

2024 PLANNING UNIT - REVIEW

Summary

The [2023 Pre-Capital Improvement Plan \(Pre-CIP\)](#) called for a planning unit review and possible planning unit splits in preparation for a school level boundary review. The review's goal is to determine if planning units with many student populations should be split. The data sources for the planning unit review include:

- Systemwide Capacity,
- Enrollment Data by Grade Level per Planning Unit,
- Class Size Averages, and
- Neighborhood School Walksheds.

Arlington Public Schools (APS) has used and maintained planning units for over twenty years (20) as the building blocks for neighborhood school attendance zones. Planning units are a geographic form of data generalization that provides broad categorization of student populations while securing individual student anonymity. The geographic component, delineated by streets and property lines captures the sense of neighborhood and community.

In 2017, APS contracted with a consultant to review existing planning units and recommend planning unit splits where there were large number of student populations at each school level. The conditions for splitting in 2017 are not evident in 2023, in fact while some of the data points have decreased since 2017 others have remained relatively stable. In 2023, the total median number of K-5 students has decreased since 2017 (Tables [6](#) & [7](#)). The average class size has remained stable when comparing 2017 to 2023 (Tables [3](#), [4](#) & [5](#)). Overall, the district has increased seat capacity by 14% while enrollment has increased by less than 3% (Table [2](#)).

During the 2023 Pre-CIP engagement process, the community stressed that any boundary review should consider walkability and requested a walkshed analysis at our neighborhood schools. The walkshed analysis did not prove to be a practical basis for planning unit splits. Splitting planning units with a walkshed layer resulted in the creation of too many new planning units with student populations that were too small (Table [9](#) & [10](#)). The description and definition of a walkshed is provided on [page 4](#).

Staff recommend reviewing planning units annually as part of the planning process. An annual review will provide a better understanding of student population distribution which will help inform any redistricting efforts.

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Background

During the 2000-01 school year, planning units were the building blocks used to create neighborhood school attendance boundaries. The 2000 dataset contained 216 planning units and student data included:

- Student counts by:
 - o Grade levels
 - o English learners
 - o Special education
- Free and reduced lunch rates
- Ethnicity

During the 2016 high school boundary process, some planning units had a disproportionate number of students thus limiting the flexibility in potential boundary changes. As APS prepared for additional boundary proposals at the elementary and middle school levels, external consultants recommended splitting units with large number of student populations. The considerations used for splitting planning units with large student populations included:

- Student population totals,
- Existing landmarks,
- Large apartment / condo buildings,
- Garden apartment complexes,
- Existing attendance boundaries,
- Civic association boundaries,
- Census blocks,
- Parcel / Lot lines, and
- Alignment with both sides of minor roads and selected cul-de-sacs.

The result was a 2017 dataset with 130 additional planning units for a total of 346 planning units. The smaller planning units had a 36% - 39% reduction in the average number of grade level student populations. ([Table 1](#))

In 2019, one planning unit was split to accommodate new housing along Columbia Pike. The split captured Gilliam Place, an apartment elevator complex with 173 committed affordable housing units. The 2019 dataset was the last modification, and the district now has 347 planning units.

Analysis

The [June 2023 Pre-Capital Improvement Plan \(Pre-CIP\) Report](#) proposed subdividing some planning units to create more flexibility for any upcoming boundary process. The 2024 analysis will use the same methodology implemented during the 2017 report with emphasis on student populations and walksheds.

Student Populations

2017 vs 2023

In the seven years since 2017, APS K-12 enrollment grew around 3% and the student seat capacity grew about 14% ([Table 2](#)). The average class size at neighborhood schools across the district increased by 1.2% at the high school level and decreased by -0.4% at the elementary and middle school level (Tables [3](#), [4](#) & [5](#)). Reporting on the average class sizes of neighborhood schools provides additional insight into student populations beyond the planning unit.

Comparing 2017 and 2023 planning unit data

The process of comparing planning unit data from 2017 to 2023 begins first by identifying students by their home address. Next, student level data is aggregated per planning unit for 2017 and 2023.

The methodology used for comparison calculates median and quartile values instead of averages. Statistically, median values are not affected by very low or very high outliers and quartiles divide the data neatly into four parts. The quartile student enrollment data indicates that 75% of the planning units for school level K-5 students have less students in 2023 when compared to 2017 (Tables [6](#) & [7](#)). In other words, most 2023 planning units have smaller school level K-5 populations than 2017. The 2023 planning units have greater maximums across all grade levels when compared to 2017 (Tables [6](#) & [7](#)). Median values slightly increased from 2017 to 2023 for grade levels 6-8 and 9-12 (Tables [6](#) & [7](#)).

Walksheds

A walkshed is an area covered by walking from a school door entryway to a residential property line. Walksheds are established across sidewalks, trails, stairs, crosswalks, and neighborhood streets. The distance of a walkshed is determined by [Policy E-5.1 Student Transportation Services](#) which states: *kindergarten through grade 5 students residing beyond a 1-mile walking distance from their school and grades 6 -12 students residing beyond 1.5 miles walking distance from their school are eligible for bus service*. All elementary school walksheds have a maximum distance of 1 mile whereas middle / high schools a maximum of 1.5 miles. Time was not a factor when creating walksheds. A walkshed is unique to each school and only neighborhood walksheds were used as potential criteria for splits. The neighborhood school count consists of 20 elementary, 6 middle, and 3 high schools.

The walkshed analysis examines populations of students, quantifying the discrepancies between small (Q1 data) and large (Q3 data) populations. The analysis includes a sample set of schools across school levels provided below.

- Abingdon ES
- Barcroft ES
- Cardinal ES
- Glebe ES
- Nottingham ES
- Jefferson MS
- Swanson MS
- Washington-Liberty HS

When considering area in square miles, three quarters (3/4) of the walksheds were larger than their respective school attendance boundary ([Table 8](#)). Splitting planning units by walksheds approximately doubles the total count of planning units that are impacted (intersected) by the walkshed ([Table 9](#)).

Applying the walkshed as the mechanism to split planning units results in two parts.

1. One part of the planning unit is inside the walkshed.
2. The remaining part of the planning unit is outside the walkshed.

When comparing the planning unit split by the walkshed, the number of total students assigned per planning unit was significantly reduced in size, on average by -80% - -99% ([Table 10](#)). Approximately 3/4 of the planning unit walkshed splits had total student counts less than the average class size per school level ([Table 10](#))

Conclusions & Recommendations

Currently, staff does not suggest splitting planning units for the following reasons:

- **Stable average class sizes at the elementary and middle school levels (Tables [3](#), [4](#) & [5](#)),**
- **The median value of total K-5 students has decreased (Tables [6](#) & [7](#)),**
- **Walksheds splits create too small and too many planning units. (Tables [9](#) & [10](#))**

Instead, staff suggest establishing 2023 as a benchmark for planning unit data and revisiting this analysis annually. The benchmark data would include only large planning units that have student totals per school level as calculated by the Q3 quartile. There are 55 planning units that currently have K-5 total student counts greater than 51, grades 6-8 total student counts greater than 25 and grades 9-12 total student counts greater than 33 (Tables [7](#) & [11](#), [Illustration 1](#)). The size of the Q3 quartile data is important because it is greater than the average class size by grade and school level (Tables [3](#), [4](#) & [5](#)). Extra attention should be placed on the K-5 grade level total student counts which will matriculate through APS longer than those at the secondary level.

The stability over 7 years in the average class size data lends confidence in utilizing class size for defining small groups of students. Staff recommends quantifying small groups per planning unit as containing less than 40 students per school level (K-5, Grades 6-8 or Grades 9-12). The 40-student threshold is derived by doubling the smallest average class size of 20 students for school level 6-8 (Tables [3](#), [4](#) & [5](#)).

Staff also suggest utilizing the walkshed data when revisiting school bus ineligibility zones. The walkshed data does not account for time and time equates to safety; a consideration best addressed through community support. The walkshed data is another tool for improvements when revisiting school transportation choices.

Appendix

Table 1 Average Number of Students by School Level, 2001 & 2017

	2001 Dataset (216) Average # of 2017 students per unit	2017 Dataset (346) Average # of 2017 students per unit	Percent Reduction in Average # of 2017 students per unit
Elementary school	59	37	37%
Middle school	25	16	36%
High school	31	19	39%

Table 2 K-12 Enrollment and Capacity, 2017 & 2023

	2017	2023	Percent Change
K-12 Enrollment	25,731	26,533	3.02%
Capacity	25,996	30,319	14.26%

Table 3 Neighborhood Elementary School Class Size Averages by Grade and Systemwide, 2017 & 2023

Average Class Size	2017	2023	Percent Change
Kindergarten	21.28	19.58	-8.72%
Grade 1	19.78	19.62	-0.84%
Grade 2	21.10	21.39	1.36%
Grade 3	21.59	22.16	2.56%
Grade 4	22.51	22.78	1.19%
Grade 5	22.46	22.58	0.56%
Systemwide (Elementary School)	21.45	21.35	-0.48%

Table 4 Neighborhood Middle School Class Size Averages by Grade and Systemwide, 2017 & 2023

Average Class Size	2017	2023	Percent Change
Math 6 (13110)	17.43	21.14	17.54%
English 6 (11109)	20.07	19.61	-2.37%
Science 6 (14105)	21.19	21.64	2.07%
Social Studies 6 (12354)	21.32	21.32	0.00%
Math 7 (13111)	19.29	18.84	-2.38%
English 7 (11110)	20.58	19.13	-7.57%
Life Science (14115)	21.28	20.16	-5.53%
Social Studies 7 (12355)	21.34	20.54	-3.89%
Algebra I (23130)	21.54	22.18	2.89%
English 8 (11120)	19.72	17.15	-14.96%
Physical Science (14125)	20.1	19.64	-2.33%
Social Studies 8 (12210)	19.89	21.24	6.36%
Systemwide (Middle School)	20.31	20.22	-0.48%

Table 5 Neighborhood High School Class Size Averages by Grade and Systemwide, 2017 & 2023

Average Class Size	2017	2023	Percent Change
Algebra I (23130)	19.86	21.91	9.34%
Geometry (23143)	23.34	23.51	0.73%
Algebra II (23135)	24.77	26.58	6.83%
Biology (24310)	23.47	23.86	1.64%
Chemistry (24410)	23.91	24.14	0.93%
Physics (24510)	25.06	26.95	7.03%
English 9 (21130)	20.85	21.12	1.27%
English 10 (21140)	22.61	20.99	-7.69%
English 11 (21150)	19.96	20.13	0.84%
English 12 (21160)	23.46	23.29	-0.72%
Virginia / U.S. History (22360)	22.89	22.91	0.09%
Virginia / U.S. Government (22440)	21.41	19.52	-9.68%
System wide (High School)	22.63	22.91	1.21%

The Economics & Personal Finance (22212) class from 2023-24 was not included because the course was only offered at Wakefield, one of the three neighborhood high schools.

Table 6 2017 Planning Unit: Median and Quartile Enrollment Data by Grade Level

Enrollment 2017	K-5 Totals	Gr6-8 Totals	Gr9-12 Totals	K-12 Totals
Minimum	1	1	1	1
Q1	20.75	9	10	39
Median	36	15	18	67
Q3	54	24	29	102
Maximum	164	62	86	242

Table 7 2023 Planning Unit: Median and Quartile Enrollment Data by Grade Level

Enrollment 2023	K-5 Totals	Gr6-8 Totals	Gr9-12 Totals	K-12 Totals
Minimum	1	1	1	1
Q1	17	9	12	38.75
Median	33	16	21	69
Q3	51	25	33	108
Maximum	176	70	97	299

Table 8 Comparing Areas of Bus Ineligibility Zones, Walksheds & Attendance Boundaries

	Bus Ineligibility Zone (SqMi)	Walkshed (SqMi)	Attendance Boundary (SqMi)	Percent Delta between Attendance Boundary and Walkshed
Abingdon	0.48	0.59	1.52	157.6%
Barcroft	0.39	1.51	0.95	-37.1%
Cardinal	0.52	1.94	1.3	-33.0%
Glebe	0.76	1.69	1.05	-37.9%
Nottingham	0.58	1.71	0.79	-53.8%
Jefferson	1.89	3.93	3.83	-2.5%
Swanson	2.52	4.14	3.36	-18.8%
Washington-Liberty	3.57	4.67	6.01	28.7%

Table 9 Potential Number of Planning Units Split by Walksheds

Schools	Number of Planning Units Impacted (Intersected) by a School's Walkshed	Potential # of Split Planning Units based on a School's Walkshed
Abingdon	10	20
Barcroft	25	50
Cardinal	26	52
Glebe	23	46
Nottingham	15	30
Jefferson	35	68
Swanson	30	65
Washington-Liberty	44	83

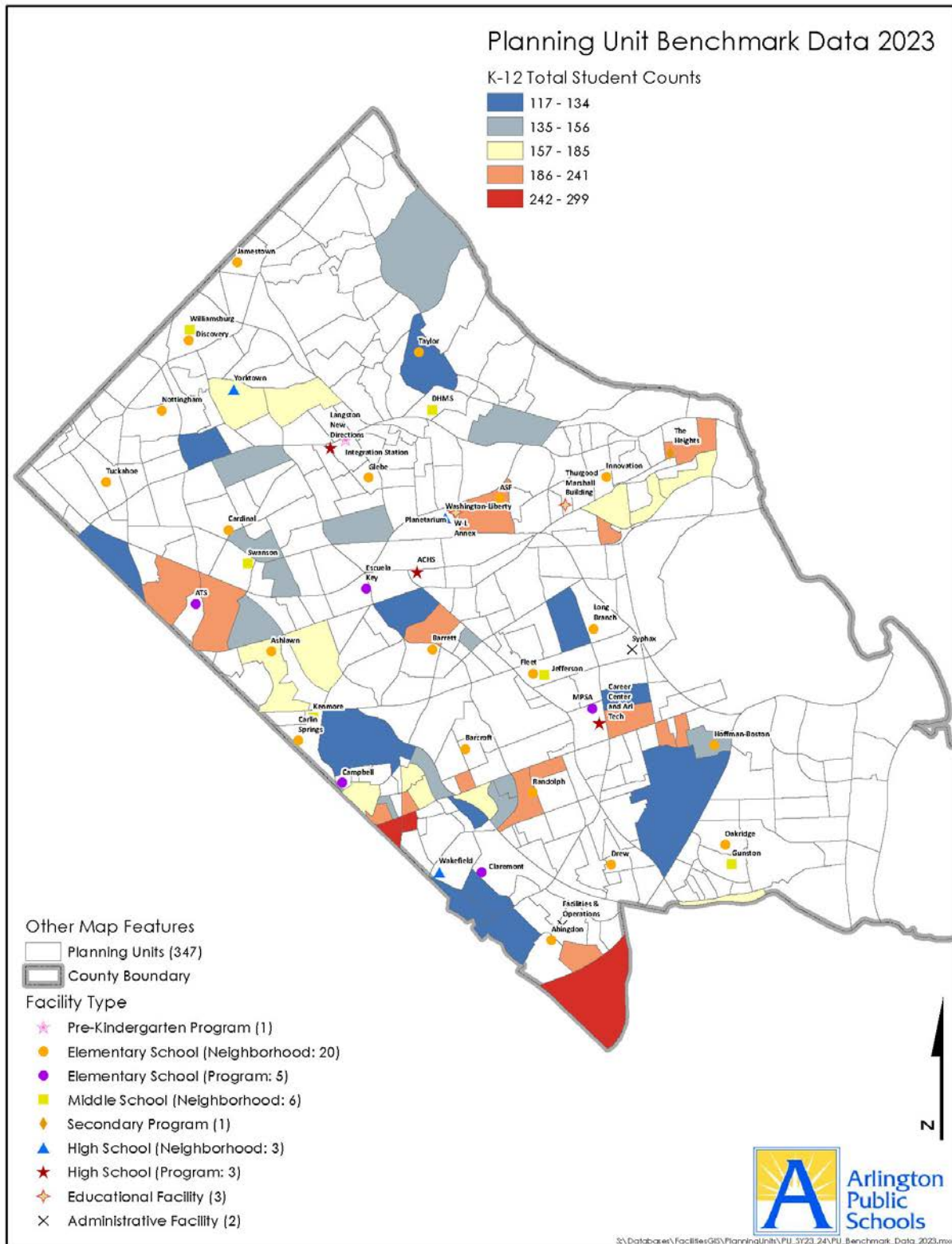
Table 10 Planning Unit Data Based on Walkshed Splits

ELEMENTARY SCHOOLS 2023 K-5 Class Sive Average 21.35 students					
	Planning Unit Splits Inside Walkshed (Student Totals)	Planning Unit Splits Outsideside Walkshed (Student Totals)	K-5 Systemwide (Student Totals)	Percent Change (Inside Splits & K-5 Systemwide)	Percent Change (Outside Splits & K-5 Systemwide)
ABINGDON					
Minimum	3	14	1	66.7%	92.9%
Q1	15	21.5	17	-13.3%	20.9%
Median	22	26	33	-50.0%	-26.9%
Q3	31	40	51	-64.5%	-27.5%
Maximum	65	111	176	-170.8%	-58.6%
BARCROFT					
Minimum	3	2	1	66.7%	50.0%
Q1	6	7	17	-183.3%	-142.9%
Median	18	27	33	-83.3%	-22.2%
Q3	27.5	40	51	-85.5%	-27.5%
Maximum	82	159	176	-114.6%	-10.7%
CARDINAL					
Minimum	2	1	1	50.0%	0.0%
Q1	5.25	6.25	17	-223.8%	-172.0%
Median	13.5	17	33	-144.4%	-94.1%
Q3	47.75	25	51	-6.8%	-104.0%
Maximum	84	49	176	-109.5%	-259.2%
GLEBE					
Minimum	1	1	1	0.0%	0.0%
Q1	6.5	10	17	-161.5%	-70.0%
Median	14	17	33	-135.7%	-94.1%
Q3	26	40.5	51	-96.2%	-25.9%
Maximum	34	77	176	-417.6%	-128.6%
NOTTINGHAM					
Minimum	1	3	1	0.0%	66.7%
Q1	6.25	9.5	17	-172.0%	-78.9%
Median	14.5	18	33	-127.6%	-83.3%
Q3	21.75	38	51	-134.5%	-34.2%
Maximum	58	67	176	-203.4%	-162.7%
MIDDLE SCHOOLS 2023 Gr 6-8 Class Sive Average 19.94 students					
	Planning Unit Splits Inside Walkshed (Student Totals)	Planning Unit Splits Outsideside Walkshed (Student Totals)	Gr 6-8 Systemwide (Student Totals)	Percent Change (Inside Splits & K-5 Systemwide)	Percent Change (Outside Splits & K-5 Systemwide)
JEFFERSON					
Minimum	1	1	1	0.0%	0.0%
Q1	6.75	3.25	9	-33.3%	-176.9%
Median	9.5	8	16	-68.4%	-100.0%
Q3	17.5	15.75	25	-42.9%	-58.7%
Maximum	46	29	70	-52.2%	-141.4%
SWANSON					
Minimum	1	1	1	0.0%	0.0%
Q1	6	3	9	-50.0%	-200.0%
Median	8	5	16	-100.0%	-220.0%
Q3	17	10	25	-47.1%	-150.0%
Maximum	47	39	70	-48.9%	-79.5%
HIGH SCHOOLS 2023 Gr 9-12 Class Sive Average 23.25 students					
	Planning Unit Splits Inside Walkshed (Student Totals)	Planning Unit Splits Outsideside Walkshed (Student Totals)	Gr 9-12 Systemwide (Student Totals)	Percent Change (Inside Splits & K-5 Systemwide)	Percent Change (Outside Splits & K-5 Systemwide)
WASHINGTON-LIBERTY					
Minimum	1	1	1	0.0%	0.0%
Q1	5.25	5.75	12	-128.6%	-108.7%
Median	10	13.5	21	-110.0%	-55.6%
Q3	17	28.5	33	-94.1%	-15.8%
Maximum	34	71	97	-185.3%	-36.6%
DISTRICTWIDE					
				Average Percent Change (Inside Splits & K-5 Systemwide)	Average Percent Change (Outside Splits & K-5 Systemwide)
				-99.3%	-80.1%

Table 11 2023 Planning Unit Benchmark

Planning Unit ID	K-5 Totals	Gr 6-8 Totals	Gr 9-12 Totals	Planning Unit ID	K-5 Totals	Gr 6-8 Totals	Gr 9-12 Totals
12040	95	46	58	35071	61	34	52
12061	69	31	46	35081	75	41	69
13031	74	50	43	35090	88	35	75
13040	72	29	45	35100	77	38	64
13050	88	29	53	36010	172	42	53
13070	65	26	38	36020	137	70	79
14020	91	44	65	36050	60	29	43
14030	105	51	62	36051	57	39	37
14051	55	42	44	36070	58	29	35
14061	76	33	42	36111	111	54	76
15121	58	26	60	36130	176	62	61
16070	65	42	34	37033	107	46	71
16110	56	28	34	37060	67	36	37
17033	52	26	39	37080	55	26	44
17040	67	36	56	37090	85	27	59
17060	69	38	55	38010	69	27	45
23020	59	36	51	38011	76	31	49
23060	55	29	39	38020	85	43	63
23111	71	29	42	38030	90	55	63
23190	109	34	48	46101	67	33	34
24051	94	42	57	46102	110	50	55
24071	102	30	53	46140	106	36	50
24080	101	35	34	46950	53	35	37
24082	72	35	57	48150	70	30	37
24120	86	62	71	48220	53	27	48
35040	52	27	49	48281	108	35	50
35060	71	41	55	48960	85	35	62
35070	89	40	97				

Illustration 1 2023 Planning Units Benchmark



Data Sources:

A Plan for Managing Growing Enrollment in APS (March 6, 2018)

<https://www.apsva.us/wp-content/uploads/2018/03/AFSAP-Decision-Points-FINAL-03-06-19.pdf>

Work Session on Preparing for Middle School Boundary Process (September 12, 2017)

[https://go.boarddocs.com/vsba/arlington/Board.nsf/files/AR6GKM44281D/\\$file/MS%20Boundaries%20WS%20Presentation%209-12-17.pdf](https://go.boarddocs.com/vsba/arlington/Board.nsf/files/AR6GKM44281D/$file/MS%20Boundaries%20WS%20Presentation%209-12-17.pdf)

2023 Pre-Capital Improvement Plan (Pre-CIP) Report

<https://www.apsva.us/wp-content/uploads/sites/57/2023/06/Pre-CIP-Report-2024-2033-Finalv2.pdf>

Policy E-5.1 Student Transportation Services

[https://go.boarddocs.com/vsba/arlington/Board.nsf/files/CLPTX3782B9E/\\$file/E-5.1%20Student%20Transportation%20Services.pdf](https://go.boarddocs.com/vsba/arlington/Board.nsf/files/CLPTX3782B9E/$file/E-5.1%20Student%20Transportation%20Services.pdf)

Class Size Report SY2017-18

<https://www.apsva.us/wp-content/uploads/2018/01/Class-Size-Report-2017-18.pdf>

Class Size Report SY2023-24

<https://www.apsva.us/wp-content/uploads/sites/57/2024/02/Class-Size-Report-SY-23-24.pdf>

September 30, 2017, Membership Summary.

For copy of this data, please contact engage@apsva.us

September 30, 2023, Membership Summary.

https://www.apsva.us/wp-content/uploads/sites/57/2023/10/U_MEM_281_Summary_10_4_2023.pdf