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**The Public School Retirement System
of
The School District of Kansas City, Missouri**

Actuarial Valuation Report
as of January 1, 2018





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June 1, 2018

The Board of Trustees
Public School Retirement System of the School District of Kansas City, Missouri
3100 Broadway, Suite 1211
Kansas City, MO 64111

Dear Members of the Board:

In accordance with your request, we have completed the annual actuarial valuation of the Public School Retirement System of the School District of Kansas City, Missouri as of January 1, 2018. The major findings of the valuation are contained in this report, including the actuarial required contribution rate for the 2018 plan year. The 2018 Missouri General Assembly passed a bill which impacts contributions to the System beginning January 1, 2019. There were no changes to the actuarial assumptions or actuarial methods since the prior valuation.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, plan provisions, member data, and financial information. We found this information to be reasonably consistent and comparable with information for the last valuation. The valuation results depend on the integrity of the data provided. If any of this information is inaccurate or incomplete, our valuation results may be different and our calculations may need to be revised.

We further certify that all costs, liabilities, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions. The Board of Trustees has the final decision regarding the selection of assumptions and adopted the set indicated in Appendix C of this report. In our opinion, the set of assumptions and methods used for funding purposes in this report meet the parameters set by applicable Actuarial Standards of Practice.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.



Actuarial computations presented in this report are for purposes of determining the actuarial contribution rates for funding the System. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are provided in separate reports.

The consultants who worked on this assignment are pension actuaries. CMC's advice is not intended to be a substitute for qualified legal or accounting counsel.

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries and have experience in performing valuations for public retirement plans, that the valuation was prepared in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement plan and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

We respectfully submit the following report and look forward to discussing it with you.

Sincerely,

A handwritten signature in blue ink that reads 'Patrice Beckham'.

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Bryan K. Hoge'.

Bryan K. Hoge, FSA, EA, FCA, MAAA
Senior Actuary



SECTION I: EXECUTIVE SUMMARY

This report presents the results of the January 1, 2018 actuarial valuation of the Public School Retirement System of the School District of Kansas City, Missouri (System). The primary purposes of performing a valuation are to:

- estimate the liabilities for future benefits expected to be paid by the System;
- determine the actuarial contribution rate based on the Board’s funding policy and evaluate the sufficiency of the current contribution rates;
- disclose certain asset and liability measurements as of the valuation date;
- monitor any deviation between actual plan experience and experience anticipated by the actuarial assumptions; and
- analyze and report on any significant trends in assets, liabilities, and contributions over the past several years.

The 2018 Missouri General Assembly passed a bill which, as of the date of this report, has not been signed by the Governor. However, the expectation is that the bill will be signed and become law in 2018. The new legislation provides for an increase in the employer contribution rate from 9.0% to 10.5% of pay, effective January 1, 2019, and then 12.0% of pay, effective January 1, 2020. Beginning July 1, 2021, the employer contribution rate will be the greater of (1) the actuarial required contribution rate, as determined in the valuation prepared for the prior calendar year, less the member contribution rate, or (2) 12.00% of pay, until the System is fully funded. More detail on the new contribution provisions can be found in Appendix B of this report. These changes, particularly the move to set employer contributions based on the actuarial contribution rate, are expected to improve the funded status of the System in the future. Because the effective date of these changes is in the future, they did not impact the current valuation results.

The actuarial valuation results provide a “snapshot” view of the System’s financial condition on January 1, 2018 which reflects net favorable experience for the past plan year as demonstrated by an unfunded actuarial accrued liability that was less than expected, based on the actuarial assumptions. Favorable experience on liabilities resulted in a gain of \$10.8 million, primarily due to lower salary amounts than expected. This favorable experience was partially offset by unfavorable experience on the actuarial value of assets, which resulted in an actuarial loss of \$9.5 million. The net impact was an actuarial gain of \$1.3 million. The System’s unfunded actuarial accrued liability increased from \$297.1 million in the January 1, 2017 valuation to \$302.1 million in the January 1, 2018 valuation. A detailed analysis of the change in the unfunded actuarial accrued liability is shown on page 5.

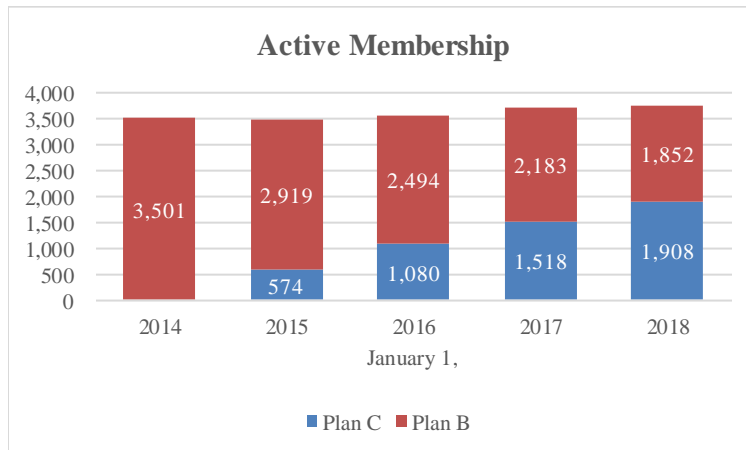
In the following pages, changes in the assets, liabilities, and contributions of the System over the last year are discussed in more detail.

MEMBERSHIP

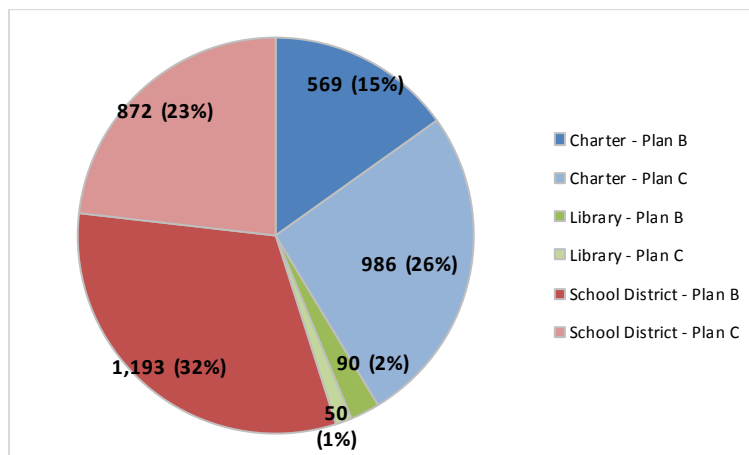
The size of the active membership increased about 1.6%, from 3,701 in the 2017 valuation to 3,760 in the current valuation. There are different benefit provisions applicable to the current active membership. The number of actives covered by Plan C, which was effective for members hired on and after January 1, 2014, increased from 1,518 last year (about 41%) to 1,908 in the 2018 valuation (about 51%). As more of the active members are covered by Plan C in the future, the normal cost rate is expected to decline, reflecting the lower cost of Plan C as compared to Plan B. The following graphs shows the historical number of active members and the split between Plan B and Plan C:



SECTION I: EXECUTIVE SUMMARY



The System covers employees of the Kansas City School District, the Kansas City Library and Charter Schools in Kansas City. The current allocation of active membership among these groups, by plan, is shown below:



Group	Count	Average Salary	Average Age	Average Service
KC School District	2,065	\$45,539	46.2	9.3
Charter Schools	1,555	41,772	37.9	4.3
Library	140	46,722	47.5	10.4
Total	3,760	\$44,025	42.8	7.5

Although the number of active members increased by 1.6%, total covered payroll (on which contributions are paid) increased only 1.1% from the prior valuation (the assumption is 3%). The low increase in covered payroll this year is the result of a 2015 retroactive pay increase for some members included in their calendar year 2016 reported salary and thus reflected in the 1/1/2017 valuation. As a result, the retroactive pay increases included in the 1/1/2017 valuation attributed to the lower than expected percentage increase in covered payroll from the 1/1/2017 to the 1/1/2018 valuation. When the actual increase in covered payroll is less than expected, it results in an increase in UAAL contribution rate for the current valuation (in this case 1/1/2018) since this rate is determined as a percent of payroll. This



SECTION I: EXECUTIVE SUMMARY

year-to-year variance will correct itself in the actuarial valuations going forward and because the contribution rate for calendar year 2018 and 2019 is a fixed rate adjustments are not necessary.

The number of terminated members increased by 6.6% from the 2017 valuation. The largest increase in count was in the terminated non-vested group. The number of members receiving benefits also increased from 4,032 in the 2017 valuation to 4,112 in the 2018 valuation.

ASSETS

As of January 1, 2018, the System had total assets of \$685.8 million when measured on a market value basis, an increase of \$54.4 million from the January 1, 2017 value of \$631.4 million. The market value of assets is not used directly in the calculation of the System’s funded status and the actuarial contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation, called the “actuarial value of assets”. Gains and losses, determined as the difference between the actual and expected value of assets, are recognized equally over a five-year period. See Table 3 for a detailed development of the actuarial value of assets. The rate of return on the market value of assets was 16.8%, but due to the asset smoothing process the return on the actuarial value of assets was only 6.3%. Because the investment return on the actuarial value of assets was lower than the actuarial assumed rate of return (7.75%), an actuarial loss on assets occurred. Due to the favorable investment experience during 2017 along with the recognition of deferred losses on the actuarial value of assets, the net deferred asset loss of \$53.0 million in the January 1, 2017 valuation has become a net deferred asset gain of \$7.5 million in the January 1, 2018 valuation.

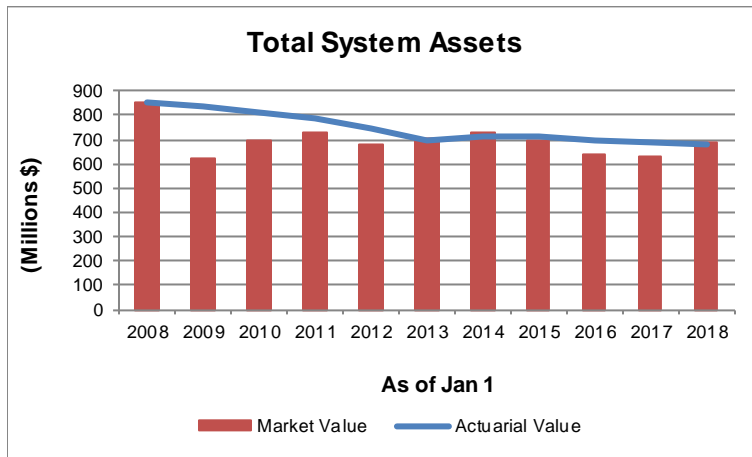
The components of the change in the market and actuarial value of assets for the System (in millions) are set forth below:

	Market Value (\$M)	Actuarial Value (\$M)
Assets, January 1, 2017	\$631.4	\$684.4
- Employers and Member Contributions	33.9	33.9
- Benefit Payments and Refunds	(81.8)	(81.8)
- Investment, Depreciation and Administrative Expenses	(5.9)	(5.9)
- Investment Income	108.2	47.7
Assets, January 1, 2018	\$685.8	\$678.3
Estimated Rate of Return	16.8%	6.3%

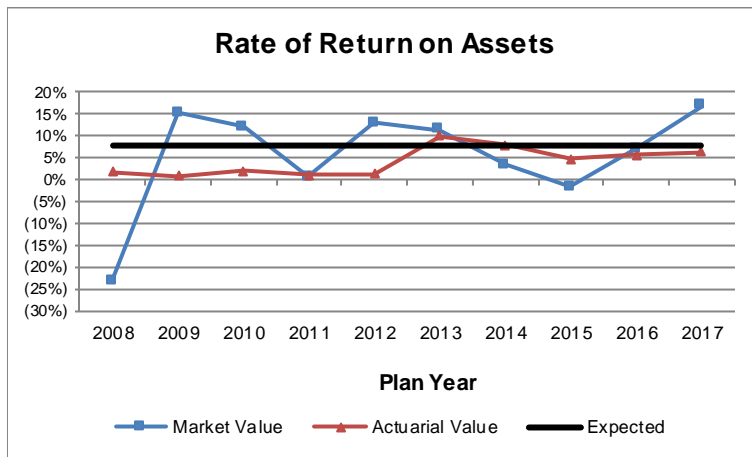
The unrecognized net asset gain represents about 1% of the market value of assets. Unless offset by future investment losses or other unfavorable experience, the recognition of the \$7.5 million net gain will flow through the asset smoothing method and positively impact the funded ratio and actuarial contribution rate in future years. If the net deferred gain was recognized immediately in the actuarial value of assets, the funded percentage would increase from 69% to 70% and the actuarial contribution rate for the System would decrease from 9.8% to 9.5% of payroll.



SECTION I: EXECUTIVE SUMMARY



The actuarial value of assets has been equal to or greater than the market value of assets over most of this period. However, over the longer term we expect the actuarial value of assets to be both higher and lower than the market value of assets.



The rate of return on the actuarial value of assets has been less volatile than the market value return, which is the main reason for using an asset smoothing method

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and asset values at the same date is referred to as the unfunded actuarial accrued liability (UAAL). The unfunded actuarial accrued liability will be reduced if the employer’s contributions exceed the employer’s normal cost for the year, after allowing for interest earned on the previous balance of the unfunded actuarial accrued liability. Benefit improvements, experience gains and losses, and changes in actuarial assumptions and procedures will also impact the total actuarial accrued liability and the unfunded portion thereof.

The Actuarial Accrued Liability and Unfunded Actuarial Accrued Liability for the System as of January 1, 2018 are:

Actuarial Accrued Liability	\$980,436,626
Actuarial Value of Assets	<u>678,288,805</u>
Unfunded Actuarial Accrued Liability	\$302,147,821



SECTION I: EXECUTIVE SUMMARY

The existence of an unfunded actuarial accrued liability means that the System has actuarial assets below the target amount for an ongoing plan using the actuarial cost method. Consequently, contributions in excess of the normal cost will be needed in order for the System to reach fully funded status, assuming all assumptions are met in the future. Because the actuarial accrued liability includes projections of future salary increases and years of service, this measure does not provide a reliable indication of the level of funding relative to actual benefits earned to date. In addition, note that if the market value of assets were used instead of the actuarial value of assets, the amount of UAAL would be different. This information is shown on page 7 of this report.

Between January 1, 2017 and January 1, 2018, the change in the unfunded actuarial accrued liability for the System was as follows (in millions):

	(\$ Millions)	
Unfunded Actuarial Accrued Liability, January 1, 2017	\$	297.1
- Expected increase from amortization method		4.0
- Actual versus actuarial contributions		1.2
- Investment experience		9.5
- Liability experience		(10.8)
- Other experience		1.1
Unfunded Actuarial Accrued Liability, January 1, 2018	\$	302.1

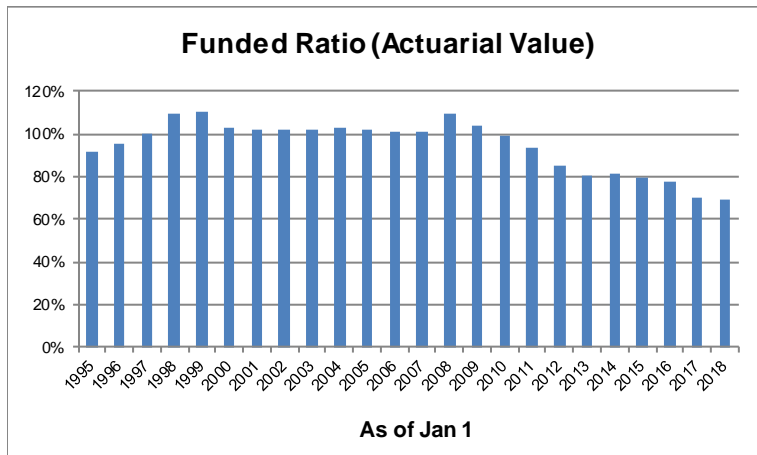
The experience gain for the 2017 plan year of \$1.3 million reflects the net impact of an actuarial gain of \$10.8 million on System liabilities, and an actuarial loss of \$9.5 million on System assets (actuarial value). The largest source of gain on the liability experience was salary increases that were smaller than expected, based on the actuarial assumptions (discussed earlier).

Analysis of the unfunded actuarial accrued liability strictly as a dollar amount can be misleading. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded status, the ratio of the actuarial value of assets to the actuarial accrued liability. This information for recent years is shown below (in millions). Longer term historical information is shown in the graph following the chart:

	1/1/2014	1/1/2015	1/1/2016	1/1/2017	1/1/2018
Actuarial Accrued Liability (\$M)	\$875.5	\$891.5	\$895.2	\$981.5	\$980.4
Actuarial Value of Assets (\$M)	\$710.8	\$712.4	\$694.6	\$684.4	\$678.3
Funded Ratio (Actuarial Value)	81.2%	79.9%	77.6%	69.7%	69.2%
Market Value of Assets (\$M)	\$726.6	\$698.5	\$636.1	\$631.4	\$685.8
Funded Ratio (Market Value)	83.0%	78.4%	71.1%	64.3%	70.0%



SECTION I: EXECUTIVE SUMMARY



The System's funded ratio was very strong (around 100%) in the early part of the period. Funded ratios declined from 2009 to 2013 as the market downturn of 2008 was fully reflected in the smoothing method. Future investment experience will continue to be the largest driver of the System's funded ratio in future years. However, changes to the contribution rates, beginning in 2019, will also improve the System's long-term funding.

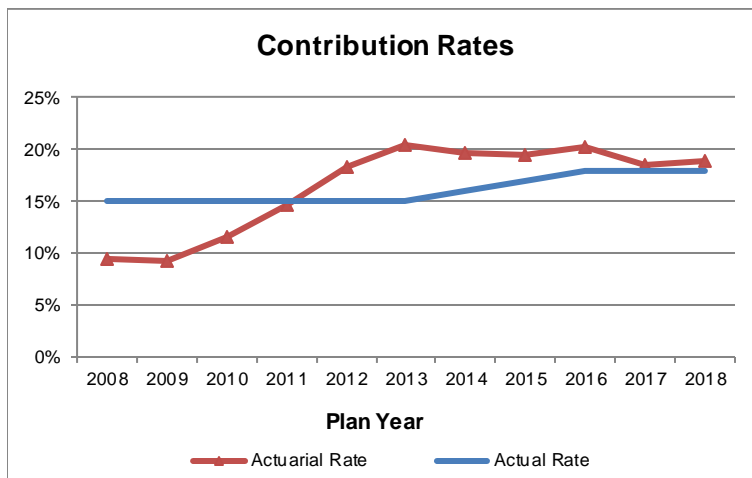
As mentioned earlier in this report, due to the asset smoothing method there is currently a \$7.5 million difference between the market value and the actuarial value of assets. To the extent there is not unfavorable investment experience to offset the net deferred gain, the \$7.5 million net deferred gain will be recognized in future years and the System's funded status will improve. The System's funded status will continue to be heavily dependent on future investment experience.

CONTRIBUTION RATES

Generally, contributions to the System consist of:

- A "normal cost" for the portion of projected liabilities allocated to service of members during the year following the valuation date by the actuarial cost method, and
- An "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

Over the last five years, the System's contribution rates have increased to address higher funding needs:



The actuarial contribution rate increased dramatically from 2009 to 2013 due to the recognition of the large asset loss from 2008 in the asset smoothing method. The contribution shortfall has been reduced due to increases in the member and employer contribution rates. Based on legislation passed in 2018, the employer contribution rate is scheduled to increase to 12% and then be equal to the actuarial contribution rate beginning July 1, 2021.

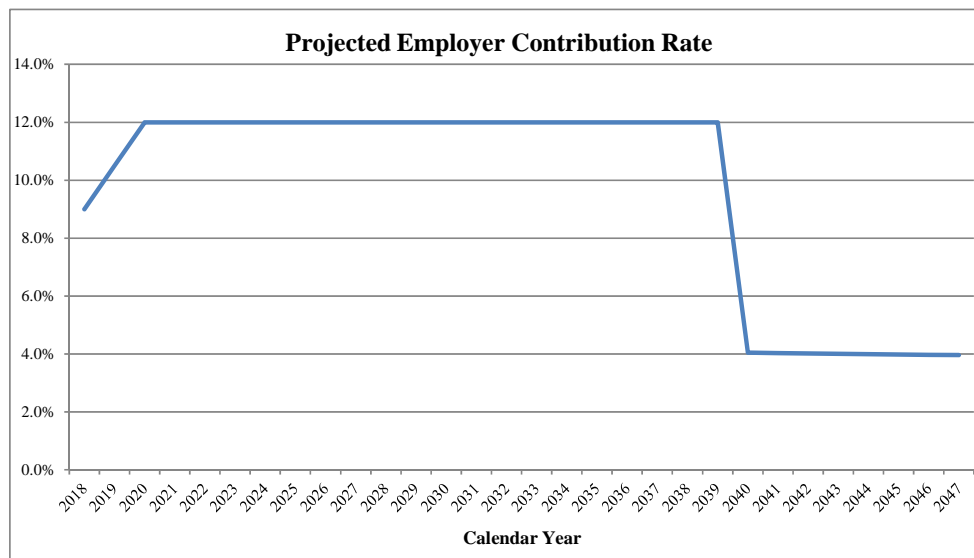


SECTION I: EXECUTIVE SUMMARY

As of January 1, 2018, the actuarial accrued liability exceeds the actuarial value of assets so an unfunded actuarial accrued liability (UAAL) exists. The January 1, 2017 UAAL is amortized over a closed 30-year period and subsequent pieces of UAAL, determined each year in the valuation process, are amortized over a separate, closed 20-year period. The amortization payments on each of the UAAL bases are determined as a level percentage of payroll. The resulting UAAL contribution rate is 9.66% of pay. The System's actuarial contribution rate is the sum of the normal cost and the UAAL amortization contribution or 18.82% of pay (9.16% normal cost plus 9.66% UAAL contribution). Given the current contribution rate of 18.00% of pay (9.00% each for employee and employer), the resulting contribution shortfall, as of January 1, 2018, is 0.82% which translates to about \$1.6 million.

The 2018 Missouri General Assembly passed a bill that increases the employer contribution rate to 10.50% of pay, effective January 1, 2019, and then 12.00% of pay, effective January 1, 2020. Beginning July 1, 2021, the employer contribution rate will be the greater of (1) the actuarial required contribution rate less the member contribution rate, or (2) 12.00% of pay, until the System is fully funded. Once the System is fully funded, the employer contribution rate may increase or decrease in subsequent years, depending on the valuation results and the employee contribution rate may decrease from 9.00% depending on valuation results. However, such changes are subject to statutory limitations. As of the date of this report, the bill has not been signed by the Governor, however the expectation is that the bill will be signed and become law in 2018. These changes to the contribution rate are a significant step in strengthening the long-term funding of the System.

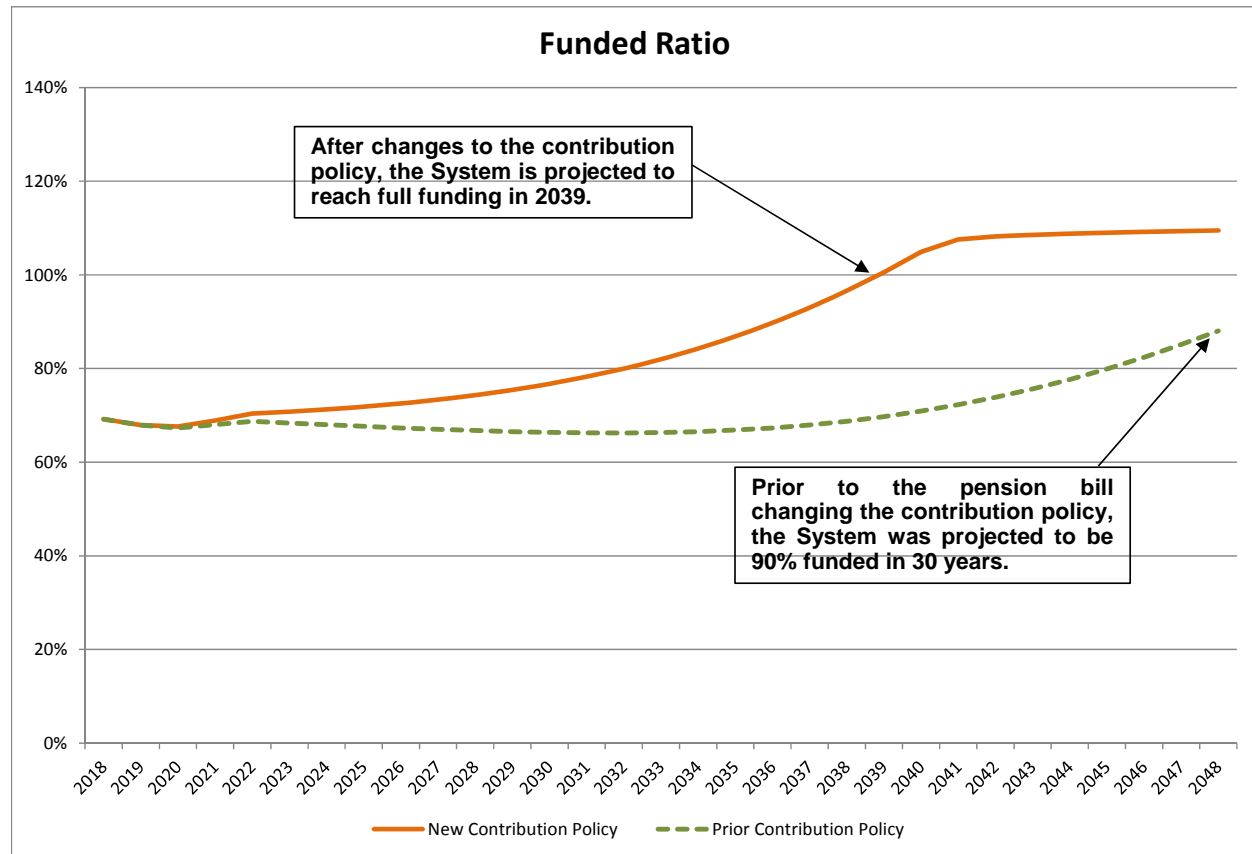
As mentioned earlier, the System is currently funded with a fixed contribution rate of 18.00% of payroll (moving to 19.50% in 2019 and 21.00% in 2020). In the current valuation, 9.16% is needed to fund the normal cost for current active members and the remainder, 8.84% of payroll, is available to finance the UAAL. However, as Plan B members leave employment in the future and are replaced by new hires in Plan C, the normal cost rate is expected to decline. The following graph reflects the projected employer contribution rate, assuming all assumptions are met in the future, including a 7.75% return on the market value of assets each year. To the extent actual experience is different than that assumed, the actual valuation results of the System will vary from these projections, perhaps significantly.





SECTION I: EXECUTIVE SUMMARY

With the legislative change in the employer contribution rates, the System is now projected to reach fully funded status in the 2039 valuation compared to a projected funded ratio of 50% in 2047 in the prior valuation. As the following graph shows, without the higher employer contributions the funded ratio would only reach 90% in thirty years.



COMMENTS

Legislation passed in 2013 modified the set of plan provisions applicable for members hired after December 31, 2013, referred to as Plan C. The key differences between Plan B and Plan C are a lower benefit multiplier (1.75% instead of 2.00%) and more stringent requirements for unreduced benefits (age 62 or Rule of 80 rather than age 60 or Rule of 75). As of January 1, 2018, there are 1,908 active Plan C members in the System out of a total of 3,760, about 50%. As discussed earlier, the impact of the new benefit structure on the System’s funding will evolve gradually over time as current members (covered by Plan B) leave covered employment and are replaced with new members who are covered by Plan C.

The System does not use the actual market value of assets in developing the actuarial contribution rate, but utilizes an asset valuation method to smooth out the peaks and valleys in investment returns from year to year. Due to the current year’s recognition of prior investment experience, the System experienced an actuarial loss on assets of \$9.5 million. The unfavorable experience on the actuarial value of assets was offset by a net gain on liabilities of \$10.8 million. The net impact of the asset and the liability experience was an actuarial gain of \$1.3 million.



SECTION I: EXECUTIVE SUMMARY

The System's actuarial required contribution rate increased from 18.61% in the January 1, 2017 valuation to 18.82% in this valuation, largely due to unfavorable experience on the actuarial value of assets. The actuarial required contribution rate to be paid by the System has been, and will continue to be, heavily impacted by investment returns from year to year. Despite the use of an asset smoothing method, actual returns that are significantly different from the 7.75% assumption will create volatility in the System's actuarial required contribution rate.

The net deferred investment gain (market value less actuarial value of assets) is \$7.5 million, about 1% of market value. Absent investment losses in future years, this net deferred investment gain will eventually be reflected in the actuarial value of assets. While the use of an asset smoothing method is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred investment experience. This is accomplished by comparing the key valuation results from the January 1, 2018 actuarial valuation using both the actuarial and market value of assets.

	Using Actuarial Value of Assets	Using Market Value of Assets
Actuarial Accrued Liability	\$980,436,626	\$980,436,626
Asset Value	<u>\$678,288,805</u>	<u>\$685,801,998</u>
Unfunded Actuarial Accrued Liability	\$302,147,821	\$294,634,628
Funded Ratio	69.2%	69.9%
Normal Cost Rate	9.16%	9.16%
UAAL Contribution Rate	<u>9.66%</u>	<u>9.37%</u>
Total Contribution Rate	18.82%	18.53%
Employee Contribution Rate	(9.00%)	(9.00%)
Employer Contribution Rate	<u>(9.00%)</u>	<u>(9.00%)</u>
Contribution Shortfall	0.82%	0.53%



SECTION I: EXECUTIVE SUMMARY

Summary of Principal Valuation Results

	1/1/2018 Valuation	1/1/2017 Valuation	% Change
1. PARTICIPANT DATA			
Number of:			
Active Members			
- Plan B	1,852	2,183	(15.16%)
- Plan C	1,908	1,518	25.69%
Total	3,760	3,701	1.59%
Retirees, Disableds, and Beneficiaries	4,112	4,032	1.98%
Terminated Members			
- Vested Members	522	490	6.53%
- Non-Vested Members	2,449	2,298	6.57%
Total	2,971	2,788	6.56%
Total Members	10,843	10,521	3.06%
Projected Annual Salaries of Active Members	\$ 196,277,971	\$ 194,132,739	1.11%
Annual Retirement Payments for Retirees, Disableds, and Beneficiaries	\$ 79,297,152	\$ 76,880,736	3.14%
2. ASSETS AND LIABILITIES			
a. Market Value of Assets	\$ 685,801,998	\$ 631,442,613	8.61%
b. Actuarial Value of Assets	678,288,805	684,412,437	(0.89%)
c. Total Actuarial Accrued Liability	980,436,626	981,514,827	(0.11%)
d. Unfunded Actuarial Accrued Liability [c - b]	\$ 302,147,821	\$ 297,102,390	1.70%
e. Funded Ratio (Actuarial Value of Assets) [b / c]	69.18%	69.73%	(0.79%)
f. Funded Ratio (Market Value of Assets) [a / c]	69.95%	64.33%	8.74%
g. Projected Benefit Obligation	\$ 956,679,971	\$ 956,558,273	0.01%
3. CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost	9.16%	9.16%	0.00%
Amortization of Unfunded Actuarial Accrued Liability	9.66%	9.45%	2.22%
Actuarial Required Contribution Rate	18.82%	18.61%	1.13%
Member Contribution Rate	(9.00%)	(9.00%)	0.00%
Employer Contribution Rate	(9.00%)	(9.00%)	0.00%
Contribution Rate Shortfall	0.82%	0.61%	34.43%
Contribution Shortfall	\$ 1,609,479	\$ 1,184,210	35.91%



SECTION II: SCOPE OF THE REPORT

This report presents the actuarial valuation of the Public School Retirement System of the School District of Kansas City, Missouri as of January 1, 2018. This valuation was prepared at the request of the System's Board of Trustees. The report is based on the plan provisions, actuarial assumptions and actuarial methods in effect as of January 1, 2018.

Please pay particular attention to our cover letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings resulting from this valuation is presented in the previous section. Section 3 describes the assets and investment experience of the System. Sections 4 and 5 describe how the obligations of the System are to be met under the actuarial cost method in use. Section 6 includes additional information regarding the System's funding history.

This report includes several appendices:

- Appendix A Schedules of valuation data classified by various categories of members.
- Appendix B A summary of the current benefit structure, as determined by the provisions of governing law on the valuation date.
- Appendix C A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D A glossary of actuarial terms.



SECTION III: ASSETS

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is January 1, 2018. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the System assets and liabilities.

MARKET VALUE OF ASSETS

The current market value represents the “snapshot” or “cash-out” value of System assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance over time. On January 1, 2018, the market value of assets for the System was \$685.8 million. Table 1 summarizes the market value of assets by asset category. Table 2 summarizes the changes in the market value of assets between January 1, 2017 and January 1, 2018.

ACTUARIAL VALUE OF ASSETS

Neither the market value of assets, representing a “cash-out” value of System assets, nor the book values of assets, representing the cost of investments, may be the best measure of the System’s ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. This methodology smoothes the difference between the actual return and the expected return (based on the actuarial assumption) on the market value of assets equally over a five-year period. Table 3 shows the development of the actuarial value of assets (AVA) as of January 1, 2018.



SECTION III: ASSETS

TABLE 1
Net Assets at Market Value
as of January 1, 2018

INVESTMENTS, AT MARKET VALUE	
Cash and short term investments	\$ 20,365,076
Commingled domestic fixed income	54,913,727
High yield fixed income	17,979,851
Global fixed income	31,604,923
Domestic equity	164,878,025
International equity	190,814,087
Pooled real estate funds	55,885,706
Alternative equity fund	89,533,199
Private equity	25,437,896
Commodities	21,097,360
Total Investments, at Market Value	\$ 672,509,850
RECEIVABLES	
Plan member contributions	\$ 685,624
Employer contributions	10,537,802
Securities sold	0
Accrued interest and dividends	456,695
Total Receivables	\$ 11,680,121
OTHER ASSETS	
Cash	\$ 2,259,107
Fixed assets	38,383
Other assets	45,403
Total Other Assets	\$ 2,342,893
TOTAL ASSETS	\$ 686,532,864
LIABILITIES	
Due to broker for securities purchased	\$ 0
Accounts payable	599,450
Accrued payroll expenses	131,416
Total Liabilities	\$ 730,866
NET ASSETS AVAILABLE FOR BENEFITS	\$ 685,801,998

Note: Based on unaudited asset information.



SECTION III: ASSETS

TABLE 2

Statement of Changes in Net Assets as of January 1, 2018

ADDITIONS TO NET ASSETS

Contributions

Plan members	\$	16,964,351
Employers		16,926,562
Total Contributions	\$	<u>33,890,913</u>

Investment Income

Net appreciation (depreciation) in fair value of investments	\$	102,069,467
Interest/Dividends		6,084,759
Other income		0
Investment income before expenses	\$	<u>108,154,226</u>
Less: investment expenses		<u>(4,386,512)</u>
Net investment income	\$	<u>103,767,714</u>

TOTAL ADDITIONS TO NET ASSETS \$ 137,658,627

DEDUCTIONS FROM NET ASSETS

Benefits paid directly to participants	\$	78,181,575
Refunds of contributions		3,581,147
Depreciation expense		15,855
Administrative expenses		1,520,665
TOTAL DEDUCTION FROM ASSETS	\$	<u>83,299,242</u>

NET INCREASE (DECREASE) \$ 54,359,385

NET ASSETS AVAILABLE FOR BENEFITS

Beginning of year	\$	631,442,613
End of year	\$	685,801,998

Note: Based on unaudited asset information.



SECTION III: ASSETS

TABLE 3

Development of Actuarial Value of Assets as of January 1, 2018

1. Deferral of Investment Return for 2017		
a. Market Value, January 1, 2017	\$	631,442,613
b. Contributions for 2017		33,890,913
c. Benefit Payments for 2017		81,762,722
d. Actual Investment Return, Net of All Expenses	\$	102,231,194
e. Expected Return Rate		7.75%
f. Expected Return - Weighted for Timing* (a. x e.) + [(b. - c.) x (((1 + e.) ⁵) - 1)]	\$	47,116,382
g. Investment Gain/(Loss) for the Year (d. - f.)	\$	55,114,812
h. Deferred Investment Return (g. x 80%)	\$	44,091,850
2. Actuarial Value, January 1, 2018		
a. Market Value, January 1, 2018	\$	685,801,998
b. Total Deferred Investment Gain/(Loss)		7,513,193
c. Actuarial Value, January 1, 2018 (a. - b.)	\$	678,288,805
d. Ratio of Actuarial Value of Assets to Market Value of Assets		98.9%
e. Approximate Actuarial Value Rate of Return for 2017, Net of All Expenses		6.3%

* Contributions and benefit payments are assumed to occur mid-year.

The table below shows the development of gain/(loss) to be recognized in the current year.

Plan Year Ended	Asset Gain/(Loss)	Gain/(Loss) Recognized in Prior Years	Gain/(Loss) Recognized This Year	Gain/(Loss) Deferred to Future Years
12/31/2013	\$ 22,436,893	\$ 17,949,516	\$ 4,487,377	\$ 0
12/31/2014	(32,229,392)	(19,337,634)	(6,445,878)	(6,445,880)
12/31/2015	(65,826,115)	(26,330,446)	(13,165,223)	(26,330,446)
12/31/2016	(6,337,217)	(1,267,443)	(1,267,443)	(3,802,331)
12/31/2017	55,114,812	0	11,022,962	44,091,850
Total	\$(26,841,019)	\$(28,986,007)	\$(5,368,205)	\$ 7,513,193



SECTION IV: SYSTEM LIABILITIES

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date, January 1, 2018. In this section, the discussion will focus on the commitments of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing members, inactive members, retirees and their beneficiaries. The liabilities summarized in Table 4 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes the measurement of both benefits already earned and future benefits to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and for the lives of the surviving beneficiaries.

All liabilities reflect the benefit provisions in place as of January 1, 2018.

ACTUARIAL ACCRUED LIABILITY

A fundamental principle in financing the liabilities of a prefunded retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to “breakdown” the present value of future benefits into two components:

1. that which is attributable to the past, and
2. that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the “past service liability” or the “actuarial accrued liability”. The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the “normal cost”. Table 5 contains the calculation of actuarial accrued liability to the System. The Entry Age Normal actuarial cost method is used to develop the actuarial accrued liability.

Table 6 develops the experience gain/(loss) for the year ended December 31, 2017.

Table 7 shows the actuarial balance sheet.

PENSION BENEFIT OBLIGATION

Table 8 shows the System’s liability on a Pension Benefit Obligation (PBO) basis.



SECTION IV: SYSTEM LIABILITIES

TABLE 4

**Present Value of Future Benefits
as of January 1, 2018**

1. Active Members	
a. Retirement Benefits	\$ 289,038,095
b. Disability Benefits	4,400,632
c. Death Benefits	6,718,616
d. Withdrawal Benefits	42,989,986
e. Subtotal	\$ <u>343,147,329</u>
2. Benefit Recipients	
a. Retiree Benefits	\$ 675,262,264
b. Survivor Benefits	21,093,775
c. Disability Benefits	8,178,874
d. Subtotal	\$ <u>704,534,913</u>
3. Inactive Members	
a. Vested Retirement Benefits	\$ 25,628,815
b. Non-vested Account Balance	8,841,004
c. Subtotal	\$ <u>34,469,819</u>
4. Total	\$ 1,082,152,061
(1e. + 2d. + 3c.)	



SECTION IV: SYSTEM LIABILITIES

TABLE 5

**Actuarial Accrued Liability
as of January 1, 2018**

1. Present Value of Future Benefits (PVFB)	\$ 1,082,152,061
2. Present Value of Future Normal Costs (PVFNC)	
a. Retirement benefits	\$ 52,040,378
b. Disability benefits	1,496,633
c. Death benefits	2,593,115
d. Withdrawal benefits	45,585,309
e. Total	\$ <u>101,715,435</u>
3. Actuarial Accrued Liability (AAL) (1. - 2e.)	\$ 980,436,626
4. Actuarial Value of Assets (AVA)	\$ 678,288,805
5. Unfunded Actuarial Accrued Liability (UAAL) (3. - 4.)	\$ 302,147,821
6. Funded Ratio (AVA / AAL) (4. / 3.)	69.2%



SECTION IV: SYSTEM LIABILITIES

TABLE 6

Actuarial Gain/(Loss) for 2017

Liabilities

1. Actuarial accrued liability as of January 1, 2017	\$	981,514,827
2. Normal cost for 2017		15,616,175
3. Interest at 7.75% on (1) and (2) to December 31, 2017		77,277,653
4. Benefit payments during 2017		(81,762,722)
5. Interest on benefit payments		(3,109,189)
6. Updated mortality assumption		1,714,061
7. Expected actuarial accrued liability as of December 31, 2017	\$	<u>991,250,805</u>
8. Actuarial accrued liability as of December 31, 2017		980,436,626
9. Actuarial gain / (loss) on actuarial accrued liability (7. – 8.)	\$	10,814,179

Assets

10. Actuarial value of assets as of January 1, 2017	\$	684,412,437
11. Contributions during 2017		33,890,913
12. Benefit payments during 2017		(81,762,722)
13. Interest at 7.75% on (10), (11) and (12) to December 31, 2017		51,221,544
14. Expected actuarial value of assets as of December 31, 2017	\$	<u>687,762,172</u>
15. Actuarial value of assets as of December 31, 2017		678,288,805
16. Actuarial gain / (loss) on actuarial assets (15. – 14.)	\$	(9,473,367)
17. Total actuarial gain / (loss) (9. + 16.)	\$	1,340,812



SECTION IV: SYSTEM LIABILITIES

TABLE 7

Actuarial Balance Sheet

<u>Assets</u>	
Current assets (actuarial value)	\$ 678,288,805
Present value of future normal costs	101,715,435
Present value of future contributions to fund unfunded actuarial accrued liability	<u>302,147,821</u>
Total Assets	\$ <u>1,082,152,061</u>
 <u>Liabilities</u>	
Present value of future retirement benefits for:	
Active employees	\$ 343,147,329
Members currently receiving a benefit	704,534,913
Terminated vested members	25,628,815
Inactive employees due refunds	<u>8,841,004</u>
Total Liabilities	\$ <u>1,082,152,061</u>



SECTION IV: SYSTEM LIABILITIES

TABLE 8

Pension Benefit Obligation Funded Status

The Pension Benefit Obligation (PBO) is statutorily required to be used in the determination of whether a cost-of-living allowance can be granted to retirees. If the funded ratio, after reflecting the effect of the proposed increase, exceeds 100%, and other safeguards are met, a cost-of-living allowance may be provided. See Appendix B for additional details.

Projected Benefit Obligation	<u>January 1, 2018</u>	<u>January 1, 2017</u>
1. Retired members and beneficiaries currently receiving benefits and terminated members not yet receiving benefits	\$ 739,004,732	\$ 717,052,296
2. Current active participants		
a. Accumulated member contributions, including interest	103,069,314	105,887,868
b. Employer-financed vested benefits	<u>114,605,925</u>	<u>133,618,109</u>
Total Projected Benefit Obligation (PBO)	\$ 956,679,971	\$ 956,558,273
Projected Benefit Obligation funded status		
1. Actuarial Value of Assets (AVA)	\$ 678,288,805	\$ 684,412,437
a. Unfunded Projected Benefit Obligation	278,391,166	272,145,836
b. Funding Ratio (AVA / PBO)	71%	72%
2. Market Value of Assets (MVA)	\$ 685,801,998	\$ 631,442,613
a. Unfunded Projected Benefit Obligation	270,877,973	325,115,660
b. Funding Ratio (MVA / PBO)	72%	66%



SECTION V: EMPLOYER CONTRIBUTIONS

The previous two sections were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the present value of future benefits (total liability). This is expected, except for a completely closed fund, where no further contributions are anticipated. In an active open system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will deal with this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost rate and (2) the unfunded actuarial accrued liability contribution rate.

The term “fully funded” is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, a surplus exists.

DESCRIPTION OF CONTRIBUTION RATE COMPONENTS

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under this method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member’s year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/(losses).

The calculation of the employer contribution rate is outlined in Appendix B.

As of January 1, 2018, the valuation assets were less than the actuarial accrued liability so an unfunded actuarial accrued liability exists. The System’s funding policy is to amortize the UAAL, as a level percent of pay amount, using a “layered” approach with the legacy UAAL amortized over a closed 30-year period commencing January 1, 2017 and new bases over a closed 20-year period.

CONTRIBUTION RATE SUMMARY

Table 9 develops the normal cost rate for the System. In Table 10, the amortization payment related to the unfunded actuarial accrued liability, as of January 1, 2018, is developed. In Table 11, the contribution rate for the System is calculated.

The actuarial required contribution rate shown in this report is based on the actuarial assumptions and cost methods described in Appendix C.



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 9

Normal Cost Rate

1. Normal Cost	
a. Retirement Benefits	\$ 8,334,833
b. Disability Benefits	222,865
c. Death Benefits	443,900
d. Termination Benefits	<u>6,769,677</u>
e. Total	\$ 15,771,275
2. Expected Payroll for Current Actives	\$ 172,200,079
3. Normal Cost Rate for 2018	9.16%



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 10

**Amortization of the
Unfunded Actuarial Accrued Liability**

Amortization Bases	Original Amount	1/1/2018 Remaining Payments	Date of Last Payment	Outstanding Balance as of Jan. 1, 2018	Annual Contribution*
2017 UAAL Base	\$ 297,102,390	29	1/1/2046	\$ 301,093,536	\$ 18,887,098
2018 Experience Base	1,054,285	20	1/1/2037	1,054,285	81,203
Total				\$ 302,147,821	\$ 18,968,301

* Contribution amount reflects mid-year timing.

1. Total UAAL Amortization Payments	\$ 18,968,301
2. Projected Payroll for plan year ending December 31, 2017	\$ 196,277,971
3. UAAL Amortization Payment Rate	9.66%



SECTION V: EMPLOYER CONTRIBUTIONS

TABLE 11

**Development of
2018 Actuarial Required Contribution (ARC)**

1. Normal Cost Rate (See Table 9)	9.16%
2. UAAL Contribution Rate (See Table 10)	9.66%
3. Actuarial Recommended Contribution Rate (1) + (2)	18.82%
4. Statutory Contribution Rate:	
(a) Member	9.00%
(b) Employer	9.00%
(c) Total	<hr/> 18.00%
5. Contribution Shortfall (3) - (4c)	0.82%



SECTION VI: HISTORICAL FUNDING AND OTHER INFORMATION

HISTORICAL FUNDING AND OTHER INFORMATION

In this section, we provide some historical information regarding the funding progress of the System. These exhibits retain some of the information that used to be required for accounting purposes and are included because they help explain the System's funding history.



SECTION VI: HISTORICAL FUNDING AND OTHER INFORMATION

TABLE 12
Schedule of Funding Progress

Analysis of the dollar amounts of actuarial value of assets, actuarial accrued liability, or unfunded actuarial liability in isolation can be misleading. Expressing the actuarial value of assets as a percentage of the actuarial accrued liability provides one indication of the System’s funded status on an on-going concern basis. Analysis of this percentage over time indicates whether the System is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the System’s funding. The unfunded actuarial accrued liability and annual covered payroll are both affected by inflation. Expressing the unfunded actuarial accrued liability as a percentage of covered payroll approximately adjusts for the effects of inflation and aids analysis of the progress being made in accumulating sufficient assets to pay benefits when due. Generally, the smaller this percentage, the stronger the System’s funding.

Actuarial Valuation Date	Actuarial Value of Assets (AVA) (a)	Actuarial Accrued Liabilities (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b - a) / c]
1/1/1995	\$ 353,329,957	\$ 386,874,780	\$ 33,544,823	91.3%	\$ 185,374,096	18.1%
1/1/1996	389,103,803	409,428,594	20,324,791	95.0%	171,262,008	11.9%
1/1/1997	428,419,710	429,517,108	1,097,398	99.7%	161,802,480	0.7%
1/1/1998	482,599,919	442,614,693	(39,985,225)	102.3%	168,328,728	(23.8%)
1/1/1999	624,225,667	564,056,509	(60,169,158)	110.7%	153,733,920	(39.1%)
1/1/2000	660,830,255	640,614,688	(20,215,567)	103.2%	151,091,616	(13.4%)
1/1/2001	696,071,310	682,531,577	(13,539,734)	102.0%	165,795,367	(8.2%)
1/1/2002	718,703,692	701,725,938	(16,977,755)	102.4%	171,523,233	(9.9%)
1/1/2003	717,681,067	701,114,370	(16,566,697)	102.4%	168,391,474	(9.8%)
1/1/2004	738,612,110	716,126,707	(22,485,404)	103.1%	186,528,530	(12.1%)
1/1/2005	763,684,602	747,711,194	(15,973,408)	102.1%	195,866,663	(8.2%)
1/1/2006	788,788,666	780,663,389	(8,125,277)	101.0%	187,445,140	(4.3%)
1/1/2007	824,302,795	818,027,315	(6,275,480)	100.8%	199,221,110	(3.2%)
1/1/2008	854,123,580	781,284,025	(72,839,554)	109.3%	202,311,837	(36.0%)
1/1/2009	832,609,879	804,623,080	(27,986,799)	103.5%	205,326,108	(13.6%)
1/1/2010	814,536,473	819,534,391	4,997,918	99.4%	194,474,437	2.6%
1/1/2011	786,297,998	844,232,490	57,934,492	93.1%	162,417,257	35.7%
1/1/2012	742,279,611	874,286,498	132,006,887	84.9%	155,893,016	84.7%
1/1/2013	697,028,072	868,663,383	171,635,311	80.2%	157,303,005	109.1%
1/1/2014	710,828,744	875,451,114	164,622,370	81.2%	157,014,537	104.8%
1/1/2015	712,390,611	891,543,036	179,152,425	79.9%	170,845,124	104.9%
1/1/2016	694,641,248	895,230,295	200,589,047	77.6%	179,013,516	112.1%
1/1/2017	684,412,437	981,514,827	297,102,390	69.7%	194,132,739	153.0%
1/1/2018	678,288,805	980,436,626	302,147,821	69.2%	196,277,971	153.9%

Note: Years prior to 1/1/2014 were provided by prior Actuary



SECTION VII: RISK CONSIDERATIONS

TABLE 13

Historical Contribution Rates

Actuarial Valuation Date	Actuarial Contribution Rate	Actual Contribution Rate	Contribution Shortfall/(Margin)
1/1/2005	14.02%	15.00%	(0.98%)
1/1/2006	13.78%	15.00%	(1.22%)
1/1/2007	13.28%	15.00%	(1.72%)
1/1/2008	9.39%	15.00%	(5.61%)
1/1/2009	9.35%	15.00%	(5.65%)
1/1/2010	11.50%	15.00%	(3.50%)
1/1/2011	14.64%	15.00%	(0.36%)
1/1/2012	18.30%	15.00%	3.30%
1/1/2013	20.52%	15.00%	5.52%
1/1/2014	19.68%	16.00%	3.68%
1/1/2015	19.56%	17.00%	2.56%
1/1/2016	20.18%	18.00%	2.18%
1/1/2017	18.61%	18.00%	0.61%
1/1/2018	18.82%	18.00%	0.82%

Note: Years prior to 1/1/2014 were provided by prior Actuary.

Summary of Actuarial Methods and Assumptions

Valuation Date	January 1, 2018
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level-Percent of Pay, layered
Remaining Amortization Period	January 1, 2017 UAAL – 29 years Subsequent layers of amortization – See Table 10
Asset Valuation Method	5-Year Smoothed Market Value
Actuarial Assumptions:	
Investment Rate of Return*	7.75%
Projected Salary Increases*	5.00%
No future COLAs	

*Includes Inflation at 2.75%



SECTION VII: RISK CONSIDERATIONS

TABLE 14
Solvency Test

In a system that has been following the discipline of level percent of payroll financing, the liabilities for active participant accumulated contributions (liability 1) and the liabilities for future benefits to retirees, beneficiaries, and inactive participants (liability 2) will be fully covered by assets if all assumptions are met. In addition, the liabilities for service already rendered by active participants (liability 3) are normally partially covered by the remainder of the present assets. Generally, if the system has been using level percent of payroll financing, the funded portion of liability 3 will increase over time. The schedule below illustrates the history of the liabilities of the system and is indicative of the system following the discipline of level percent of compensation funding.

Valuation Date January 1,	Active Participants' Accumulated Contributions (1)	Retirees, Beneficiaries and Inactive Participants (2)	Active Participants (Employer Financed) (3)	Valuation Assets	Percent Covered By Valuation Assets		
					(1)	(2)	(3)
1989	\$ 68,032,000	\$ 72,476,675	\$ 50,436,314	\$ 192,074,767	100%	100%	102%
1990	77,843,936	79,855,895	52,384,902	220,844,765	100%	100%	121%
1991	86,392,672	77,212,948	62,859,420	241,369,537	100%	100%	124%
1992	91,688,784	101,408,720	69,055,820	278,065,508	100%	100%	123%
1993	98,482,791	102,336,338	61,479,865	307,050,085	100%	100%	173%
1994	99,547,061	123,475,760	121,674,513	336,466,320	100%	100%	93%
1995	110,658,079	144,027,489	124,562,502	353,451,344	100%	100%	79%
1996	108,123,636	177,617,507	117,169,151	389,103,803	100%	100%	88%
1997	104,554,877	231,762,583	91,329,968	428,419,710	100%	100%	101%
1998	115,847,655	228,328,855	108,592,620	482,599,919	100%	100%	127%
1999	117,478,379	274,442,924	172,607,724	624,225,667	100%	100%	135%
2000	113,334,820	343,382,932	184,049,309	660,830,255	100%	100%	111%
2001	115,781,706	389,055,603	184,779,937	696,071,310	100%	100%	103%
2002	119,968,776	406,094,033	187,309,245	718,703,692	100%	100%	103%
2003	112,468,027	435,548,298	165,766,206	717,681,067	100%	100%	102%
2004	125,754,562	430,145,689	179,264,397	738,612,110	100%	100%	102%
2005	127,221,118	431,366,177	201,836,083	763,684,602	100%	100%	102%
2006	133,811,729	477,844,206	177,531,611	788,788,666	100%	100%	100%
2007	136,978,872	498,841,373	187,966,845	824,302,795	100%	100%	100%
2008	140,844,707	492,273,102	156,840,245	854,123,580	100%	100%	141%
2009	140,096,771	503,450,518	161,075,791	832,609,879	100%	100%	117%
2010	139,860,248	524,692,426	154,981,717	814,536,473	100%	100%	97%
2011	110,538,745	611,806,997	121,886,748	786,297,998	100%	100%	52%
2012	99,513,420	654,828,752	119,944,326	742,279,611	100%	98%	0%
2013	100,767,726	653,949,421	113,946,236	697,028,072	100%	91%	0%
2014	98,272,633	660,003,861	117,174,620	710,828,744	100%	93%	0%
2015	98,966,336	674,794,654	117,782,046	712,390,611	100%	91%	0%
2016	101,173,695	677,295,366	116,761,234	694,641,248	100%	88%	0%
2017	105,887,868	717,052,296	158,574,663	684,412,437	100%	81%	0%
2018	103,069,314	739,004,732	138,362,580	678,288,805	100%	78%	0%

Note: Years prior to 1/1/2014 were provided by prior Actuary.



SECTION VII: RISK CONSIDERATIONS

While actuarial assumptions allow for a projection of how future contributions and investment returns will meet the cash flow needs for future benefit payments, actual experience will not unfold exactly as anticipated by the assumptions. In this section, we discuss some of the risk factors that can have a significant impact – good or bad – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and inflation;
- demographic risks such as mortality, payroll growth, aging population including the impact of baby boomers, and retirement ages;
- contribution risk; and
- external risks such as the regulatory and political environment.

The most significant risk factor is investment return because of the volatility of returns and the size of plan assets compared to payroll (see Exhibit 15). A perusal of historical rates over 10-20 years reveals that the actual return each year is rarely close to the average return for the same period. This is an expected result given the underlying capital market assumptions and the asset allocation. However, the valuation is a measurement based on a single investment return, usually around the median of the distribution of returns. The magnitude of variations in investment returns and the short timeframe in which they occur makes the management of this risk very challenging. In order to manage risk, it is first necessary to measure it which is the purpose of this section of the report.

A key demographic risk for all retirement systems, including KCPSRS, is improvements in mortality (longevity) greater than anticipated. While the mortality assumption reflects some improvement in mortality experience and this assumption is evaluated and refined in each experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, would also be significant, although more easily absorbed.

Finally, the projections for funding anticipate a stable employment level, i.e., active member count remains the same. A significant change in the number of active members in the future could have an adverse impact on the System's funding status.

As plan demographics change over time, along with the funded status, the risk factors may also change. The following exhibits summarize certain historical information that provide an indication as to how key risk metrics have changed over time.



SECTION VII: RISK CONSIDERATIONS

EXHIBIT 15

HISTORICAL LEVERAGE RATIO

The size of the plan assets relative to covered payroll, sometimes referred to as the leverage ratio, is an important risk indicator. The higher this ratio is, the more sensitive a plan is to investment return volatility. In the January 1, 2018 valuation, the asset leverage ratio was 3.49. So, for example, if the actual return on the market value of assets was 10% lower than expected, it would translate into almost 35% of payroll. This ratio tends to grow over time as plans become better funded, so this is an important metric to monitor over time.

<u>Valuation Date</u>	<u>Market Value of Assets</u>	<u>Covered Payroll</u>	<u>Leverage Ratio</u>
1/1/2008	\$853,722,741	\$202,311,837	4.22
1/1/2009	624,647,065	205,326,108	3.04
1/1/2010	693,934,794	194,474,437	3.57
1/1/2011	730,278,733	162,417,257	4.50
1/1/2012	681,930,607	155,893,016	4.37
1/1/2013	702,966,521	157,303,005	4.47
1/1/2014	726,553,301	157,014,537	4.63
1/1/2015	698,523,480	170,845,124	4.09
1/1/2016	636,109,506	179,013,516	3.55
1/1/2017	631,442,613	194,132,739	3.25
1/1/2018	685,801,998	196,277,971	3.49

The table below shows the impact of investment volatility on the contribution rate due to the leverage ratio:

	One Standard Deviation	
	Above 7.75%	Below 7.75%
1. Rate of Return	19.75%	-4.25%
2. Ratio of Assets to Payroll	3.49	3.49
3. Asset Gain/Loss as a Percent of Payroll [(1) - 7.75%] * (2)	42%	-42%
4. Impact on Contribution Rate	-0.65%	0.65%

Note: Based on a standard deviation of returns of 12% in any given year. Impact on contribution rate reflects asset smoothing and 20-year amortization of actuarial loss. Absent favorable experience in subsequent years, additional increases in the contribution rate would occur.



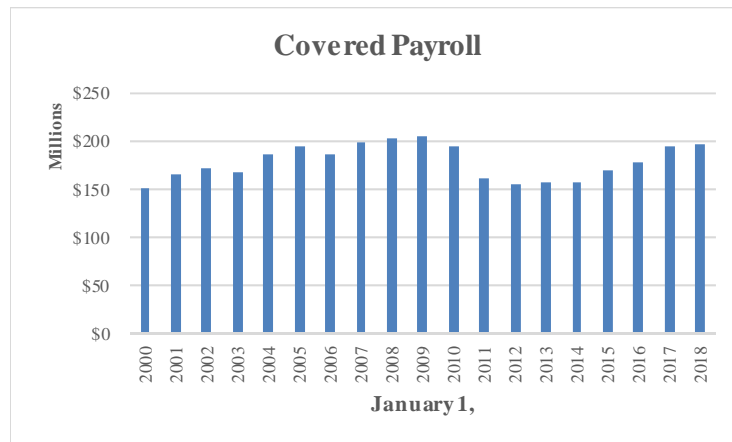
SECTION VII: RISK CONSIDERATIONS

EXHIBIT 16

COVERED PAYROLL VOLATILITY

Member and employer contributions to the System are made based on covered payroll. In addition, the payment on the unfunded actuarial accrued liability is calculated anticipating covered payroll increases each year in the future. To the extent actual payroll does not meet the assumed rate of increase (currently 3%), a higher rate of pay is necessary to collect the same dollar amount of payment on the unfunded actuarial accrued liability. A reduction in the number of active members almost always results in a decline in the dollar amount of covered payroll, as can be seen in the table below. Over the last 20 years, the number of active members has declined significantly which creates challenges for funding the System.

<u>Actuarial Valuation Date</u>	<u>Number of Active Members</u>	<u>Covered Payroll</u>
1/1/2000	4,666	\$151,091,616
1/1/2001	5,012	165,795,367
1/1/2002	5,014	171,523,233
1/1/2003	4,891	168,391,474
1/1/2004	5,090	186,528,530
1/1/2005	5,005	195,866,663
1/1/2006	4,808	187,445,140
1/1/2007	4,757	199,221,110
1/1/2008	4,862	202,311,837
1/1/2009	4,648	205,326,108
1/1/2010	4,336	194,474,437
1/1/2011	3,490	162,417,257
1/1/2012	3,284	155,893,016
1/1/2013	3,396	157,303,005
1/1/2014	3,501	157,014,537
1/1/2015	3,493	170,845,124
1/1/2016	3,574	179,013,516
1/1/2017	3,701	194,132,739
1/1/2018	3,760	196,277,971





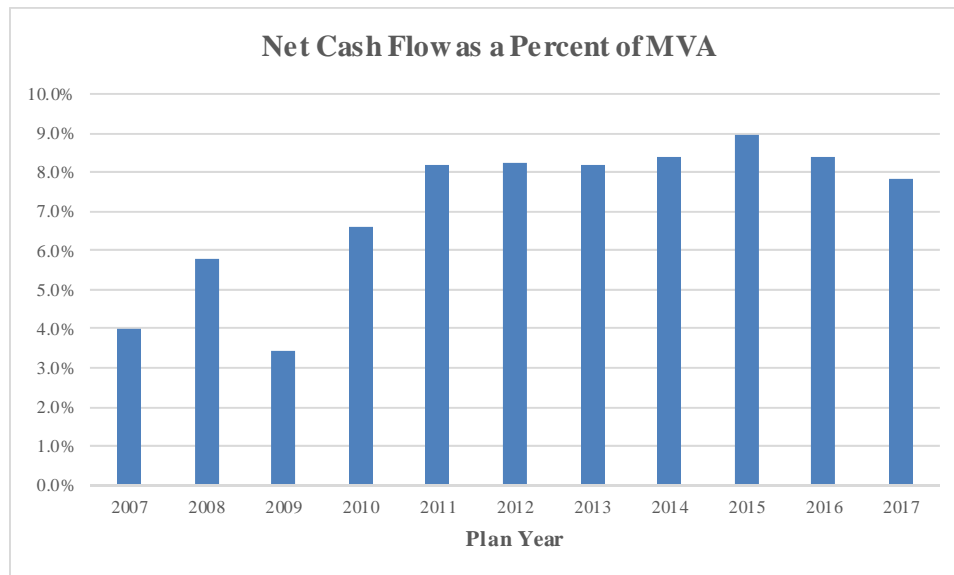
SECTION VII: RISK CONSIDERATIONS

EXHIBIT 17

HISTORICAL CASH FLOWS

It is very common for mature plans to have negative cash flows (benefit payments exceed contributions). This is a key metric because plans with negative cash flow experience increased sensitivity to investment return volatility. If the System has negative cash flows and actual investment experience is below the assumed rate of return, there are fewer assets to be reinvested to earn the higher returns that typically follow periods of low returns. Negative cash flows can also impact the system’s asset allocation and is a consideration in setting the investment policy of the system. The higher the net cash flow is as a percent of the market value of assets, the greater the risk to the system’s funding.

<u>Fiscal Year End</u>	<u>Market Value of Assets (MVA)</u>	<u>Contributions</u>	<u>Benefit Payments and Expenses</u>	<u>Net Cash Flow</u>	<u>Net Cash Flow as a Percent of MVA</u>
12/31/07	\$853,722,741	\$30,420,687	\$64,467,437	(\$34,046,750)	(3.99%)
12/31/08	624,647,065	31,501,230	67,592,066	(36,090,836)	(5.78%)
12/31/09	693,934,794	42,652,068	66,609,290	(23,957,222)	(3.45%)
12/31/10	730,278,733	27,094,752	75,322,662	(48,227,910)	(6.60%)
12/31/11	681,930,607	24,054,927	79,925,242	(55,870,315)	(8.19%)
12/31/12	702,966,521	22,948,176	80,819,536	(57,871,360)	(8.23%)
12/31/13	726,553,301	24,404,265	83,867,077	(59,462,812)	(8.18%)
12/31/14	698,523,480	26,646,322	85,398,587	(58,752,265)	(8.41%)
12/31/15	636,109,506	29,145,161	86,023,247	(56,878,086)	(8.94%)
12/31/16	631,442,613	32,808,515	85,794,815	(52,986,300)	(8.39%)
12/31/17	685,801,998	33,890,913	87,685,754	(53,794,841)	(7.84%)





SECTION VII: RISK CONSIDERATIONS

EXHIBIT 18

LIABILITY MATURITY MEASUREMENTS

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations indicated by an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the baby boomers over the next 10-15 years is expected to further exacerbate the aging of the retirement system population. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread the cost.

The retirement system is also growing larger with respect to the sponsoring entities, as can be seen by the ratio of actuarial liability to payroll.

Projections provide the most effective way of analyzing the impact of these changes on future funding measures, but studying several key metrics from the valuation can also provide some valuable insight.

<u>Fiscal Year End</u>	<u>Retiree Liability</u> (a)	<u>Total Actuarial Liability</u> (b)	<u>Retiree Percentage</u> (a) / (b)	<u>Covered Payroll</u> (c)	<u>Ratio</u> (b) / (c)
12/31/07	\$484,041,632	\$781,284,025	62.0%	\$202,311,837	3.86
12/31/08	477,828,410	804,623,080	59.4%	205,326,108	3.92
12/31/09	498,921,369	819,534,391	60.9%	194,474,437	4.21
12/31/10	580,324,640	844,232,490	68.7%	162,417,257	5.20
12/31/11	622,135,967	874,286,498	71.2%	155,893,016	5.61
12/31/12	620,358,237	868,663,383	71.4%	157,303,005	5.52
12/31/13	621,249,525	875,451,114	71.0%	157,014,537	5.58
12/31/14	645,100,053	891,543,036	72.4%	170,845,124	5.22
12/31/15	648,136,960	895,230,295	72.4%	179,013,516	5.00
12/31/16	684,767,536	981,514,827	69.8%	194,132,739	5.06
12/31/17	704,534,913	980,436,626	71.9%	196,277,971	5.00



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

MEMBER CENSUS INFORMATION

A. ACTIVE MEMBERS	January 1, 2018	January 1, 2017	% Change
1. Number of Active Members			
(a) Plan B	1,852	2,183	(15.2%)
(b) Plan C	1,908	1,518	25.7%
(c) Total	<u>3,760</u>	<u>3,701</u>	1.6%
2. Active Member Averages			
(a) Age	42.8	43.5	(1.6%)
(b) Service	7.5	8.1	(7.4%)
(c) Expected Annual Pay	\$ 52,202	\$ 52,454	(0.5%)
B. TERMINATED VESTED MEMBERS			
1. Number of Terminated Vested Members	522	490	6.5%
2. Terminated Vested Members Averages			
(a) Age	49.8	50.5	(1.4%)
(b) Estimated Monthly Benefit	\$ 678	\$ 671	1.0%
C. TERMINATED NON-VESTED MEMBERS			
1. Number of Terminated Non-Vested Members	2,449	2,298	6.6%
2. Terminated Non-Vested Members Averages			
(a) Age	44.1	44.0	0.2%
(b) Account Balance	\$ 3,610	\$ 3,418	5.6%
D. RETIREES, DISABLED, AND BENEFICIARIES			
1. Number of Members			
(a) Retired	3,809	3,732	2.1%
(b) Disabled	84	89	(5.6%)
(c) Beneficiaries	219	211	3.8%
(e) Total	<u>4,112</u>	<u>4,032</u>	2.0%
2. Average Age			
(a) Retired	72.3	72.2	0.1%
(b) Disabled	67.9	67.1	1.2%
(c) Beneficiaries	74.3	74.6	(0.4%)
(e) Total	<u>72.3</u>	<u>72.2</u>	0.1%
3. Average Monthly Benefit			
(a) Retired	\$ 1,648	\$ 1,630	1.1%
(b) Disabled	1,000	1,002	(0.2%)
(c) Beneficiaries	1,121	1,105	1.4%
(e) Total	<u>\$ 1,607</u>	<u>\$ 1,589</u>	1.1%



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

MEMBER DATA RECONCILIATION

January 1, 2017 to January 1, 2018

The number of members included in the valuation, as summarized in the table below, is in accordance with the data submitted by the System for members as of the valuation date.

	Active Members	Retirees	Beneficiaries*	Disabled	Terminated Vested	Non-vested with Balance	Total
Total as of January 1, 2017	3,701	3,732	211	89	490	2,298	10,521
New Entrants	732	0	19	0	0	67	818
Rehires/Transfers	55	0	0	0	(15)	(40)	0
Retirements	(166)	196	0	0	(30)	0	0
Disablingments	0	0	0	0	0	0	0
Deaths	(6)	(119)	(11)	(5)	(1)	0	(142)
Vested Terminations	(93)	0	0	0	93	0	0
Non-vested Terminations	(252)	0	0	0	0	252	0
Refunds Paid	(210)	0	0	0	(15)	(128)	(353)
Payments Ended	0	0	0	0	0	0	0
Data Adjustments	(1)	0	0	0	0	0	(1)
Total as of January 1, 2018	3,760	3,809	219	84	522	2,449	10,843

* Includes beneficiaries who were owed a single lump sum payment and were not paid prior to the valuation date.



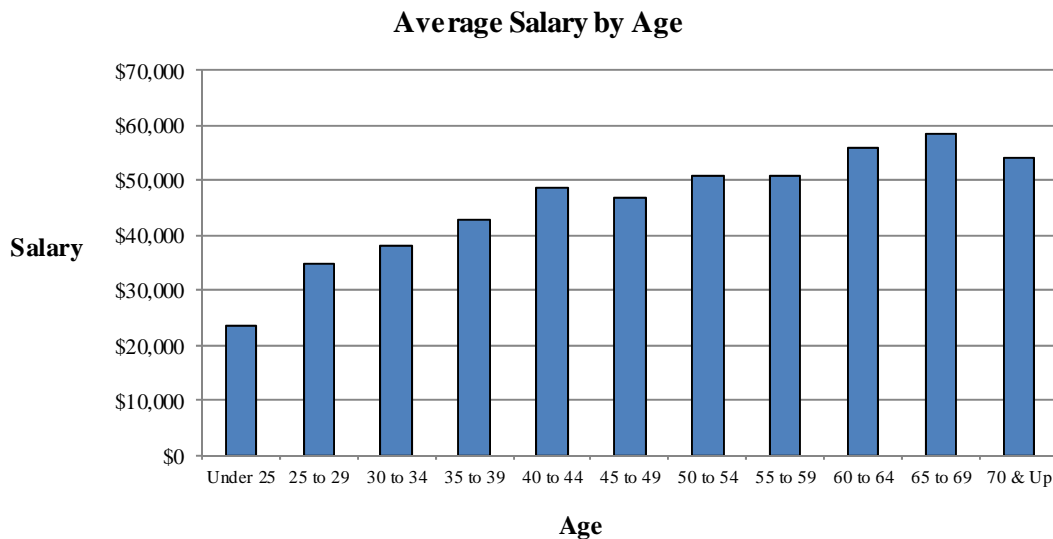
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Total – All Plans

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	47	185	232	\$ 873,958	\$ 4,606,001	\$ 5,479,959
25 to 29	141	460	601	4,714,041	16,154,220	20,868,261
30 to 34	134	328	462	4,845,429	12,705,797	17,551,226
35 to 39	121	335	456	5,769,842	13,789,324	19,559,166
40 to 44	105	270	375	5,570,772	12,682,666	18,253,438
45 to 49	96	279	375	4,621,820	12,919,427	17,541,247
50 to 54	113	285	398	5,718,246	14,469,210	20,187,456
55 to 59	117	294	411	6,194,173	14,590,326	20,784,499
60 to 64	84	235	319	5,072,583	12,688,082	17,760,665
65 to 69	25	79	104	1,756,967	4,332,241	6,089,208
70 & Up	7	20	27	347,669	1,112,098	1,459,767
Total	990	2,770	3,760	\$45,485,500	\$120,049,392	\$165,534,892

* Partial year pay amounts have not been annualized.





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

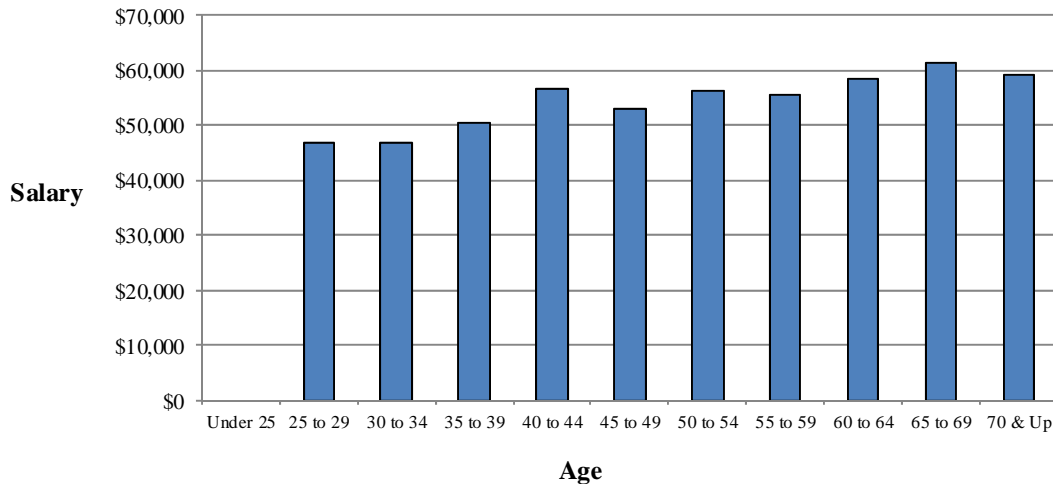
SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Total – Plan B

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	31	101	132	1,493,236	4,658,394	6,151,630
30 to 34	45	104	149	2,033,086	4,951,184	6,984,270
35 to 39	57	174	231	3,422,323	8,227,994	11,650,317
40 to 44	50	141	191	3,084,135	7,691,473	10,775,608
45 to 49	53	158	211	2,919,910	8,213,630	11,133,540
50 to 54	82	193	275	4,581,504	10,863,929	15,445,433
55 to 59	85	217	302	4,991,599	11,791,942	16,783,541
60 to 64	66	185	251	4,212,243	10,445,198	14,657,441
65 to 69	21	67	88	1,548,430	3,832,458	5,380,888
70 & Up	5	17	22	258,521	1,039,623	1,298,144
Total	495	1,357	1,852	\$28,544,987	\$71,715,825	\$100,260,812

* Partial year pay amounts have not been annualized.

Average Salary by Age





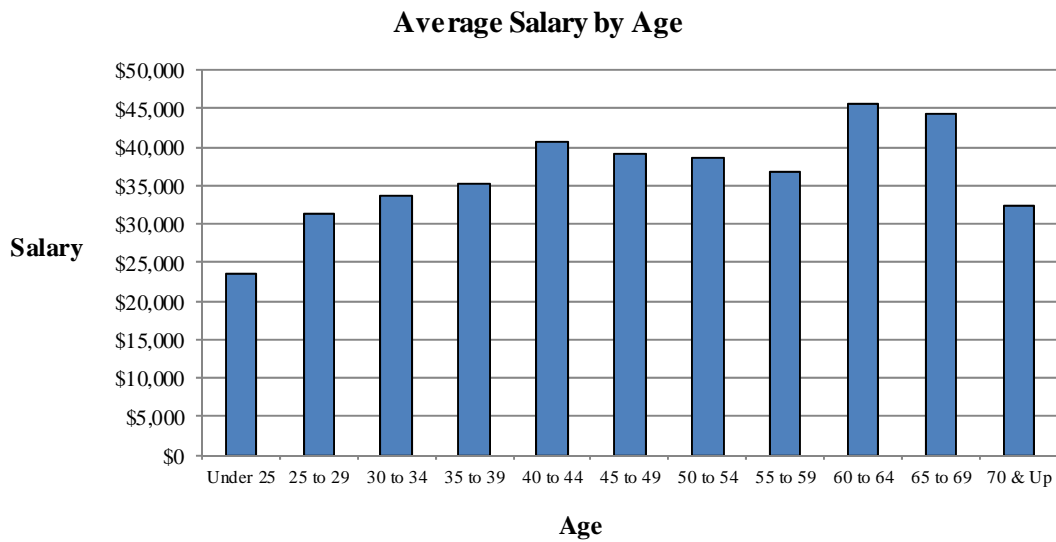
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Total – Plan C

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	47	185	232	\$ 873,958	\$ 4,606,001	\$ 5,479,959
25 to 29	110	359	469	3,220,805	11,495,826	14,716,631
30 to 34	89	224	313	2,812,343	7,754,613	10,566,956
35 to 39	64	161	225	2,347,519	5,561,330	7,908,849
40 to 44	55	129	184	2,486,637	4,991,193	7,477,830
45 to 49	43	121	164	1,701,910	4,705,797	6,407,707
50 to 54	31	92	123	1,136,742	3,605,281	4,742,023
55 to 59	32	77	109	1,202,574	2,798,384	4,000,958
60 to 64	18	50	68	860,340	2,242,884	3,103,224
65 to 69	4	12	16	208,537	499,783	708,320
70 & Up	2	3	5	89,148	72,475	161,623
Total	495	1,413	1,908	\$16,940,513	\$48,333,567	\$65,274,080

* Partial year pay amounts have not been annualized.





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Charter Schools – All Plans

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	29	124	153	\$ 507,322	\$ 3,086,746	\$ 3,594,068
25 to 29	73	286	359	2,571,937	10,332,632	12,904,569
30 to 34	70	191	261	2,671,321	7,946,420	10,617,741
35 to 39	51	159	210	2,523,459	7,198,269	9,721,728
40 to 44	49	118	167	2,442,951	5,542,517	7,985,468
45 to 49	43	94	137	2,143,335	4,325,761	6,469,096
50 to 54	24	66	90	1,335,968	2,964,361	4,300,329
55 to 59	25	50	75	1,453,448	2,184,751	3,638,199
60 to 64	26	46	72	1,560,467	2,344,467	3,904,934
65 to 69	5	19	24	354,962	1,036,404	1,391,366
70 & Up	3	4	7	173,797	254,049	427,846
Total	398	1,157	1,555	\$17,738,967	\$47,216,377	\$64,955,344

* Partial year pay amounts have not been annualized.





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

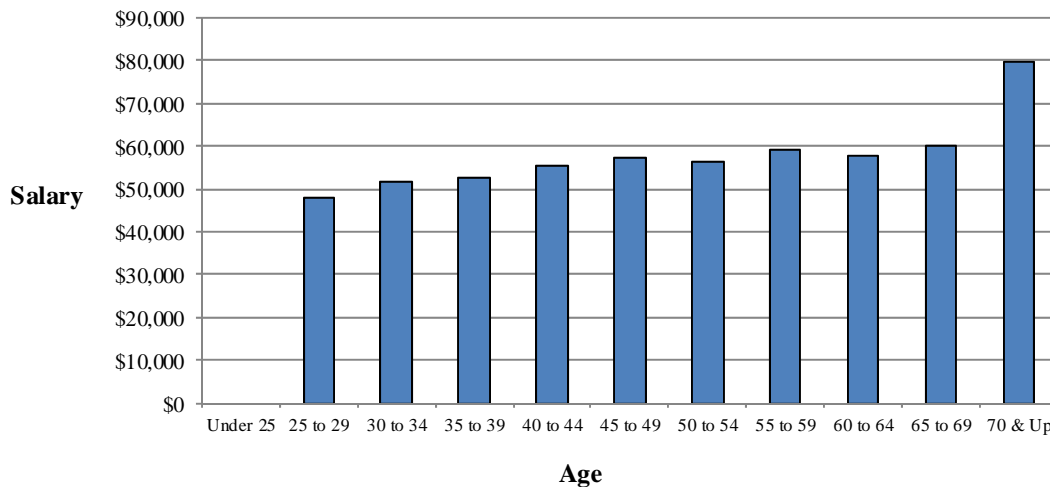
SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Charter Schools – Plan B

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	15	67	82	735,977	3,195,916	3,931,893
30 to 34	24	63	87	1,165,732	3,339,738	4,505,470
35 to 39	19	81	100	1,137,343	4,128,235	5,265,578
40 to 44	24	58	82	1,396,465	3,152,844	4,549,309
45 to 49	24	45	69	1,424,614	2,543,974	3,968,588
50 to 54	13	33	46	890,455	1,703,238	2,593,693
55 to 59	15	23	38	981,172	1,266,048	2,247,220
60 to 64	16	32	48	990,350	1,783,532	2,773,882
65 to 69	3	10	13	176,938	601,559	778,497
70 & Up	1	3	4	84,649	234,686	319,335
Total	154	415	569	\$8,983,695	\$21,949,770	\$30,933,465

* Partial year pay amounts have not been annualized.

Average Salary by Age





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Charter Schools – Plan C

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	29	124	153	\$ 507,322	\$ 3,086,746	\$ 3,594,068
25 to 29	58	219	277	1,835,960	7,136,716	8,972,676
30 to 34	46	128	174	1,505,589	4,606,682	6,112,271
35 to 39	32	78	110	1,386,116	3,070,034	4,456,150
40 to 44	25	60	85	1,046,486	2,389,673	3,436,159
45 to 49	19	49	68	718,721	1,781,787	2,500,508
50 to 54	11	33	44	445,513	1,261,123	1,706,636
55 to 59	10	27	37	472,276	918,703	1,390,979
60 to 64	10	14	24	570,117	560,935	1,131,052
65 to 69	2	9	11	178,024	434,845	612,869
70 & Up	2	1	3	89,148	19,363	108,511
Total	244	742	986	\$8,755,272	\$25,266,607	\$34,021,879

* Partial year pay amounts have not been annualized.





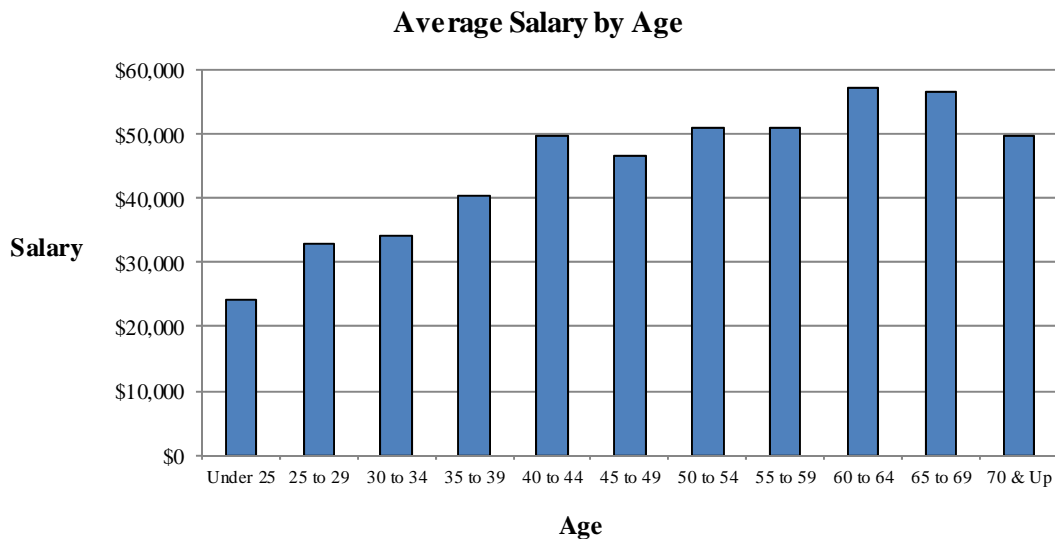
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

School District & Retirement System – All Plans

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	17	59	76	\$ 332,077	\$ 1,494,180	\$ 1,826,257
25 to 29	64	171	235	2,023,503	5,718,678	7,742,181
30 to 34	59	123	182	1,971,730	4,239,790	6,211,520
35 to 39	66	165	231	3,144,343	6,181,677	9,326,020
40 to 44	48	143	191	2,780,131	6,710,367	9,490,498
45 to 49	47	171	218	2,189,949	7,950,699	10,140,648
50 to 54	86	210	296	4,187,367	10,871,893	15,059,260
55 to 59	82	232	314	4,263,142	11,756,949	16,020,091
60 to 64	50	181	231	3,157,427	10,026,594	13,184,021
65 to 69	17	57	74	1,103,916	3,087,719	4,191,635
70 & Up	4	13	17	173,872	672,399	846,271
Total	540	1,525	2,065	\$25,327,457	\$68,710,945	\$94,038,402

* Partial year pay amounts have not been annualized.





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

School District & Retirement System – Plan B

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	15	34	49	718,968	1,462,478	2,181,446
30 to 34	20	39	59	819,539	1,531,856	2,351,395
35 to 39	36	87	123	2,188,617	3,858,517	6,047,134
40 to 44	20	78	98	1,366,939	4,263,678	5,630,617
45 to 49	24	105	129	1,249,538	5,277,556	6,527,094
50 to 54	66	154	220	3,496,138	8,729,572	12,225,710
55 to 59	60	182	242	3,532,844	9,877,268	13,410,112
60 to 64	43	146	189	2,898,257	8,369,764	11,268,021
65 to 69	15	54	69	1,073,403	3,022,781	4,096,184
70 & Up	4	11	15	173,872	619,287	793,159
Total	303	890	1,193	\$17,518,115	\$47,012,757	\$64,530,872

* Partial year pay amounts have not been annualized.





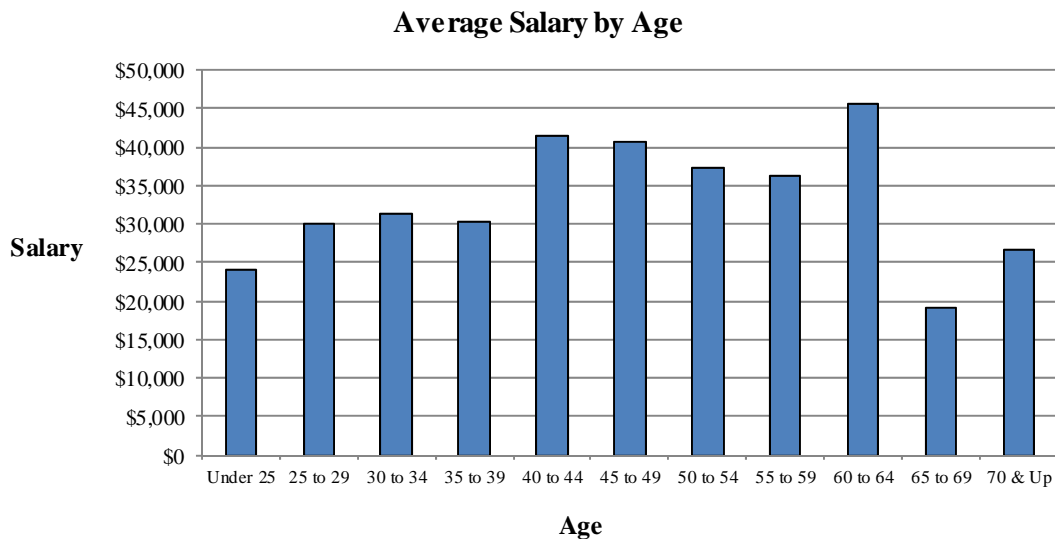
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

School District & Retirement System – Plan C

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	17	59	76	\$ 332,077	\$ 1,494,180	\$ 1,826,257
25 to 29	49	137	186	1,304,535	4,256,200	5,560,735
30 to 34	39	84	123	1,152,191	2,707,934	3,860,125
35 to 39	30	78	108	955,726	2,323,160	3,278,886
40 to 44	28	65	93	1,413,192	2,446,689	3,859,881
45 to 49	23	66	89	940,411	2,673,143	3,613,554
50 to 54	20	56	76	691,229	2,142,321	2,833,550
55 to 59	22	50	72	730,298	1,879,681	2,609,979
60 to 64	7	35	42	259,170	1,656,830	1,916,000
65 to 69	2	3	5	30,513	64,938	95,451
70 & Up	0	2	2	0	53,112	53,112
Total	237	635	872	\$7,809,342	\$21,698,188	\$29,507,530

* Partial year pay amounts have not been annualized.





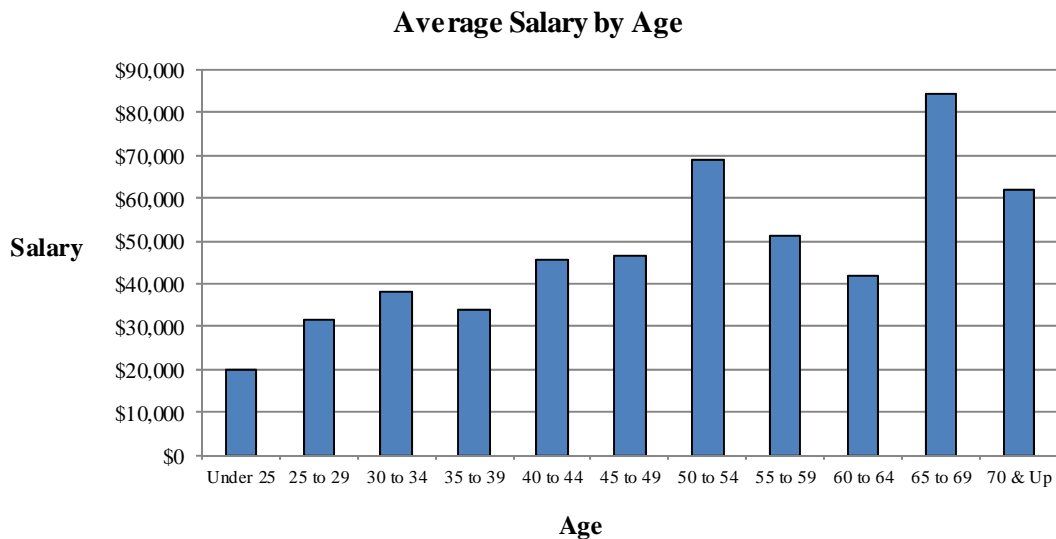
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Library – All Plans

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	1	2	3	\$ 34,559	\$ 25,075	\$ 59,634
25 to 29	4	3	7	118,601	102,910	221,511
30 to 34	5	14	19	202,378	519,587	721,965
35 to 39	4	11	15	102,040	409,378	511,418
40 to 44	8	9	17	347,690	429,782	777,472
45 to 49	6	14	20	288,536	642,967	931,503
50 to 54	3	9	12	194,911	632,956	827,867
55 to 59	10	12	22	477,583	648,626	1,126,209
60 to 64	8	8	16	354,689	317,021	671,710
65 to 69	3	3	6	298,089	208,118	506,207
70 & Up	0	3	3	0	185,650	185,650
Total	52	88	140	\$2,419,076	\$4,122,070	\$6,541,146

* Partial year pay amounts have not been annualized.





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Library – Plan B

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	1	0	1	38,291	0	38,291
30 to 34	1	2	3	47,815	79,590	127,405
35 to 39	2	6	8	96,363	241,242	337,605
40 to 44	6	5	11	320,731	274,951	595,682
45 to 49	5	8	13	245,758	392,100	637,858
50 to 54	3	6	9	194,911	431,119	626,030
55 to 59	10	12	22	477,583	648,626	1,126,209
60 to 64	7	7	14	323,636	291,902	615,538
65 to 69	3	3	6	298,089	208,118	506,207
70 & Up	0	3	3	0	185,650	185,650
Total	38	52	90	\$2,043,177	\$2,753,298	\$4,796,475

* Partial year pay amounts have not been annualized.





APPENDIX A: SUMMARY OF MEMBERSHIP DATA

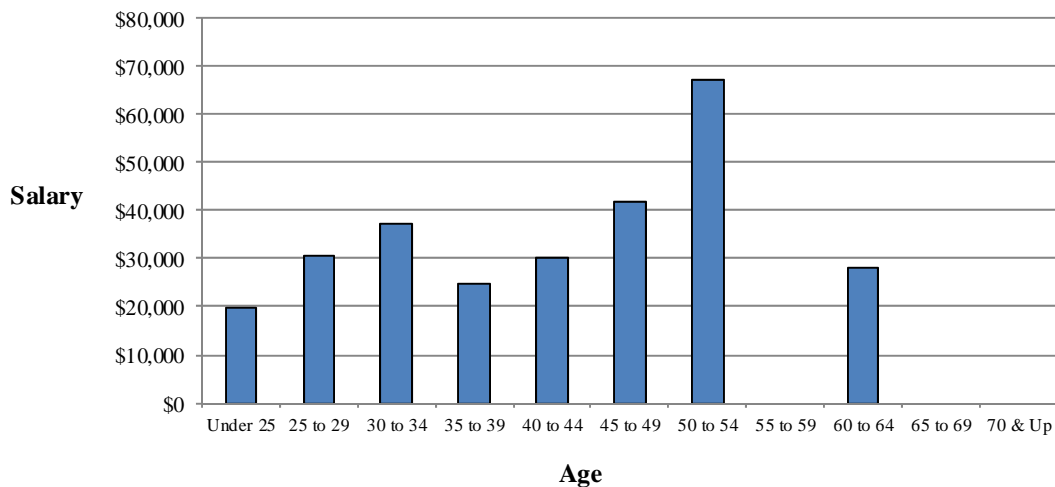
SUMMARY OF ACTIVE MEMBERS
as of January 1, 2018

Library – Plan C

Age	Number			2017 Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	1	2	3	\$ 34,559	\$ 25,075	\$ 59,634
25 to 29	3	3	6	80,310	102,910	183,220
30 to 34	4	12	16	154,563	439,997	594,560
35 to 39	2	5	7	5,677	168,136	173,813
40 to 44	2	4	6	26,959	154,831	181,790
45 to 49	1	6	7	42,778	250,867	293,645
50 to 54	0	3	3	0	201,837	201,837
55 to 59	0	0	0	0	0	0
60 to 64	1	1	2	31,053	25,119	56,172
65 to 69	0	0	0	0	0	0
70 & Up	0	0	0	0	0	0
Total	14	36	50	\$ 375,899	\$1,368,772	\$1,744,671

* Partial year pay amounts have not been annualized.

Average Salary by Age





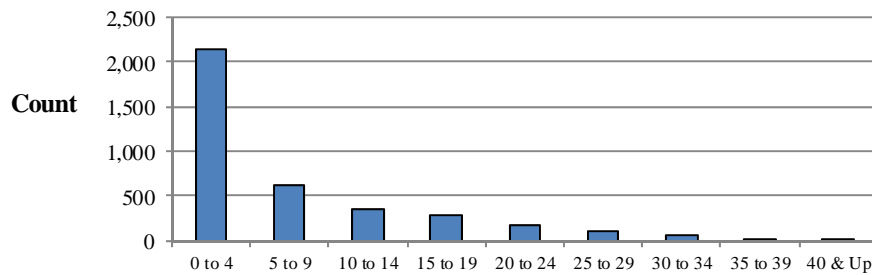
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

**DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018**

Total – All Plans

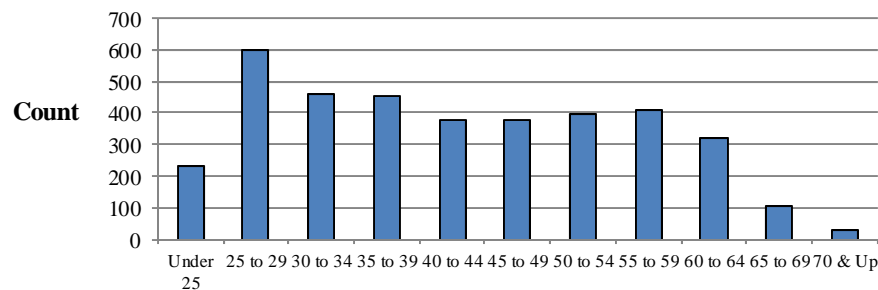
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	232	0	0	0	0	0	0	0	0	232
25 to 29	539	62	0	0	0	0	0	0	0	601
30 to 34	346	106	10	0	0	0	0	0	0	462
35 to 39	257	111	67	21	0	0	0	0	0	456
40 to 44	205	72	41	48	9	0	0	0	0	375
45 to 49	181	71	43	41	33	6	0	0	0	375
50 to 54	133	65	53	58	44	36	9	0	0	398
55 to 59	127	64	64	45	47	31	30	3	0	411
60 to 64	87	59	49	53	21	24	14	8	4	319
65 to 69	19	18	19	17	11	9	4	3	4	104
70 & Up	7	2	5	4	2	1	1	1	4	27
Total	2,133	630	351	287	167	107	58	15	12	3,760

Service Distribution



Service

Age Distribution



Age



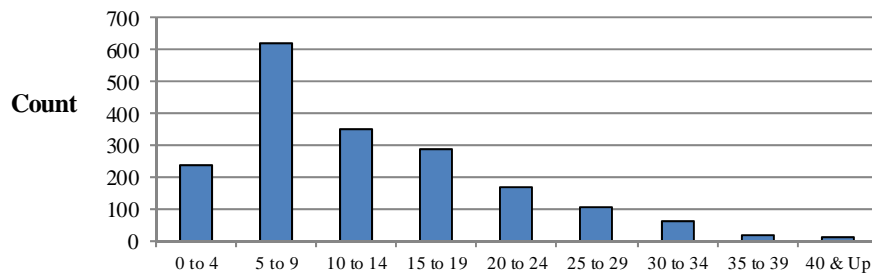
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

**DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018**

Total – Plan B

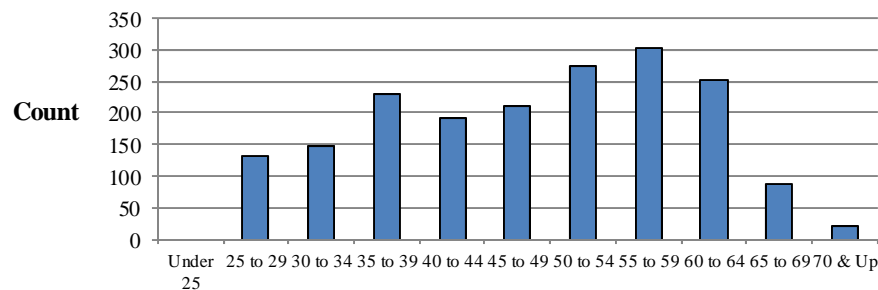
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	0	0	0	0	0	0	0	0	0	0
25 to 29	72	60	0	0	0	0	0	0	0	132
30 to 34	38	101	10	0	0	0	0	0	0	149
35 to 39	32	111	67	21	0	0	0	0	0	231
40 to 44	22	71	41	48	9	0	0	0	0	191
45 to 49	18	70	43	41	33	6	0	0	0	211
50 to 54	11	64	53	58	44	36	9	0	0	275
55 to 59	20	62	64	45	47	31	30	3	0	302
60 to 64	20	58	49	53	21	24	14	8	4	251
65 to 69	3	18	19	17	11	9	4	3	4	88
70 & Up	2	2	5	4	2	1	1	1	4	22
Total	238	617	351	287	167	107	58	15	12	1,852

Service Distribution



Service

Age Distribution



Age



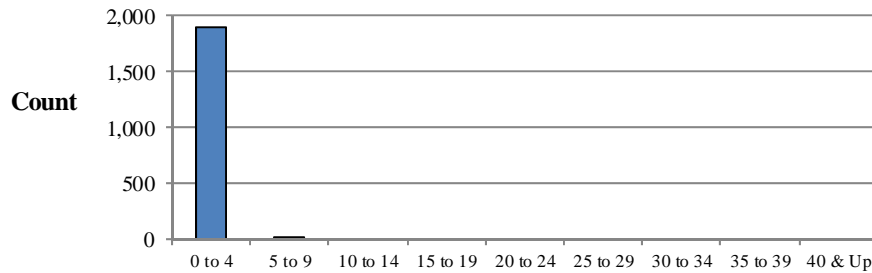
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

**DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018**

Total – Plan C

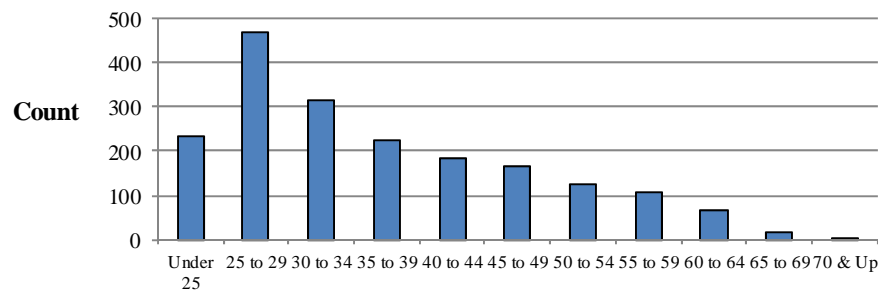
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	232	0	0	0	0	0	0	0	0	232
25 to 29	467	2	0	0	0	0	0	0	0	469
30 to 34	308	5	0	0	0	0	0	0	0	313
35 to 39	225	0	0	0	0	0	0	0	0	225
40 to 44	183	1	0	0	0	0	0	0	0	184
45 to 49	163	1	0	0	0	0	0	0	0	164
50 to 54	122	1	0	0	0	0	0	0	0	123
55 to 59	107	2	0	0	0	0	0	0	0	109
60 to 64	67	1	0	0	0	0	0	0	0	68
65 to 69	16	0	0	0	0	0	0	0	0	16
70 & Up	5	0	0	0	0	0	0	0	0	5
Total	1,895	13	0	0	0	0	0	0	0	1,908

Service Distribution



Service

Age Distribution



Age



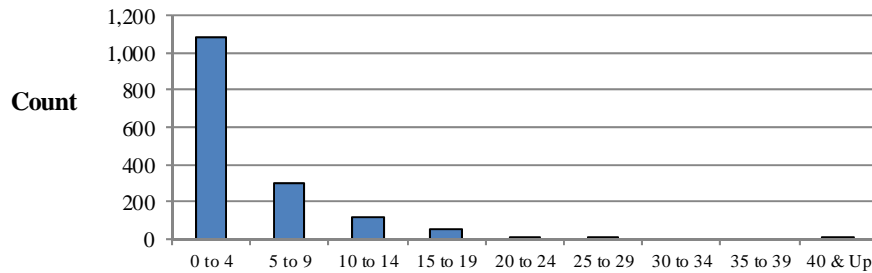
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

Charter Schools – All Plans

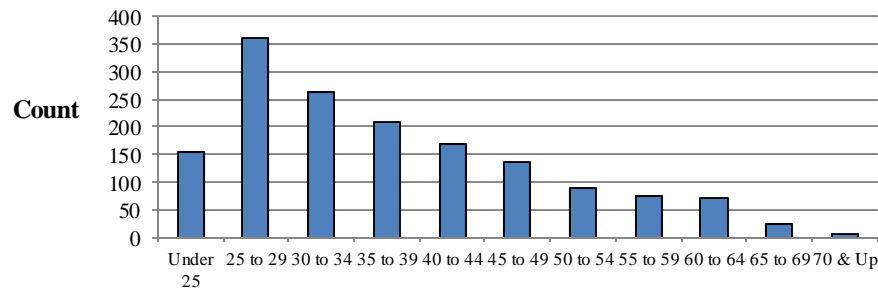
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	153	0	0	0	0	0	0	0	0	153
25 to 29	313	46	0	0	0	0	0	0	0	359
30 to 34	191	64	6	0	0	0	0	0	0	261
35 to 39	124	56	25	5	0	0	0	0	0	210
40 to 44	96	36	19	15	1	0	0	0	0	167
45 to 49	76	32	15	12	1	1	0	0	0	137
50 to 54	44	19	19	7	1	0	0	0	0	90
55 to 59	41	21	9	3	0	1	0	0	0	75
60 to 64	31	15	15	7	3	1	0	0	0	72
65 to 69	11	3	4	5	0	0	0	0	1	24
70 & Up	5	1	1	0	0	0	0	0	0	7
Total	1,085	293	113	54	6	3	0	0	1	1,555

Service Distribution



Service

Age Distribution



Age



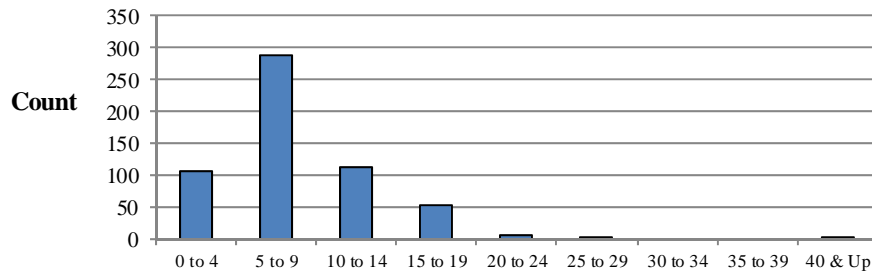
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

Charter Schools – Plan B

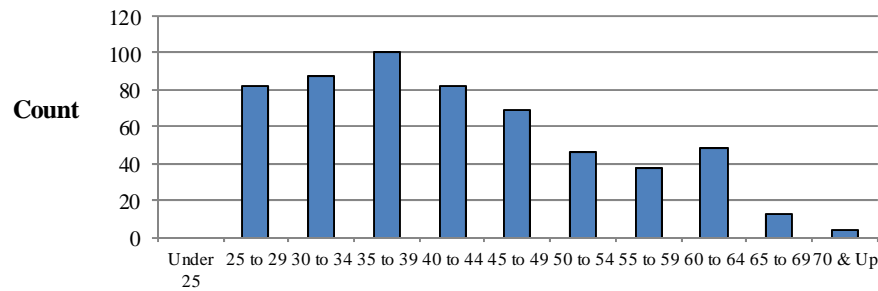
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	0	0	0	0	0	0	0	0	0	0
25 to 29	38	44	0	0	0	0	0	0	0	82
30 to 34	21	60	6	0	0	0	0	0	0	87
35 to 39	14	56	25	5	0	0	0	0	0	100
40 to 44	11	36	19	15	1	0	0	0	0	82
45 to 49	8	32	15	12	1	1	0	0	0	69
50 to 54	0	19	19	7	1	0	0	0	0	46
55 to 59	5	20	9	3	0	1	0	0	0	38
60 to 64	7	15	15	7	3	1	0	0	0	48
65 to 69	0	3	4	5	0	0	0	0	1	13
70 & Up	2	1	1	0	0	0	0	0	0	4
Total	106	286	113	54	6	3	0	0	1	569

Service Distribution



Service

Age Distribution



Age



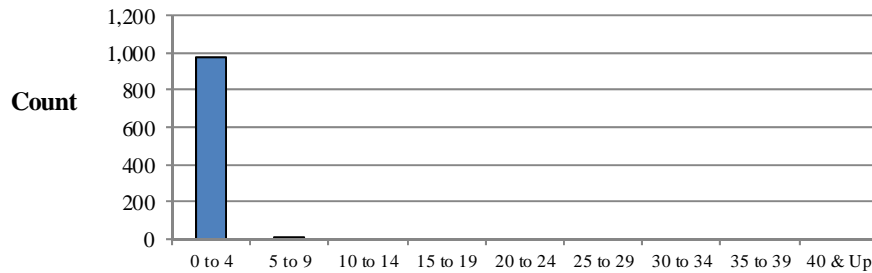
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

Charter Schools – Plan C

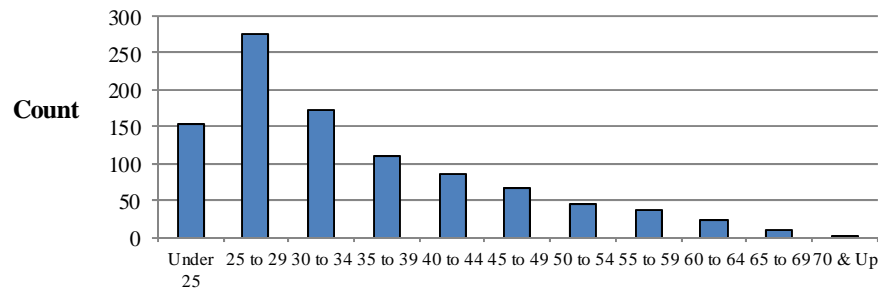
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	153	0	0	0	0	0	0	0	0	153
25 to 29	275	2	0	0	0	0	0	0	0	277
30 to 34	170	4	0	0	0	0	0	0	0	174
35 to 39	110	0	0	0	0	0	0	0	0	110
40 to 44	85	0	0	0	0	0	0	0	0	85
45 to 49	68	0	0	0	0	0	0	0	0	68
50 to 54	44	0	0	0	0	0	0	0	0	44
55 to 59	36	1	0	0	0	0	0	0	0	37
60 to 64	24	0	0	0	0	0	0	0	0	24
65 to 69	11	0	0	0	0	0	0	0	0	11
70 & Up	3	0	0	0	0	0	0	0	0	3
Total	979	7	0	0	0	0	0	0	0	986

Service Distribution



Service

Age Distribution



Age



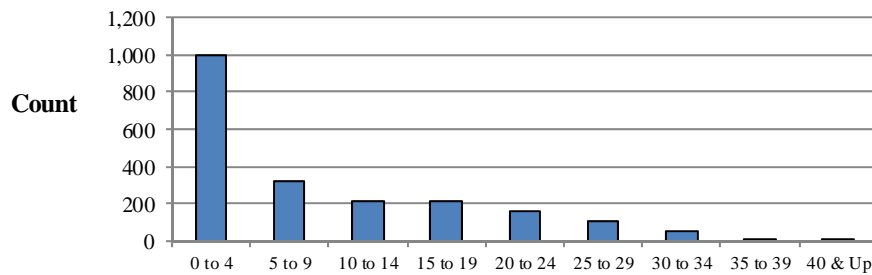
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

School District & Retirement System – All Plans

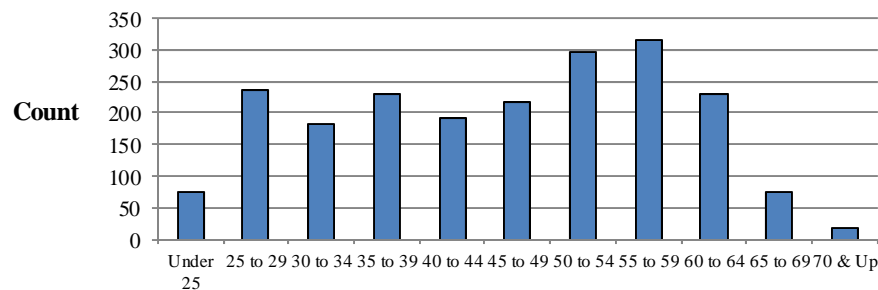
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	76	0	0	0	0	0	0	0	0	76
25 to 29	219	16	0	0	0	0	0	0	0	235
30 to 34	139	39	4	0	0	0	0	0	0	182
35 to 39	125	51	39	16	0	0	0	0	0	231
40 to 44	102	31	19	31	8	0	0	0	0	191
45 to 49	97	34	25	25	32	5	0	0	0	218
50 to 54	86	45	29	50	42	35	9	0	0	296
55 to 59	86	40	48	40	41	30	28	1	0	314
60 to 64	53	43	29	41	18	21	14	8	4	231
65 to 69	8	15	14	9	11	8	4	3	2	74
70 & Up	2	1	4	4	2	1	1	0	2	17
Total	993	315	211	216	154	100	56	12	8	2,065

Service Distribution



Service

Age Distribution



Age



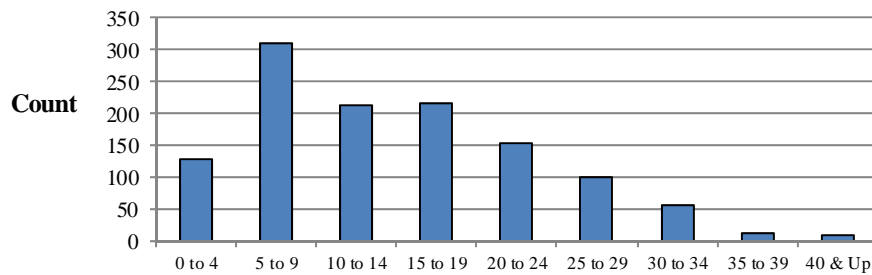
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

**DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018**

School District & Retirement System – Plan B

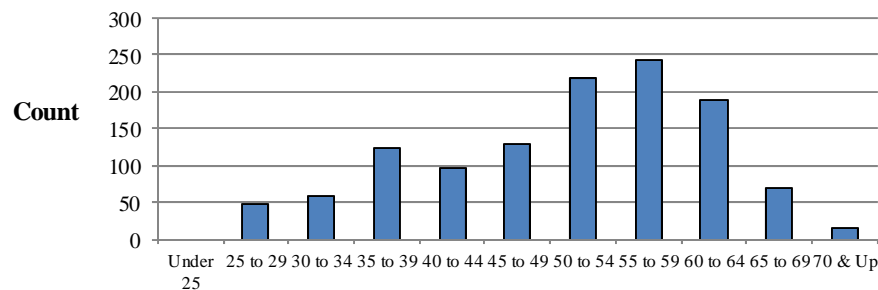
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	0	0	0	0	0	0	0	0	0	0
25 to 29	33	16	0	0	0	0	0	0	0	49
30 to 34	17	38	4	0	0	0	0	0	0	59
35 to 39	17	51	39	16	0	0	0	0	0	123
40 to 44	10	30	19	31	8	0	0	0	0	98
45 to 49	9	33	25	25	32	5	0	0	0	129
50 to 54	11	44	29	50	42	35	9	0	0	220
55 to 59	15	39	48	40	41	30	28	1	0	242
60 to 64	12	42	29	41	18	21	14	8	4	189
65 to 69	3	15	14	9	11	8	4	3	2	69
70 & Up	0	1	4	4	2	1	1	0	2	15
Total	127	309	211	216	154	100	56	12	8	1,193

Service Distribution



Service

Age Distribution



Age



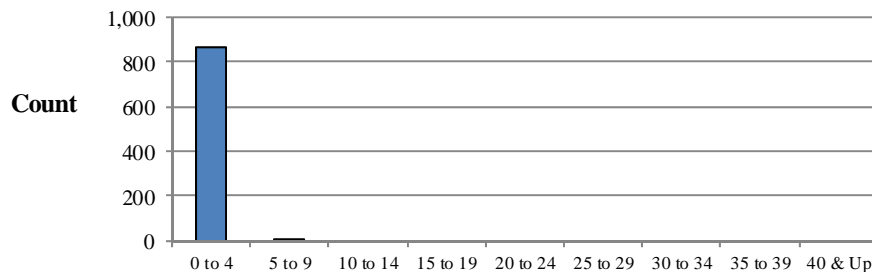
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

School District & Retirement System – Plan C

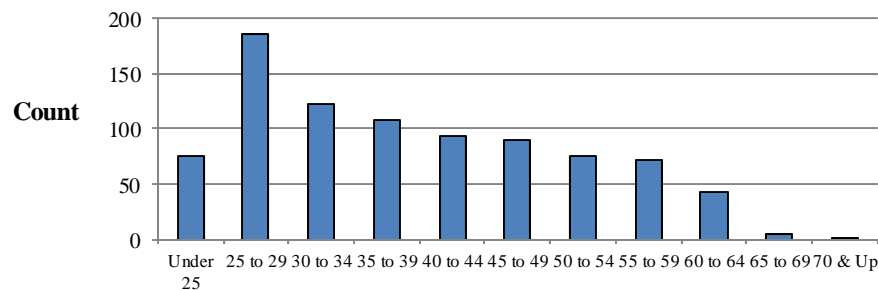
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	76	0	0	0	0	0	0	0	0	76
25 to 29	186	0	0	0	0	0	0	0	0	186
30 to 34	122	1	0	0	0	0	0	0	0	123
35 to 39	108	0	0	0	0	0	0	0	0	108
40 to 44	92	1	0	0	0	0	0	0	0	93
45 to 49	88	1	0	0	0	0	0	0	0	89
50 to 54	75	1	0	0	0	0	0	0	0	76
55 to 59	71	1	0	0	0	0	0	0	0	72
60 to 64	41	1	0	0	0	0	0	0	0	42
65 to 69	5	0	0	0	0	0	0	0	0	5
70 & Up	2	0	0	0	0	0	0	0	0	2
Total	866	6	0	0	0	0	0	0	0	872

Service Distribution



Service

Age Distribution



Age



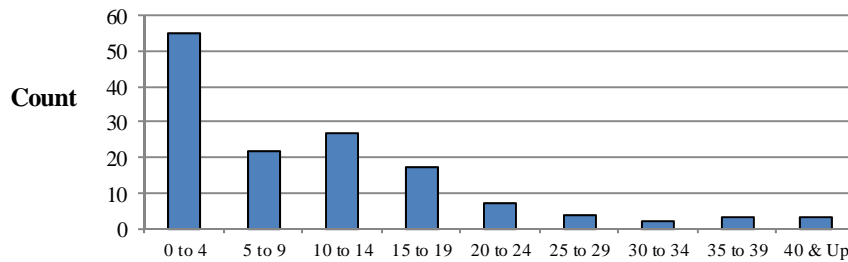
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

Library – All Plans

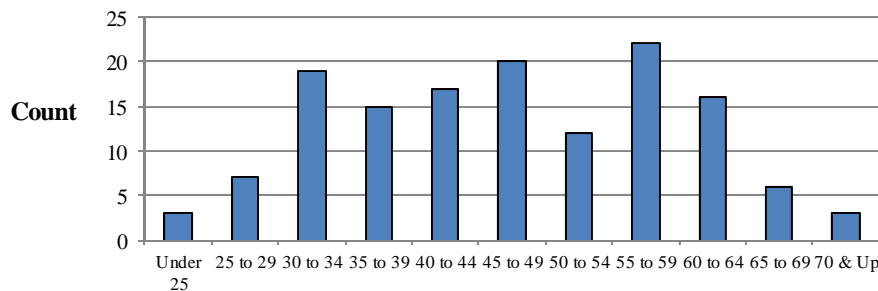
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	3	0	0	0	0	0	0	0	0	3
25 to 29	7	0	0	0	0	0	0	0	0	7
30 to 34	16	3	0	0	0	0	0	0	0	19
35 to 39	8	4	3	0	0	0	0	0	0	15
40 to 44	7	5	3	2	0	0	0	0	0	17
45 to 49	8	5	3	4	0	0	0	0	0	20
50 to 54	3	1	5	1	1	1	0	0	0	12
55 to 59	0	3	7	2	6	0	2	2	0	22
60 to 64	3	1	5	5	0	2	0	0	0	16
65 to 69	0	0	1	3	0	1	0	0	1	6
70 & Up	0	0	0	0	0	0	0	1	2	3
Total	55	22	27	17	7	4	2	3	3	140

Service Distribution



Service

Age Distribution



Age



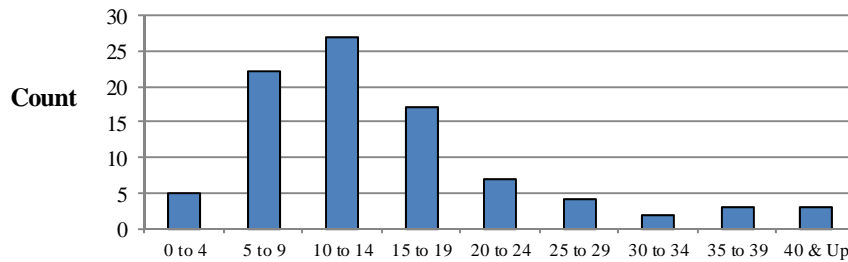
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

Library – Plan B

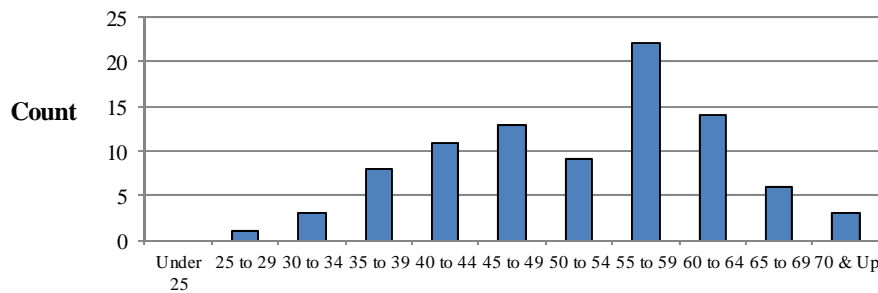
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	0	0	0	0	0	0	0	0	0	0
25 to 29	1	0	0	0	0	0	0	0	0	1
30 to 34	0	3	0	0	0	0	0	0	0	3
35 to 39	1	4	3	0	0	0	0	0	0	8
40 to 44	1	5	3	2	0	0	0	0	0	11
45 to 49	1	5	3	4	0	0	0	0	0	13
50 to 54	0	1	5	1	1	1	0	0	0	9
55 to 59	0	3	7	2	6	0	2	2	0	22
60 to 64	1	1	5	5	0	2	0	0	0	14
65 to 69	0	0	1	3	0	1	0	0	1	6
70 & Up	0	0	0	0	0	0	0	1	2	3
Total	5	22	27	17	7	4	2	3	3	90

Service Distribution



Service

Age Distribution



Age



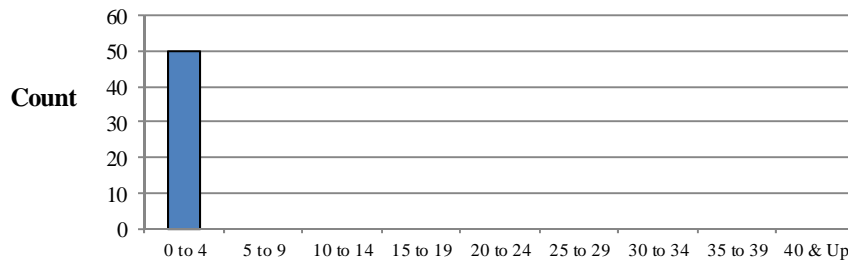
APPENDIX A: SUMMARY OF MEMBERSHIP DATA

DISTRIBUTION OF ACTIVE MEMBERS
as of January 1, 2018

Library – Plan C

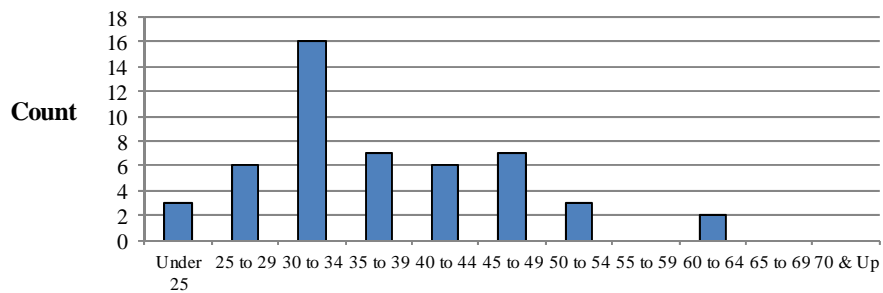
Age	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	3	0	0	0	0	0	0	0	0	3
25 to 29	6	0	0	0	0	0	0	0	0	6
30 to 34	16	0	0	0	0	0	0	0	0	16
35 to 39	7	0	0	0	0	0	0	0	0	7
40 to 44	6	0	0	0	0	0	0	0	0	6
45 to 49	7	0	0	0	0	0	0	0	0	7
50 to 54	3	0	0	0	0	0	0	0	0	3
55 to 59	0	0	0	0	0	0	0	0	0	0
60 to 64	2	0	0	0	0	0	0	0	0	2
65 to 69	0	0	0	0	0	0	0	0	0	0
70 & Up	0	0	0	0	0	0	0	0	0	0
Total	50	0	0	0	0	0	0	0	0	50

Service Distribution



Service

Age Distribution



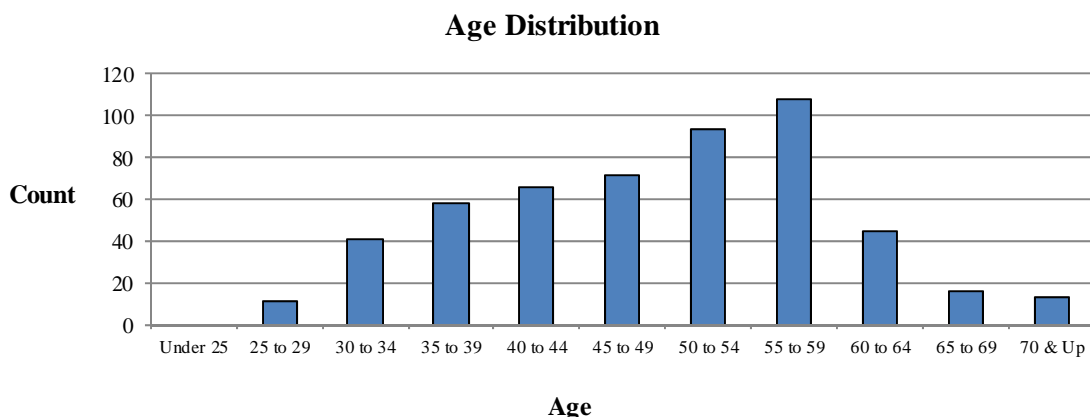
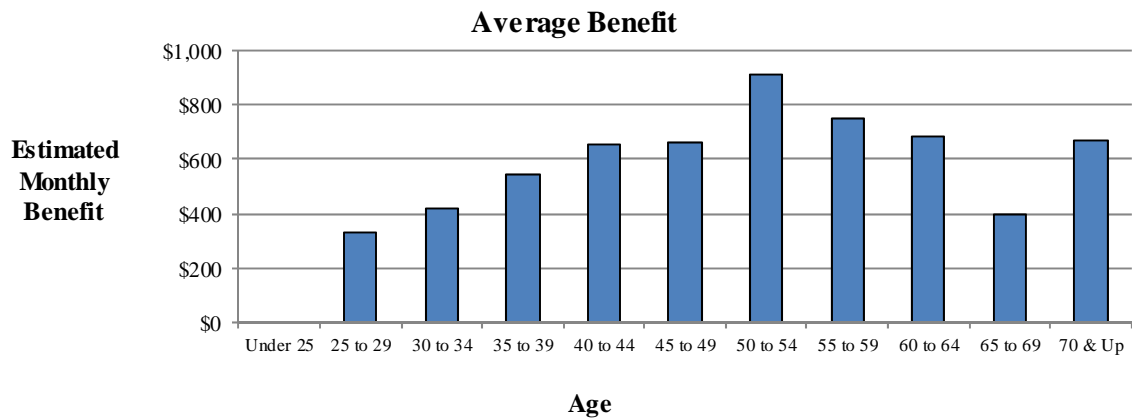
Age



APPENDIX A: SUMMARY OF MEMBERSHIP DATA

**SUMMARY OF TERMINATED VESTED MEMBERS
as of January 1, 2018**

Age	Number			Estimated Monthly Benefit		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	3	8	11	862	2,800	3,662
30 to 34	9	32	41	4,206	13,040	17,246
35 to 39	20	38	58	10,361	21,183	31,544
40 to 44	16	50	66	11,692	31,632	43,324
45 to 49	18	53	71	10,253	36,773	47,026
50 to 54	34	59	93	34,810	49,740	84,550
55 to 59	36	72	108	28,910	51,674	80,584
60 to 64	9	36	45	4,052	26,661	30,713
65 to 69	4	12	16	1,374	4,985	6,359
70 & Up	7	6	13	6,906	1,822	8,728
Total	156	366	522	\$113,426	\$240,310	\$353,736

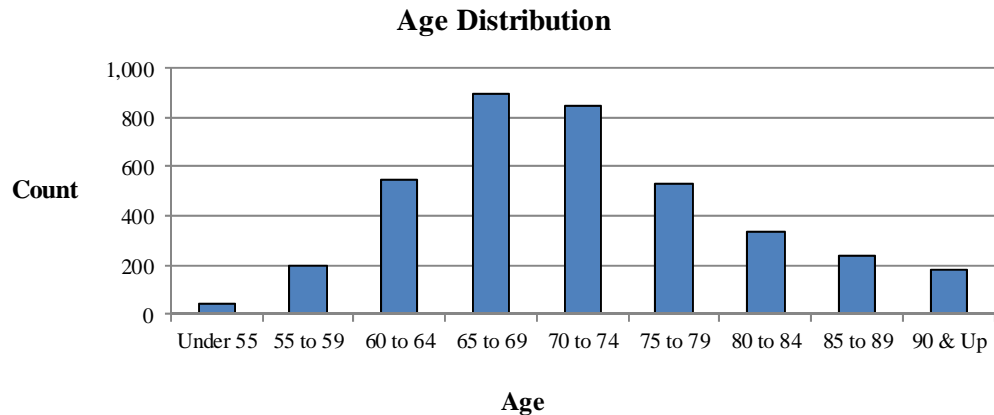
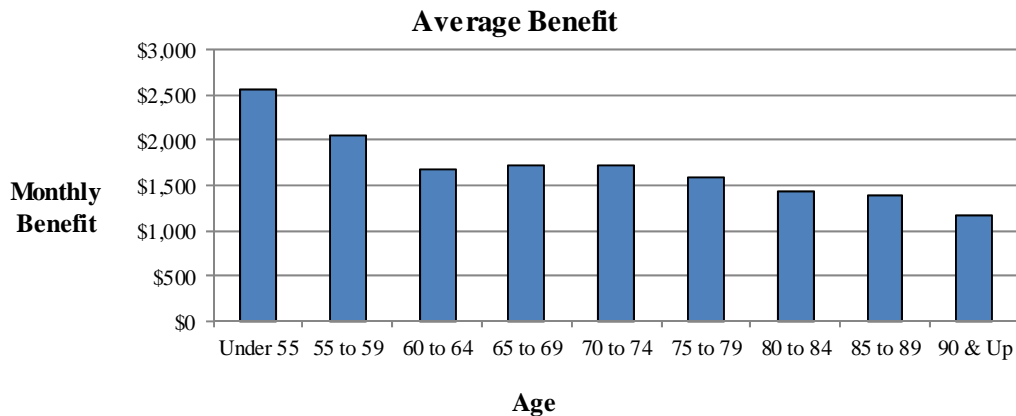




APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF RETIRED MEMBERS
as of January 1, 2018

Age	Number			Monthly Benefit		
	Male	Female	Total	Male	Female	Total
Under 55	12	30	42	\$ 28,208	\$ 78,904	\$ 107,112
55 to 59	61	137	198	121,015	286,903	407,918
60 to 64	145	400	545	214,776	697,737	912,513
65 to 69	226	672	898	345,355	1,196,371	1,541,726
70 to 74	209	634	843	318,911	1,130,601	1,449,512
75 to 79	142	391	533	220,322	621,512	841,834
80 to 84	89	247	336	150,914	328,064	478,978
85 to 89	48	187	235	77,909	251,529	329,438
90 & Up	35	144	179	47,615	161,951	209,566
Total	967	2,842	3,809	\$ 1,525,025	\$ 4,753,572	\$ 6,278,597



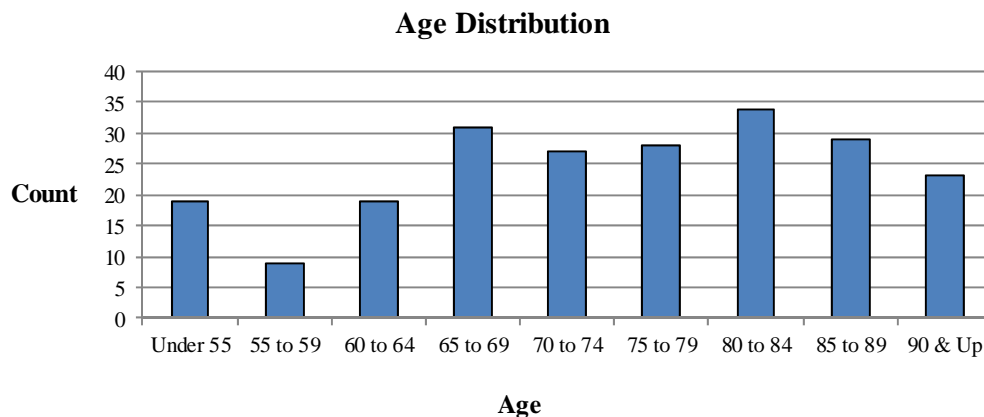
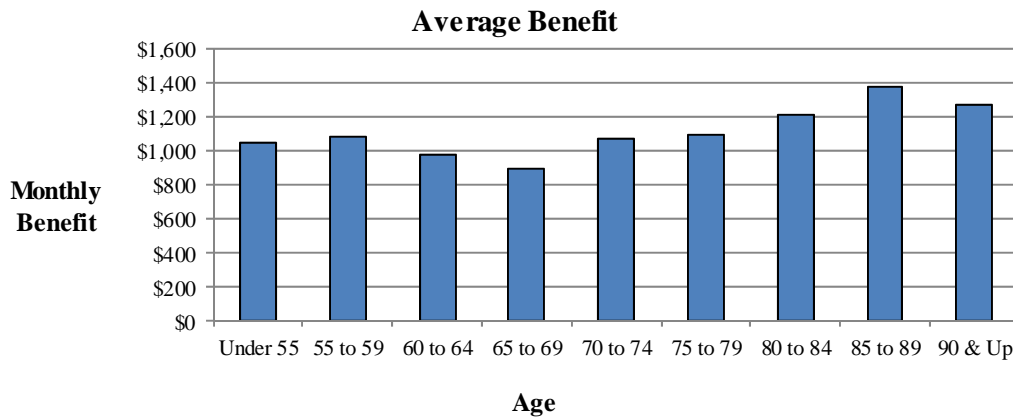


APPENDIX A: SUMMARY OF MEMBERSHIP DATA

SUMMARY OF BENEFICIARIES*
as of January 1, 2018

Age	Number			Monthly Benefit		
	Male	Female	Total	Male	Female	Total
Under 55	9	10	19	\$ 8,257	\$ 11,602	\$ 19,859
55 to 59	6	3	9	7,862	1,873	9,735
60 to 64	18	1	19	18,534	0	18,534
65 to 69	25	6	31	20,414	7,369	27,783
70 to 74	14	13	27	17,689	11,114	28,803
75 to 79	23	5	28	24,875	5,602	30,477
80 to 84	27	7	34	33,005	8,322	41,327
85 to 89	23	6	29	31,555	8,217	39,772
90 & Up	21	2	23	27,156	2,025	29,181
Total	166	53	219	\$ 189,347	\$ 56,124	\$ 245,471

* Includes beneficiaries who were owed a single lump sum payment and were not paid prior to the valuation date.



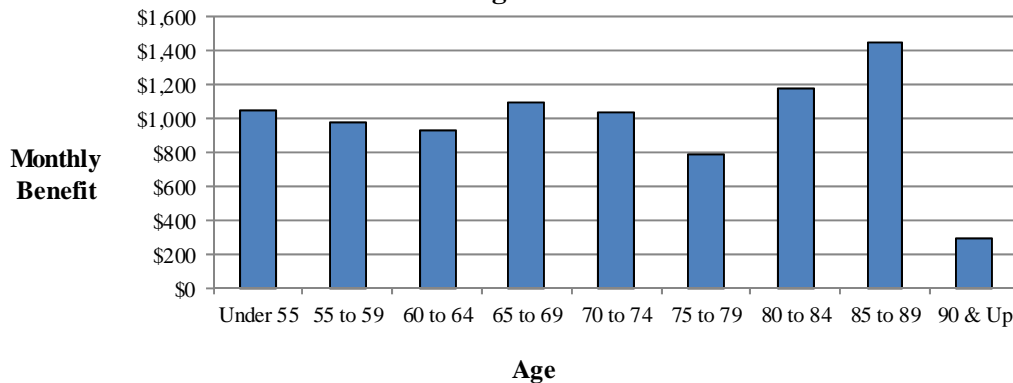


APPENDIX A: SUMMARY OF MEMBERSHIP DATA

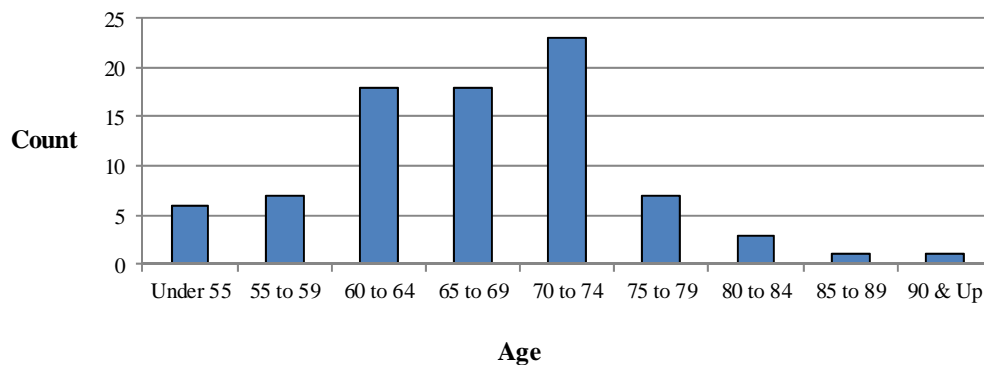
SUMMARY OF DISABLED MEMBERS
as of January 1, 2018

Age	Number			Monthly Benefit		
	Male	Female	Total	Male	Female	Total
Under 55	3	3	6	\$ 2,849	\$ 3,466	\$ 6,315
55 to 59	1	6	7	859	5,958	6,817
60 to 64	5	13	18	3,753	12,929	16,682
65 to 69	4	14	18	4,856	14,782	19,638
70 to 74	7	16	23	7,762	15,994	23,756
75 to 79	0	7	7	0	5,528	5,528
80 to 84	1	2	3	704	2,842	3,546
85 to 89	0	1	1	0	1,449	1,449
90 & Up	0	1	1	0	297	297
Total	21	63	84	\$ 20,783	\$ 63,245	\$ 84,028

Average Benefit



Age Distribution





APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Summary of Plan Provisions

Effective Date

January 1, 1944, most recently amended in 2018.

Plan Type

Plan B applies to anyone who retires on or after June 30, 1999 and was hired prior to January 1, 2014. Plan C applies to members hired on or after January 1, 2014. All members with Plan A benefits have terminated or retired.

Eligibility for coverage

All regular, full-time employees of the School District of Kansas City, Missouri, the Kansas City, Missouri Public Library District, the Retirement System, and the Charter Schools located within the boundaries of the Kansas City School District become members as a condition of employment. Regular employment means working at least five hours per day, five days per week, nine months per year. Temporary and part-time employees are excluded.

Service

Creditable service is member service, which is service for which required contributions have been made. There is no cap on creditable service. Prior to 1990, creditable service could not exceed 35 years. The Plan B maximum retirement benefit is 60% of Average final compensation, which will be reached upon attainment of 30 years of service. The Plan C maximum retirement benefit is 60% of Average final compensation, which will be reached upon attainment of 34.25 years of service.

Annual compensation

A member's annual compensation level will be the regular compensation shown on the employer's salary and wage schedules, excluding extra pay, overtime pay, or any pay not on the schedule.

Average final compensation

The average final compensation is the highest average annual compensation paid during any four consecutive years of service.

Normal retirement

Eligibility

Plan B: Members may retire after (a) the completion of five years of creditable service and the attainment of age 60, or (b) having a total of at least 75 credits, with each year of creditable service and year of age, both prorated for fractional years, equal to one credit.

Plan C: Members may retire after (a) the completion of five years of creditable service and the attainment of age 62, or (b) having a total of at least 80 credits, with each year of creditable service and year of age, both prorated for fractional years, equal to one credit.



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Benefit

Plan B: The normal retirement benefit payable monthly equals one twelfth of 2.00% (1.75% for members who retired prior to June 30, 1999) of the member's average final compensation multiplied by years of creditable service, subject to a maximum of 60% of average final compensation. Any member whose years of creditable service exceed 34.25 years on August 28, 1993 shall have a maximum greater than 60%, which shall be equal to 1.75% times the member's years of creditable service on August 28, 1993.

Plan C: The normal retirement benefit payable monthly equals one twelfth of 1.75% of the member's average final compensation multiplied by years of creditable service, subject to a maximum of 60% of average final compensation.

Minimum benefit

Effective January 1, 1990, any member with at least 10 years of creditable service, but less than 20 years, is entitled to a minimum benefit of \$150 per month, plus \$15 for each year of creditable service in excess of 10 years, or the actuarial equivalent if an option was elected. Any member with at least 20 years of creditable service at retirement is entitled to a minimum benefit of \$300 per month, or the actuarial equivalent of \$300 if an option was elected. Beneficiaries of deceased members who retired with at least 10 years of creditable service and elected one of the optional plans for payment of benefits may receive the actuarial equivalent of the minimum benefit available for the option chosen.

Early retirement

Eligibility

Members may retire at any time after the completion of five years of creditable service and the attainment of age 55.

Benefit

Plan B: A member eligible for early retirement will receive a reduced benefit, with the reduction based on the number of months preceding eligibility for a normal retirement benefit. The reduction factors are as follows:

Age	Reduction Factor
59	0.91042
58	0.82985
57	0.75727
56	0.69175
55	0.63251



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Plan C: A member eligible for early retirement will receive a reduced benefit, with the reduction based on the number of months preceding eligibility for a normal retirement benefit. The reduction factors are as follows:

Age	Reduction Factor
61	0.90799
60	0.82558
59	0.75162
58	0.68511
57	0.62518
56	0.57109
55	0.52219

Disability retirement

Eligibility

A member with at least five years of creditable service who is certified to be totally incapacitated for performance of duty by the Medical Board is eligible for a disability retirement.

Benefit

A disabled vested member will receive a benefit, calculated as for normal retirement, based on creditable service and average final compensation at actual disability retirement date, or the minimum disability benefit whichever is greater. The minimum disability retirement benefit will be the lesser of (a) 25% of the member's average final compensation, or (b) the member's service retirement benefit calculated on the member's average final compensation and the maximum number of years of creditable service the member would have earned had the member remained an employee until age 60. Disability benefits are payable immediately.

Vested termination benefits

Eligibility

A member who has at least five years of creditable service earns a vested interest in his or her accrued benefit, provided the member leaves his or her contributions in the System.

Benefit

The vested benefit is calculated as a normal retirement benefit based on service and average final compensation at date of termination and is payable at minimum normal retirement date.



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Non-vested benefits

Benefit

If the member's termination is for reasons other than death or retirement and if the member has not met the vesting or retirement requirements, the member's contributions with interest will be refunded.

Death Benefit

Prior to retirement

For a member who dies before retirement and was either an active employee or an inactive vested member who met the other requirements (age or points) for either normal or early retirement, the member's designated beneficiary is entitled to receive either (a) the member's accumulated contributions and interest, or if the designated beneficiary is the member's spouse, dependent child or dependent parent, (b) a monthly retirement benefit calculated under Option 1 as if the deceased member had at least ten years of creditable service at time of death. If the beneficiary is a child, the optional monthly benefit is payable until the beneficiary reaches age nineteen.

For an inactive vested member who dies before retirement and has not met the other (age or points) requirements for retirement, the member's accumulated contributions and interest will be payable to the member's designated beneficiary.

All members are guaranteed to have their designated beneficiaries receive at least their accumulated contributions and interest, upon the member's death.

Postretirement

The benefit payment option selected by the retiree will determine what, if any, benefits are payable upon death after retirement.

Normal form of benefit payments

The normal form of benefit payment is the normal retirement benefit amount paid monthly for the life of the member. If the member should die before receiving payments totaling the amount of their contributions to the plan, the designated beneficiary shall receive a lump sum payment of the remaining amount.

Optional forms of benefit payments

Members may elect from the following optional forms of benefit payment:



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Option 1

Option 1 provides a reduced retirement benefit that will continue on to a designated survivor. Upon a retiree's death, the retiree's designated survivor will receive for life, the same level of monthly retirement benefit. In the event the retiree's designated survivor predeceases the retiree, the retiree's monthly retirement benefit will be adjusted to the amount that would have been paid in the normal form of payment.

Option 2

Option 2 provides a reduced retirement benefit that will continue on to a designated survivor. Upon a retiree's death, the retiree's designated survivor will receive for life, a monthly benefit equal to one-half of the retiree's monthly retirement benefit. In the event the retiree's designated survivor predeceases the retiree, the retiree's monthly retirement benefit will be adjusted to the amount that would have been paid in the normal form of payment.

Option 3

Option 3 provides that upon a retiree's death, no benefits are payable to the retiree's estate or any beneficiary. Retirement benefits payable under this option will be actuarially increased from the normal form.

Each of the above options produces benefits which are actuarially equivalent to the normal form of benefit which is a monthly annuity payable for the lifetime of the retiree.

Cost-of-living allowances

The Board of Trustees shall determine annually whether or not the system can provide an increase in benefits for those retirees who, as of the January 1 preceding the date of such increase, have been retired at least one year. Any such increase also applies to optional retirement allowances paid to a retiree's survivor. The Board makes its determination as follows:

1. The actuary recommends to the Board what portion of the investment return is available for increases and the amount available to be paid on the first day of the 14th month following the end of the valuation year. The actuary's recommendation is subject to the following safeguards:
 - a. The System's funded ratio as of the January 1st of the preceding year of the proposed increase must be at least 100% after adjusting for the effect of proposed increase. The funded ratio is the ratio of assets to the pension benefit obligation.
 - b. The actuarially required contribution rate, after adjusting for the effect of the proposed increase, may not exceed the statutory contribution rate.
 - c. The actuary must certify that the proposed increase will not impair the actuarial soundness of the System.



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

2. The Board reviews the actuary's recommendation and shall, in their discretion, determine if an increase may be granted. In accordance with Board policy, if an increase is permissible, the amount of the increase will be equal to the lesser of 3% or the percentage increase in the CPI for the preceding year, subject to a cumulative increase of 100% subsequent to December 31, 2000.
3. This provision does not guarantee an annual increase to any retired member.

Administration of the retirement system

The Board of Trustees is responsible for the general administration and proper operation of the retirement system. The Board consists of 12 members – four members appointed by the Board of Education, one member appointed by the Board of Trustees of the library district, four members elected by and from the active and terminated vested members of the retirement system, two members elected by and from the retirees of the retirement system, and the Superintendent of Schools of the School District of Kansas City, Missouri. Administrative expenses are paid out of the general reserve fund.

Employee contributions*

Contributions for Employees are as follows;

- Effective July 1, 2021, if the System is at least 100% funded, the members contribute the lesser of (a) 9.00% or (b) one-half of the actuarial required contribution rate. If the System is less than 100% funded, the members contribute 9.00%.
- Effective January 1, 2016, members contribute 9.00%.
- Effective January 1, 2015, members contributed 8.50%.
- Effective January 1, 2014, members contributed 8.00%.
- Effective January 1, 1999, members contributed 7.50%.
- Prior to January 1, 1999, members contributed 5.90%.
- Prior to 1990, members contributed 5.00% of earnable annual compensation plus 2.00% of earnable compensation in excess of \$6,500, the contribution earning base.

* Based on legislation passed by the 2018 Missouri General Assembly, which had not been signed by the Governor prior to the issuance of the January 1, 2018 valuation report.

Employer contributions*

Effective July 1, 2021, if the System is less than 100% funded on the first day of the preceding calendar year, then employers will contribute the greater of (a) the actuarial required contribution rate minus 9.00% and (b) 12.00% of covered payroll. However, if the System is at least 100% funded on the first day of the prior calendar year, then employers will contribute the greater of (a) the actuarial required contribution rate minus 9.00% and (b) one-half of the actuarial required contribution rate. Except when the employer contribution rate is lowered to one-half of the actuarial required contribution rate, the employer contribution rate cannot decrease by more than 0.50% compared to the preceding year, and under no circumstance can the employer contribution rate increase by more than 1.00% compared to the preceding year.



APPENDIX B: SUMMARY OF BENEFIT PROVISIONS

Prior to July 1, 2021, the employers of members contribute at the fixed rate of covered compensation as follows;

- Effective January 1, 2020, 12.00%.
- Effective January 1, 2019, 10.50%.
- Effective January 1, 2016, 9.00%.
- Effective January 1, 2015, 8.50%.
- Effective January 1, 2014, 8.00%.
- Effective January 1, 1999, 7.50%.
- Effective July 1, 1996, 5.99%.
- Effective July 1, 1995, 3.99%.
- Effective July 1, 1993, 1.99%.
- Prior to July 1, 1993, employer contributions were actuarially determined.

* Based on legislation passed by the 2018 Missouri General Assembly, which had not been signed by the Governor prior to the issuance of the January 1, 2018 valuation report.

Changes from the Prior Valuation

The 2018 Missouri General Assembly passed a bill, which had not been signed by the Governor prior to the issuance of the January 1, 2018 valuation report. Even though the bill had not yet been signed by the Governor, we expect the bill will be signed and become law in 2018. The bill changed contribution policy beginning January 1, 2019 with respect to employers covered by the System. In accordance with the new legislation, the employer contribution rate will increase to 10.50% of pay effective January 1, 2019 and 12.00% of pay effective January 1, 2020. Beginning July 1, 2021, the employer contribution rate will be the greater of (1) the actuarial required contribution rate, as determined in the valuation prepared for the prior calendar year, less the member contribution rate, or (2) 12.00% of pay, until the System is fully funded. Once the System is fully funded, the employer contribution rate may increase or decrease in subsequent years, depending on the valuation results and the employee contribution rate may decrease from 9.00% depending on valuation results. However, such changes are subject to statutory limitations. These changes to employer contributions are expected to improve the funding status of the System in the future.



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

ACTUARIAL COST METHOD

The actuarial cost method is a procedure for allocating the actuarial present value of pension benefits and expenses to time periods. The method used for the valuation is known as the Entry Age Normal actuarial cost method, and have the following characteristics:

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.
- (ii) Each annual normal cost is a constant percentage of the member's year-by-year projected covered compensation.

The Entry Age Normal actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's assumed pensionable compensation rates between the entry age of the member and the assumed exit ages.

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future normal costs is called actuarial accrued liability. Deducting actuarial assets from the actuarial accrued liability determines the unfunded actuarial accrued liability or (surplus). Effective with the January 1, 2017 valuation, the existing UAAL is amortized over a closed 30-year period and subsequent pieces of UAAL, determined each year in the valuation process, will be amortized over a closed 20-year period. The amortization payments on each of the UAAL bases will be determined on a level percentage of payroll basis.

CALCULATION OF THE ACTUARIAL VALUE OF ASSETS

The actuarial value of assets is based on a five-year smoothing method and is determined by spreading the effect of each year's investment return in excess of or below the expected return. The Market Value of assets on the valuation date is reduced by the sum of the following:

- I. 80% of the return to be spread during the first year preceding the valuation date,
- II. 60% of the return to be spread during the second year preceding the valuation date,
- III. 40% of the return to be spread during the third year preceding the valuation date, and
- IV. 20% of the return to be spread during the fourth year preceding the valuation date.



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

ACTUARIAL ASSUMPTIONS

System contribution requirements and actuarial present values are calculated by applying assumptions to the benefit provisions and membership information of the System, using the actuarial cost method.

The principal areas of risk which require assumptions about future activities of the System are:

- (i) Long-term rates of investment return to be generated by the assets of the System
- (ii) Patterns of pay increases to members
- (iii) Rates of mortality among members, retirees and beneficiaries
- (iv) Rates of withdrawal of active members
- (v) Rates of disability among active members
- (vi) The age patterns of actual retirements



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

In making a valuation, the monetary effect of each assumption is calculated for as long as a presently covered person survives – a period of time which can be as long as a century.

Actual experience of the System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experiences. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time, one or more of the assumptions are modified to reflect experience trends (but not random or temporary year-to-year fluctuations).

Long-term Rate of Return: (net of administrative expenses): 7.75% per year, compounded annually (2.75% long-term price inflation and a 5.00% real rate of return).

Price Inflation: 2.75%

General Wage Growth (Wage Inflation): 3.50%

Payroll Growth Assumption: 3.00% per year

Interest Crediting Rate on Member Accounts: 3.25% per year.

Salary Increase Rates: 5.00% per year.

Mortality Table: This assumption is used to measure the probabilities of members dying and the probabilities of each pension payment being made after retirement.

Healthy Retirees

And Beneficiaries: RP-2014 Healthy Annuitant Blue Collar Table with a one-year setback for females, projected 7 years from valuation date using Scale MP-2016

Disabled Retirees: RP-2014 Disabled Table for Males and Females

Active Members: RP-2014 Healthy Non-Annuitant Blue Collar Table with a one-year setback for females, projected 15 years from valuation date using Scale MP-2016



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

Rates of Retirement: These rates are used to measure the probability of eligible members retiring under the regular retirement provisions.

Retirements occur at rates based on the actual experience of the retirement system. The age-related rates used are shown in the tables below. The first year of normal retirement eligibility is the earlier of age 60 and 5 years of creditable service or 75 credits for Plan B members, and the earlier of age 62 and 5 years of creditable service or 80 credits for Plan C members.

Retirement Rates When Eligible for Unreduced Benefits		
Age	First Eligible Rate	Ultimate Rate
45 – 54	10%	12%
55 – 61	20	12
62	30	25
63	20	15
64	30	15
65 – 69	30	25
70 – 74	50	40
75	100	100

Retirement Rates When Eligible for Reduced Benefits	
Age	Rate
55 – 59	8%

Terminated vested members are assumed to begin receiving their benefits upon reaching age 60 if they participated in Plan B, and age 62 if they participated in Plan C.

Rates of Separation from Active Membership: This assumption measures the probabilities of a member terminating employment. The rates do not apply to members who are eligible to retire. Rates vary by service. Sample rates are as follows:

Years	Rate
<1	27%
1	25
5	17
10	8
15+	3



APPENDIX C: ACTUARIAL COST METHOD AND ASSUMPTIONS

Forfeiture of Vested Benefits: Members terminating in vested status are given the option of taking a refund of their accumulated member contributions (and thereby forfeiting the employer-provided benefit) or deferring their vested benefit. Active members who terminate in the future with a vested benefit are assumed to take a deferred vested annuity, unless a refund of contributions and interest is greater than the actuarial present value of their vested deferred benefit.

Rates of Disability: This assumption measures the probabilities of a member becoming disabled.

Sample Ages	% of Active Members Becoming Disabled During Next Year
25	0.025%
30	0.050
35	0.050
40	0.050
45	0.075
50	0.125
55	0.200
60	0.250

Disability probabilities vary by age, however, not all ages are shown above.

Active Member Group Size: Assumed to remain constant.

Future Benefit Increases or Additional Benefits: When funding is adequate, the Board may authorize cost of living adjustments (COLAs), as noted in the summary of plan provisions. In the past, the Board has also sometimes granted an additional monthly payment to retirees (13th check.) This valuation assumes that no future COLAs and no future 13th checks will be awarded.

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

Marriage Assumption: All members are assumed to be married for purposes of death benefits. In each case, the male was assumed to be 4 years older than the female.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Other: The turnover decrement does not operate during retirement eligibility.

Missing Gender: Records that are missing a gender are assumed to be female if the record belongs to a member, and male if the record belongs to a beneficiary.

CHANGES FROM THE PRIOR VALUATION

There have been no changes to the actuarial assumptions or methods since the prior valuation.



APPENDIX D: GLOSSARY OF TERMS

Actuarial Accrued Liability	The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as “accrued liability” or “actuarial accrued liability”.
Actuarial Assumptions	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefit between future normal cost and actuarial accrued liability; sometimes referred to as the “actuarial funding method”.
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with a lump sum payment.
Normal Cost	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.
Unfunded Actuarial Accrued Liability	<p>The difference between actuarial accrued liability and the valuation assets.</p> <p>Most retirement systems have unfunded actuarial accrued liability. They arise each time new benefits are added and each time an actuarial loss is realized.</p> <p>The existence of unfunded actuarial accrued liability is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liability does not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liability and the trend in its amount.</p>