Ridgecrest	12.4	15.34	81%
Carole Highlands	17.8	71.22	25%
Lewisdale	7.1	9.09	78%

[Figure 8] Existing Dwelling Units vs. Zoned Capacity (with % Built-Out)



[Figure 9] Existing vs. Zoned Capacity by Attendance Area

Limitations of EFMP Demographic Indicators

The EFMP's "Demographic Indicators" section presents countywide socioeconomic trends but does not allocate these indicators to attendance boundaries. As a result, the EFMP cannot identify which school communities experience the highest concentrations of poverty, linguistic isolation, or uninsured households. The area-weighted ACS allocation used in this analysis demonstrates how planners can generate attendance-area demographic profiles that reveal substantial variation across neighborhoods. These differences have direct implications for Blueprint community school requirements, including language access, health supports, and family engagement strategies. Incorporating attendance-area demographic indicators into the EFMP would provide a more accurate picture of community needs and help align facility planning with the social conditions schools must navigate.

Extending the Pupil Yield Framework

Pupil yield factors remain a central tool in PGCPs planning, offering estimates of students per dwelling unit based on existing housing stock. However, pupil yield does not incorporate parcel-level land use, housing typologies, or zoning capacity. Multifamily parcels, though limited in acreage, contain a disproportionate share of dwelling units and therefore have outsized influence on enrollment. Conversely, large expanses of single-family zoning contribute relatively few students. These findings underscore the importance of integrating land-use intensity and housing composition into pupil yield analysis, particularly in built-out communities where redevelopment will shape future enrollment.

Zoning Capacity and the Geography of Future Enrollment

The zoning capacity analysis reveals a dimension of school planning that is largely absent from the EFMP: the uneven ability of attendance areas to accommodate future families under current zoning. Lewisdale and Ridgecrest are nearly built out, with existing dwelling units approaching zoned limits. Carole Highlands, by contrast, contains significant underutilized high-density zoning that could support additional housing. These differences matter for long-term enrollment planning. Attendance areas with limited zoning capacity may experience enrollment stagnation or decline regardless of birth trends, while areas with permissive zoning may see growth even when countywide projections remain

flat. Integrating zoning capacity into EFMP projections would align school planning more closely with the land-use framework established by Plan 2035 and the zoning ordinance (Subtitle 27).

Data Capacity and the Role of State and County Agencies

This analysis also highlights a broader structural issue: not simply a lack of data, but a mismatch between the complexity of available datasets and the analytic capacity of school districts. Maryland's Department of Planning (MDP) and the Maryland-National Capital Park and Planning Commission (M-NCPPC) already play an important role in supporting school planning, including providing enrollment projections, land-use data, and technical guidance for Educational Facilities Master Plans. However, many of the underlying datasets—parcel-level land use, zoning, ACS indicators, crash data, and future land-use maps—still require substantial preprocessing, integration, and interpretation before they can be used at the scale of individual attendance zones.

Implications for Community School Planning

For community schools, spatial analysis can serve as a practical tool for understanding the structural conditions that shape student well-being. Attendance zones with high poverty, high linguistic isolation, or high renter concentration may require additional supports. Areas with limited zoning capacity may face long-term enrollment stagnation, affecting funding and program stability. Areas with high crash concentrations may require targeted pedestrian safety improvements. By integrating demographic, land-use, zoning, and transportation data, planners can help community schools develop more precise, place-based strategies that align with Blueprint requirements and local needs.

Conclusion

This article demonstrates how spatial analysis can deepen our understanding of school communities and strengthen the analytic foundation of school facility planning in Maryland. By integrating area-weighted demographic indicators, parcel-level land-use data, residential density calculations, and zoning capacity analysis, the study reveals substantial variation across four elementary attendance zones in Chillum, Maryland that is not captured in the current PGCPs Educational Facilities Master Plan.

The findings highlight three central insights. First, attendance zones contain distinct social and built-environment conditions that shape educational equity and community school needs. Second, pupil yield factors, while useful, must be supplemented with parcel-level land-use and zoning data to accurately assess enrollment potential in built-out communities. Third, the state and county possess extensive datasets that could significantly enhance school planning if made more accessible and curated for district use.

As Maryland expands its community school strategy under the Blueprint for the Future, the need for integrated, place-based planning will only grow. Attendance zones are meaningful geographies where land use, policy, and lived experience converge. By adopting spatial tools and workflows such as those demonstrated in this article, planners and school districts can better understand the neighborhoods they serve, anticipate facility needs, and design more equitable, community-responsive educational environments.

Methods

This section describes the analytic procedures used to generate the demonstration results. The workflow integrates ACS demographic data, parcel-level land-use and dwelling unit information, zoning codes, and transportation safety datasets to illustrate how school planners can use GIS-based tools to better understand school communities. The methods are designed to be replicable using ArcGIS Pro and publicly available datasets.

Attendance Area-Weighted Allocation of ACS 5-Year Estimates

American Community Survey (ACS) 5-year estimates were obtained from the Prince George's County Planning Department's Census 2020 Tracts ArcGIS map server, an authoritative source providing tract-level demographic and socioeconomic indicators. In addition to downloading ACS tables directly from census.gov and joining them to Census tract shapefiles, planners may also access ACS 5-year estimates through ArcGIS Living Atlas, a curated collection of ready-to-use datasets that integrates seamlessly with ArcGIS Pro.

To align demographic indicators with school attendance boundaries—which do not conform to Census geographies—an area-weighted allocation method was used. For each Census tract intersecting an attendance area, the proportion of tract area falling within the boundary was calculated and applied to the tract's ACS attributes. Weighted values were then summed to produce attendance-area estimates for poverty, uninsured rates, limited English households, foreign-born population, and racial/ethnic composition.

This method enables planners to generate attendance-area demographic profiles even when tract boundaries and school boundaries are misaligned. It is particularly useful for identifying schools serving communities with higher concentrations of socioeconomic disadvantage. At the same time, it highlights the limitations of tract-based allocation in regions with extensive school choice, where enrollment patterns may diverge from residential patterns.

Parcel-Level Land-Use Classification and Dwelling Unit Extraction

Parcel-level land-use data were obtained from the Prince George's County property dataset, which includes land-use codes, parcel acreage, and dwelling unit counts (DUS). Land-use codes were grouped into generalized residential categories used by Prince George's Planning to support comparison across attendance areas.

For each attendance area, parcel acreage and dwelling units were summed by housing type. This allowed for the calculation of:

- Total residential acreage
- Total dwelling units
- Dwelling units by housing type
- Renter-occupied vs. owner-occupied units

This method provides a detailed picture of the built environment surrounding each school and highlights how different housing types contribute to enrollment potential.

Residential Density Calculation (DU/acre)

Existing residential density was calculated by dividing dwelling units by parcel acreage for each land-use category. Density values were then aggregated to the attendance-area level to produce average DU/acre for

single-family, townhouse, and multifamily parcels.

This metric provides a direct measure of the built form and helps identify which housing types contribute most to enrollment. It also allows planners to compare density patterns across attendance areas and assess how land-use intensity aligns with school capacity.

Zoning Capacity Analysis (Zoned DU/acre × Zoning Acreage)

Zoning data were used to calculate the theoretical maximum number of dwelling units permitted under current zoning. For each zoning category, maximum allowable density (DU/acre) was multiplied by the acreage of that zone within each attendance area. Summing across zones yielded a zoning capacity estimate that could be compared to existing dwelling units.

This method identifies:

- attendance areas that are built out under current zoning
- attendance areas that are underbuilt relative to zoning capacity
- the degree to which zoning constrains or enables future residential growth

Zoning capacity analysis is particularly important in built-out communities where redevelopment potential, rather than greenfield development, will shape future enrollment.

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