Appendix 4
Enrollment Projection Methodology
Technical Guide

To support long-term planning, the Office of the Deputy Mayor for Education projects citywide, sector- and DCPS school-level enrollment for the next 10 years. The following provides an in depth explanation of how the citywide, sector, and DCPS school-level projections were developed for the Master Facility Plan Supplement SY2025-26.

The projections are calculated using a two-stage approach: sector-wide projections which are both combined to total to the citywide number and used as the foundation for DCPS school-level projections. The method relies on analysis of trends in both birth-to-PK3 capture rates and grade progression ratios to "age-forward" the most recent available school year of enrollment data.

Before describing the projections process in detail, the next section outlines the key points to consider when using the enrollment projections.

Key Points

- DME relies on a standard methodology to project sector and DCPS school-level projections out 10 years relying on the past three years of enrollment trends and births.
    - Like all predictive models, the greater the aggregation of projections (citywide/sector/grade band) the more precise (as compared to DCPS school-level projections).
- The model projects for PK-12th grade and includes alternative students, keeping them constant at SY25-26 levels.
    - Adult and special education schools (River Terrace Education Campus and St Coletta PCS) are excluded from projections.
- The model relies on the past three years of "grade progression ratios," SY22-23 to SY23-24, SY23-25 to SY24-25, and SY24-25 to SY25-26. The most recent year is weighted more heavily, at 60%, when calculating the mean grade progression used in the model. SY24-25 and SY23-24 were weighted 25% and 15%, respectively.
    - We weighted the most recent GPR the most as we believe this most recent year is more indicative of the future compared to the previous two years. DCPS sustained three years of enrollment growth post COVID (albeit a slowing trend), followed by the latest annual decrease. The 2026 My School DC lottery (MSDC) results show lower demand: a 10% decline in PK3 and PK4 MSDC lottery applications and 8% decline in K-5 MSDC applications.
- Rather than starting from a single year's enrollment, the baseline for each cohort is a three-year mean of SY23-24, SY24-25, and SY25-26 enrollment. This smooths out year-to-year fluctuations and provides a more stable starting point.
- The model takes known/approved changes in school "supply" into account (i.e., Euclid MS, Cardozo EC converting to Cardozo HS, the seven relatively new charter schools completing their approved grade expansion).
- The projections do not bake in assumptions or predictions for potential future closures, openings, or expansions in either sector.

- This standard methodology continues existing trends – they do not attempt to predict changes in those trends (e.g., births reversing, reversing grade progression ratios).
    - This is unlike the one-year projections used for the Uniform per Student Funding Formula budgeting process that consider individual school nuances like moving to a new facility.
- The model does not account for new housing development anticipated in the next 5 to 10 years (e.g., Buzzard Point, RFK). Instead, the DME will provide individual hot spot analysis of potential impact in specific neighborhood clusters or DCPS elementary boundaries to estimate potential impacts of new housing (see analysis from 2018 in Chapter 5 of EdScape, Residential Development Pipeline Projects and Estimated Student Yield from Residential Development Pipeline).
    - Previously, the DME relied on the Office of Planning (OP) births forecast as a core component that took future housing development into account. The DME will again rely on the OP births forecasts after they are updated.

High-level overview of the process

Stage 1: Sector-level projections. We start with a three-year average of SY23-24 through SY25-26 enrollment as our baseline and project forward using three-year weighted grade progression ratios (most recent year weighted most heavily). For new student cohorts, we use PK3 as the entry point and estimate future PK3 enrollment by:

- Holding the birth-to-PK3 capture rate flat at the most recently observed SY25-26 level.
- Applying this rate to an ARIMA-based birth forecast to estimate incoming PK3 class sizes

Alternative school enrollment remains constant at SY25-26 levels. Adult and special education schools are excluded from projections.

Stage 2: School-level projections. We use the sector-wide projections as inputs to estimate individual DCPS school enrollment. Since entry grades vary across schools and grade bands, we:

- Calculate each school's share of total sector enrollment for their entry grade using a three-year weighted average.
- Apply this proportion to the sector-wide projection for that grade.
- Project these entry cohorts forward using a three-year weighted average of school-level grade progression ratios to the full span of grades offered by the school.
- Apply ad hoc adjustments for selective high-demand DCPS high schools, whose enrollment cannot increase due to capacity limitations so is expected to remain stable.
- Scale the remaining school projections proportionally so they sum to the sector-wide projections for each year.

Stage 1: Sector-level projections

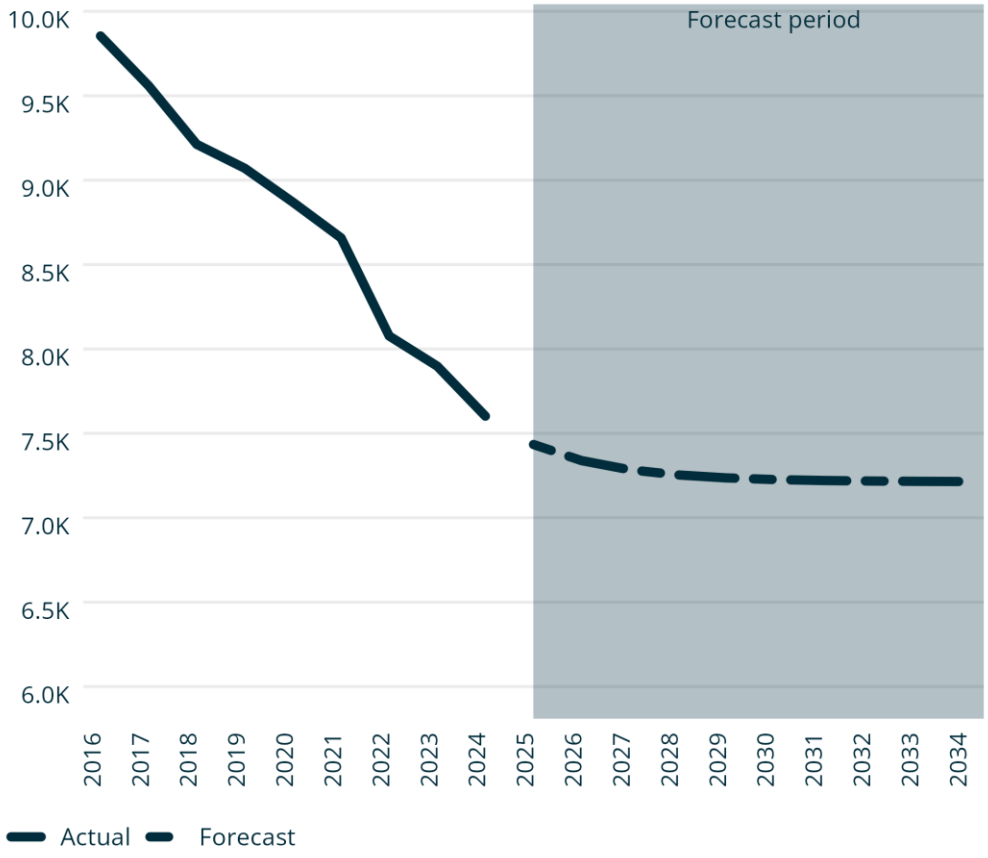
The following components combine to produce sector-level enrollment projections: birth forecasts and PK3 capture rates determine the size of future entry cohorts; grade progression ratios age existing cohorts forward through grades. The sector-level projections are summed to total to the citywide enrollment projections.

Births

Births are a key input for the enrollment projections, allowing, in combination with capture rates (outlined below), an estimation of the size of future entry cohorts.

Following a time series approach, DC birth data from 1995 onward are modelled using an ARIMA model selected automatically via *auto.arima()*. The selected model — ARIMA(1,1,0) — uses a single autoregressive lag with first differencing, producing a 10-year forecast with 80% and 95% prediction intervals.

Figure 1: Number of live births between 2016 and 2024 and forecast births from 2025 onward

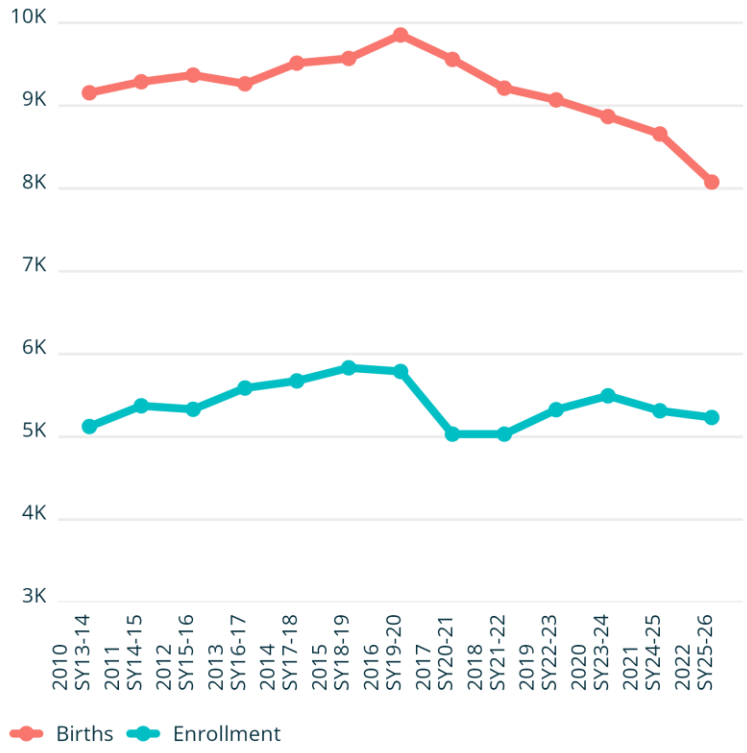


Capture rates

Each year of births – 2022, 2023, and 2024 actuals and forecasts for subsequent years – form the basis for calculating the PK3 enrollment for unobserved cohorts of public school students.

The capture rate used for the enrollment projection is PK3 enrollment as a percentage of the number of babies born in the district three years prior which provides us with a good way to estimate future entry cohorts.

Figure 2: Number of live births compared to audited citywide PK3 enrollment three years later



Future PK3 cohort sizes are estimated by holding the capture rate flat at the most recently observed 2022 to SY25-26 level (64.8%, displayed in bold in the Figure 3 below) by sector and applying it to the ARIMA birth forecast. Historical capture rate trends were analyzed and then forecasted forward using a *damped Holt's model*, but given the uncertainty in long-run projections, using the flat rate of the most recently observed year provided a more conservative assumption than extrapolating recent upward trends. As noted in Figure 3, the birth to PK3 capture rates increased during the period shown due to the COVID-19 pandemic suppressing the first year's capture rate and PK enrollment rising once schools returned to in person learning. This increase is notable in the context of rapidly declining births and a downtrend in PK3 enrollment. Despite the smaller pool to draw upon, PK3 enrollment has declined at a slower rate than the decline in births leading to the upward trend in capture rates. The forecasted capture rates that were ultimately not used are provided in Figure 3 below as well.

Figure 3: Actual birth to PK3 capture rates and 2022 capture rate used for modeling

Birth Year		Birth to 3-yr later PK3 capture rate	Sector share of PK3 enrollment	
			DCPS	Public charter
2019	Actual	58.7%	44.7%	55.3%
2020	Actual	62.0%	44.0%	56.0%
2021	Actual	61.4%	44.1%	55.9%
2022	**Actual**	**64.8%**	44.6%	55.4%
Below are the results of the damped Holt's time series model results displayed for comparison. This was not used in the model.				
2023	*Forecast*	*65.4%*	*44.3%*	*55.7%*
2024	*Forecast*	*66.1%*	*44.4%*	*55.6%*
2025	*Forecast*	*66.7%*	*44.5%*	*55.5%*
2026	*Forecast*	*67.3%*	*44.6%*	*55.4%*
2027	*Forecast*	*67.9%*	*44.6%*	*55.4%*
2028	*Forecast*	*68.5%*	*44.7%*	*55.3%*
2029	*Forecast*	*69.0%*	*44.7%*	*55.3%*
2030	*Forecast*	*69.6%*	*44.8%*	*55.2%*
2031	*Forecast*	*70.1%*	*44.8%*	*55.2%*
2032	*Forecast*	*70.6%*	*44.8%*	*55.2%*

Grade progression ratio

The Grade Progression Ratio (GPR) is a standard component of forecasting school enrollment. In many cases, the best predictor of future enrollment is past enrollment. The GPR captures the school enrollment patterns of students as they progress from grade to grade.[1]

Grade Progression Ratios are calculated by dividing the number of students in a grade in one school year by the number of students in the previous grade in the previous school year.

$$GPR^{t}_{g\rightarrow(g+1)} = \frac{E^{t}_{g+1}}{E^{t-1}_{g}}$$

To reduce the impact of individual years while giving more weight to recent trends, we calculate a three-year weighted mean of the past grade progression ratios for each grade by sector. The three years receive weights of 15%, 25%, and 60% (oldest to most recent), so that the most recent year has the greatest influence without discarding earlier history entirely.

[1] See EdScape for historic grade progression ratios. https://edscape.dc.gov/node/1607141

Figure 4: Three-year weighted mean of grade progression rations by grade and sector

	DCPS	Public charter
	Mean	Mean
from PK3 to PK4	140.60%	106.88%
from PK4 to K	120.73%	96.24%
from K to 1	99.05%	94.94%
from 1 to 2	100.14%	95.60%
from 2 to 3	98.36%	96.24%
from 3 to 4	98.19%	95.87%
from 4 to 5	92.62%	106.65%
from 5 to 6	79.09%	114.27%
from 6 to 7	101.14%	96.26%
from 7 to 8	101.14%	96.85%
from 8 to 9	135.26%	95.42%
from 9 to 10	83.88%	74.90%
from 10 to 11	86.21%	91.21%
from 11 to 12	94.31%	91.97%

Projecting enrollment forward

Once grade progression ratios and birth-based entry cohort estimates are calculated, the sector-level projection works by "aging" each cohort forward grade-by-grade. Rather than starting from a single year's enrollment, the baseline for each cohort is a three-year mean of SY23-24, SY24-25, and SY25-26 enrollment. This smooths out year-to-year fluctuations and provides a more stable starting point. Each cohort is then moved to the next grade by multiplying its size by the three-year weighted GPR for that grade transition.

New cohorts — students entering PK3 for the first time — are introduced each year using the birth-to-PK3 capture rate model: the forecast number of births from three years prior is multiplied by the sector's forecast capture rate to estimate the size of the incoming PK3 class.

Alternative school enrollment does not follow this grade-progression logic and is held constant at SY25-26 levels throughout the projection period. Adult and SPED schools are excluded entirely.

The result is a full 10-year projection of sector-level enrollment by grade and school year, which feeds the school-level disaggregation in Stage 2.

Stage 2: School-level projections

Stage 2 disaggregates the sector-level projections from Stage 1 down to individual schools, taking into account the multiple distinct entry grades and grade spans across schools.

Entry-grade shares

For each school, we calculate its share of total sector enrollment at its entry grade using a three-year weighted average of historical data. The three years receive weights of 10%, 30%, and 60% (oldest to most recent), which gives more influence to recent enrollment patterns without discarding earlier history.

This weighted share is then applied to the Stage 1 sector projection for the relevant entry grade and year, yielding an estimated number of new students entering that school.

Aging school cohorts forward

Once an entering cohort is allocated to a school, it is aged forward through grades using school-level grade progression ratios (calculated the same way as sector-level GPRs but using individual school data). A three-tier fallback hierarchy handles schools with limited history:

1. **School-level GPR** — used when the school has at least three years of data for the grade transition
2. **LEA-level GPR** — used for charter schools within the same LEA
3. **Sector-level GPR** — the final fallback, used for new or very small schools

Adjustments for high-demand schools

A small number of selective, high-demand DCPS high schools are excluded from the proportional scaling step described below (i.e., School Without Walls HS and Duke Ellington School of the Arts). Because these schools actively manage their enrollment through the admissions process and they have maximized enrollment to their available capacity, their enrollment is expected to remain relatively stable regardless of broader sector trends. Their GPR-based projections therefore are based on static entry-grade enrollments rather than a proportion of the sector enrollment.

Reconciliation with sector totals

Because individual school shares and GPRs don't perfectly reproduce the sector total, the final school-level projections for all other schools are scaled proportionally within each year, sector, and grade so that they sum exactly to the Stage 1 sector projection. This ensures complete internal consistency between the two stages of the model.

Adjustments for school modernization

What is swinging?

When a DCPS school undergoes capital modernization (major renovation or reconstruction), it is temporarily relocated to a "swing" facility while construction is underway. Enrollment commonly declines during the swing period; however, enrollment typically recovers over several years after the school returns to its permanent facility.

The standard projection model does not account for this pattern. Without adjustment, projections for schools with known modernization timelines would be unreliable. Without adjusting for enrollment

declines and the expected recovery, the lower grade progression ratios propagate throughout the projections for these schools.

Recovery curve estimation

To quantify the typical enrollment trajectory around modernization, we examine historical data for DC elementary schools that have completed the full swing-and-return cycle. For each school, enrollment is indexed relative to a baseline (the enrollment in the final year at the swing location) and plotted against time relative to the reopening date.

A recovery curve is then estimated as the mean enrollment ratio at each year relative to reopening, averaged across schools. The post-reopening portion of the curve is constrained to be monotone non-decreasing (enrollment recovery should not reverse) which prevents noise from small sample sizes in later years from pulling the average down.

Only elementary schools are used because middle and high school modernization projects are too few to produce a reliable curve.

Applying the recovery curve

For schools with upcoming or recent modernization, the projected enrollment is adjusted using the recovery curve rather than the standard GPR-based projection. Two anchor types are used:

- **Still-swinging schools:** enrollment is held flat at the most recent observed level for the duration of the swing, with the recovery curve applied from the projected reopening date.
- **Recently-returned schools:** the recovery curve is anchored to the enrollment in the school's final swing year, and the multiplier is applied to project the recovery trajectory.

Schools without an active or recently completed modernization project receive no adjustment and follow the standard Stage 2 projection.