



# Seattle City Employees' Retirement System

## January 1, 2017 Actuarial Valuation

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June 30, 2017

Retirement Board  
Seattle City Employees' Retirement System  
720 Third Avenue, Suite 900  
Seattle, WA 98104

Dear Members of the Board:

As requested, we have prepared an actuarial valuation of the Seattle City Employees' Retirement System (SCERS) as of January 1, 2017. This report reflects the benefit provisions and contribution rates in effect as of January 1, 2017.

### **Actuarial Certification**

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by SCERS staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. It should be noted that the valuation was based on the DRAFT audited financial statements, as the final audited statements were not yet available. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, 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 a reasonable estimate of anticipated experience affecting the System. Further, in our opinion, each actuarial assumption used is reasonably related to the experience of the Plan and to reasonable expectations which, in combination, represent our best estimate of anticipated experience under the System.

This valuation report is only an estimate of the System's financial condition as of a single date. It can neither predict the System's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of System benefits, only the timing of System contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

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; changes in 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 or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an

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analysis of the potential range of future measurements. The Retirement Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix A at the May 8, 2014 meeting.

Actuarial computations presented in this report are for purposes of determining the recommended funding amounts for SCERS. Actuarial computations presented for financial reporting in a separate report under GASB Statements No. 67 and 68 are for purposes of assisting SCERS and participating employers in fulfilling their financial accounting requirements. The computations prepared for these two purposes may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of SCERS' 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.

Milliman's work is prepared solely for the internal business use of SCERS. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exception(s):

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

The signing actuaries are independent of the City of Seattle. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report, along with the information contained in the Comprehensive Annual Financial Report, is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.



We would like to express appreciation to the system staff, including Mr. Jeff Davis, who gave substantial assistance in supplying the data on which this report is based.

Respectfully submitted,

A handwritten signature in black ink that reads "Nick Collier".

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A handwritten signature in black ink that reads "Daniel Wade".

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## Section 1 Summary of the Findings



### Overview

	January 1, 2017	January 1, 2016
<b>Total Actuarial Contribution Rate</b>	25.00%	25.32%
<b>Funding Ratio</b>	68.1%	66.5%

We are pleased to present the results of the January 1, 2017 actuarial valuation. This valuation determines the minimum actuarially required employer contribution rate payable beginning January 1, 2018 based on the Board's funding policy. Several key points of the valuation are summarized as follows:

- **Investment Returns:** For the year ending December 31, 2016, the SCERS assets returned around 8.4% on a market value basis (net of investment expenses) and 7.6% on an actuarial value basis. These rates of return were greater than the assumed rate. From January 1, 2016 to December 31, 2016, the SCERS assets were assumed to earn 7.50%. The result is an actuarial gain on assets for the 2016 year. Note that only one-fifth of this gain will be recognized in the current year Actuarial Value of Assets (AVA), due to the asset smoothing method; see Section 3 of this report for details. Currently, a net asset loss is being deferred in the AVA; this implies that, if all actuarial assumptions are met in future years, the minimum actuarially required contribution rate is expected to increase in future years.
- **City Contribution Rate:** The minimum actuarially required contribution rate has decreased from the prior valuation, from 25.32% to 25.00% of payroll. Since the employees contribute a fixed 10.03% of pay, the minimum actuarially required employer contribution rate has decreased from 15.29% of pay to 14.97%. We suggest the Board consider recommending that the City Council maintain the current 15.29% employer contribution rate, as rates are projected to increase in the future. This approach should result in a smaller increase in future years. We can discuss this at the August Board meeting.
- **Funding Progress:** On the basis of the January 1, 2016 actuarial valuation, the Funding Ratio (which is measured as the AVA divided by the Actuarial Accrued liability) was 66.5%. Based on the January 1, 2017 valuation, the Funding Ratio has increased to 68.1%. The most significant factor causing this increase was the amortization payment made by the City during the prior year. Note that these Funding Ratios are calculated using the AVA; Funding Ratio results based on the Market Value of Assets (MVA) are shown in Table 1 at the end of this section.
- **Funding Policy:** In August 2013, the Seattle City Council passed a resolution to formally close the period over which any SCERS UAAL will be amortized. This resolution stipulated that the 30-year amortization period would be closed as of the January 1, 2013 actuarial valuation. The result is that, for purposes of the January 1, 2017 valuation calculation, a 26-year remaining closed period is in effect.

**Overview  
(continued)**

- **SCERS Plan 2:** New members entering SCERS January 1, 2017 and later will join Plan 2. This valuation only includes Plan 1 members, so we will not reflect the impact of Plan 2 until next valuation.

The effect of closing the UAAL amortization period is that the total SCERS UAAL is projected to be fully paid off over the next 26 years from the January 1, 2017 valuation date.

**Minimum Actuarially  
Required Contribution  
Rate**

Based on the actuarial valuation of the benefits in effect under the SCERS as of January 1, 2017, the total minimum actuarially required contribution rate decreased from 25.32% to 25.00% for the year beginning January 1, 2018.

The current contribution rates for the death benefit program are projected to be sufficient to finance the \$2,000 death benefit.

Based on a fixed member contribution rate of 10.03%, the City's contribution rate may be decreased from 15.29% to 14.97% effective January 1, 2018. This reflects the City's commitment to fund at least the minimum actuarially required contribution rate, which is based on a 26-year amortization of the UAAL beginning January 1, 2017. A greater City contribution rate would result in a shorter amortization of the UAAL, if all actuarial assumptions are met.

It should be noted that the contribution rate of 25.00% of pay is calculated based on the AVA; see Section 3 of this report for details. This AVA is currently deferring a net actuarial asset loss of \$75.6 million under the asset smoothing method. This means that if no actuarial gains or losses occur in the future, the minimum actuarially required contribution rate would increase over the next several years as the deferred asset losses are phased into the AVA.

We have performed a five-year projection of the contribution rates if 7.50% was returned on the Market Value of Assets in each future year (and assuming that no other actuarial gains or losses occur and there are no other changes to assumptions or benefit provisions). This projection shows the expected impact of recognizing the currently deferred asset gains and losses over time. The result is ultimately an increase in the contribution rate over the next several years.



**Minimum Actuarially  
 Required Contribution  
 Rate  
 (continued)**

It is likely that the Market Value of Assets will not return an annual average of exactly 7.50% over all future years. To show the potential impact of volatility in asset returns on the contribution rate, we have performed a projection of the contribution rates at the 5<sup>th</sup> and 95<sup>th</sup> percentile expected returns (thereby yielding a 90% asset-return-based confidence interval for the specified rates). These projections are shown in the table below.

Projected Total Actuarial Required Contribution Rate		
Contribution Year*	Assuming 7.50% Future Returns	90% Asset Return Confidence Interval
2018	25.00%	25.00% - 25.00%
2019	25.08%	24.35% - 25.82%
2020	25.41%	23.86% - 27.05%
2021	25.67%	23.10% - 28.47%
2022	25.63%	21.86% - 29.85%
2023	25.63%	20.45% - 31.52%

\* Contribution year lags valuation year by one year. For example: Contribution Year 2018 is based on the 2017 valuation results, amortized over 26 years beginning in 2017, if the increase takes place in 2017.

	Compounded Average Return for Period	
	Percentile	
	95th	5th
1-Year Period	-11.3%	26.0%
2-Year Period	-6.6%	19.7%
3-Year Period	-4.4%	17.0%
4-Year Period	-3.1%	15.4%
5-Year Period	-2.2%	14.4%

The 90% confidence interval results are based on the 5<sup>th</sup> and 95<sup>th</sup> percentile compounded returns for one-, two-, three-, four- and five-year periods. Since actuarial assets are used to calculate contribution rates, deferred gains or losses would continue to decrease or increase the minimum actuarially required contribution rate after these dates.

See Section 8 of this report for a detailed discussion of the projected contribution rates.

**Funding Valuation**

This report provides information relevant to the funding of SCERS. Information for financial reporting purposes will be provided in a separate GASB 67 and 68 Disclosure report.

**Funding Progress**

On the basis of the January 1, 2016 actuarial valuation, the Funding Ratio was 66.5%. Based on the January 1, 2017 valuation, the Funding Ratio is 68.1%. The increase in the Funding Ratio is due mainly to the UAAL payment made by the City in 2016. See Section 3 of this report for a full discussion.

See the following section titled Analysis of Change for more details.

**Analysis of Change**

The following table shows the sources of change in the actuarial contribution rate and the funding ratio between the prior and current actuarial valuations.

Sources of Change	Actuarial Contrib. Rate	Funding Ratio
<b>January 1, 2016 Actuarial Valuation</b>	<b>25.32 %</b>	<b>66.5 %</b>
Expected Valuation-to-Valuation Change	-	1.1 %
Asset Gain/Loss on Actuarial Value	(0.02)%	-
Salary/Membership Growth Different Than Expected	(0.22)%	0.3 %
Changes in Assumptions	-	-
Other	(0.08)%	0.2 %
<b>Total Change</b>	<b>(0.32)%</b>	<b>1.6 %</b>
<b>January 1, 2017 Actuarial Valuation</b>	<b>25.00 %</b>	<b>68.1 %</b>

**Contingent COLA Benefits**

The Seattle Municipal Code allows for an increase in the cost-of-living adjustment (COLA) available to current and future retired members. Currently, the Floor COLA (also referred to as a Restoration of Purchasing Power COLA) is at the 65% level. The enhanced COLA benefit (70% Floor COLA) does not become effective until the System attains at least a 100% funding level.

Since it is unknown when this benefit will become effective, especially given the current funded status of the System, we have not included the valuation of these potential benefit changes (i.e., the increase in the ROPP COLA to the 70% level) in this valuation. See Appendix A of this report for further details.

**SCERS Plan 2**

SCERS Plan 2 plan provides a somewhat lower level of benefits than the current plan and is therefore expected to have a lower Normal Cost rate. We have not reflected the impact of the new plan in this valuation as no current employees are members of this plan as of the valuation date. We will reflect the lower costs of Plan 2 in the contribution rate in future valuations as Plan 2 members join SCERS.

We have assumed that future UAAL contributions will be made on the combined SCERS Plan 1 and Plan 2 payroll. If contributions were only made on the Plan 1 payroll, this would materially affect our calculations.

**Membership Information**

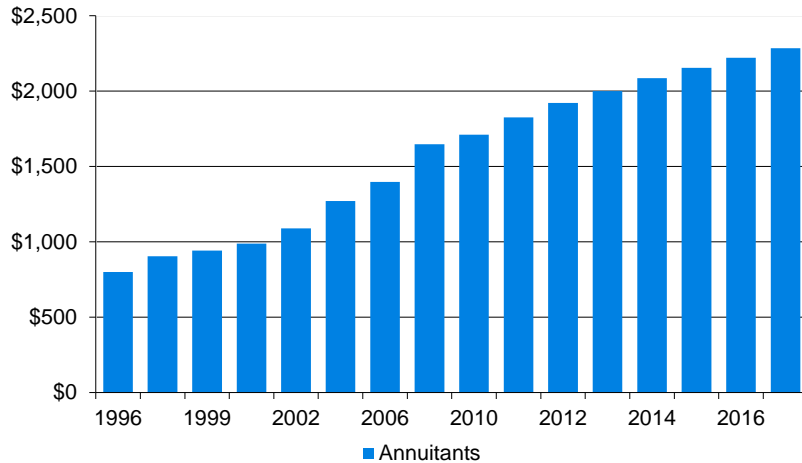
Total valuation payroll has increased by 5.7% since the 2016 valuation, and active membership has increased by 3.0% during this same period. As of January 1, 2017, the annualized payroll is \$726 million for 9,151 active members.



**Membership Information (continued)**

Retired member counts and average retirement benefit amounts continue to increase steadily. As of January 1, 2017, there were 6,382 retired members and beneficiaries with an average benefit of \$2,285 per month. This represents a 2.6% increase in count and a 2.9% increase in average benefit amount.

**Average Monthly Retirement Benefit**



**Analysis of Change in Member Population**

The following table summarizes the year-to-year change in member population.

	Actives	Deferred Members*	Retirees/ Beneficiaries
<b>January 1, 2016 Valuation</b>	8,882	2,197	6,223
Termination with Refund / Death	(144)	(72)	(237)
Termination without Refund	(246)	246	-
Service Retirement	(270)	(43)	313
Disability Retirement	0	-	-
Rehires	24	(24)	-
New Entrants / Beneficiaries	905	48	83
Data Corrections	-	-	-
<b>January 1, 2017 Valuation</b>	<b>9,151</b>	<b>2,352</b>	<b>6,382</b>

\* Counts include non-vested terminated members whose contributions are still on deposit with SCERS as of valuation date.

**Summary Exhibit**

A summary of the key results of this valuation, along with a comparison to the January 1, 2016 valuation, is shown in Table 1.

Note that the valuation measures are based on the Actuarial Value of Assets, which recognizes asset gains and losses over a five-year period; however, we have also shown key measures using the Market Value of Assets.

Graphs 1 and 2 and the associated data table show historical asset and liability information, including the Present Value of Future Benefits (PVFB) and Present Value of Future Normal Costs (PVFNC), at previous valuation dates.

## Seattle City Employees' Retirement System Actuarial Valuation

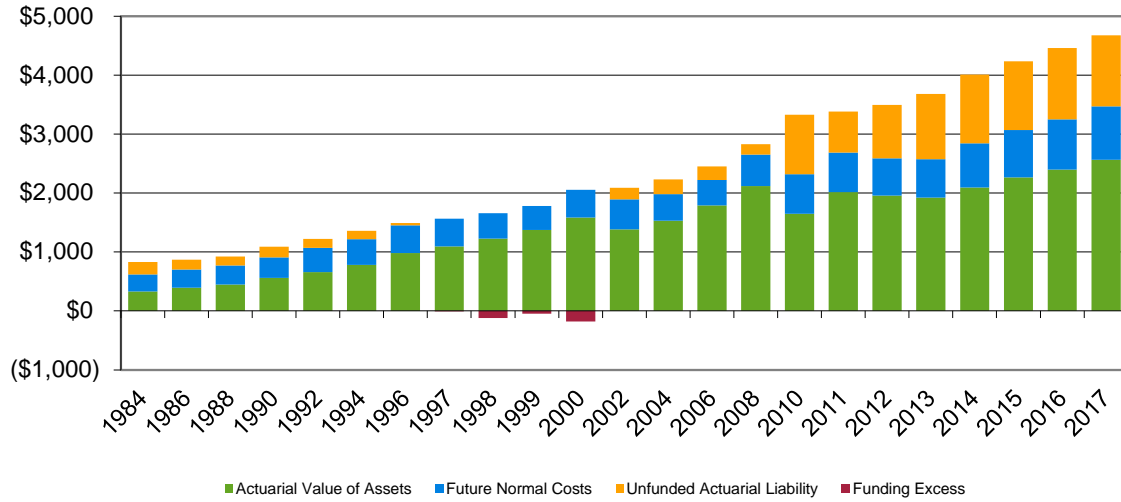
**Table 1 Summary of Results**

	Valuation January 1, 2017	Valuation January 1, 2016	Percentage Change
I. Total Membership			
A. Active Members	9,151	8,882	3.0%
B. Retired Members & Beneficiaries	6,382	6,223	2.6%
C. Vested Terminated Members*	<u>2,352</u>	<u>2,197</u>	7.1%
D. Total	17,885	17,302	3.4%
II. Pay as of Valuation Date			
A. Annual Total (\$millions)	\$ 725.6	\$ 686.7	5.7%
B. Annual Average	\$ 79,288	\$ 77,317	2.5%
III. Average Monthly Benefit Paid to Current Retirees and Beneficiaries			
A. Service Retirement	\$ 2,417	\$ 2,356	2.6%
B. Disability Retirement	1,351	1,315	2.8%
C. Surviving Spouse and Dependents	<u>1,405</u>	<u>1,357</u>	3.6%
D. Total	\$ 2,285	\$ 2,221	2.9%
IV. Actuarial Accrued Liability (\$millions)			
A. Active Members	\$ 1,791.3	\$ 1,730.0	3.5%
B. Retired Members	1,783.6	1,694.2	5.3%
C. Vested Terminated Members	<u>191.5</u>	<u>180.9</u>	5.9%
D. Total	\$ 3,766.4	\$ 3,605.1	4.5%
V. Assets			
A. Actuarial Value of Assets (\$millions)	\$ 2,564.1	\$ 2,397.1	7.0%
VI. Unfunded Actuarial Accrued Liability or Surplus Funding (\$millions)	\$ 1,202.3	\$ 1,208.0	(0.5)%
VII. Amortization of UAAL			
Total Contribution Rate Needed for 26-Year** Amortization (as a % of Payroll)	25.00%	25.32%	(1.3)%
VIII. Funding Ratio	68.1%	66.5%	2.4%
IX. Normal Cost as a Percent of Salary	15.83%	15.80%	0.2%
<b>Market Value of Assets (MVA) -- For Informational Purposes Only</b>			
X. Assets Based on MVA			
A. Market Value of Assets (\$millions)	\$ 2,488.5	\$ 2,313.0	7.6%
XI. Amortization of UAAL Based on MVA			
A. Total Contribution Rate Needed for 26-Year** Amortization (as a % of Payroll)	25.61%	26.02%	(1.6)%
XII. Funding Ratio Based on MVA	66.1%	64.2%	3.0%

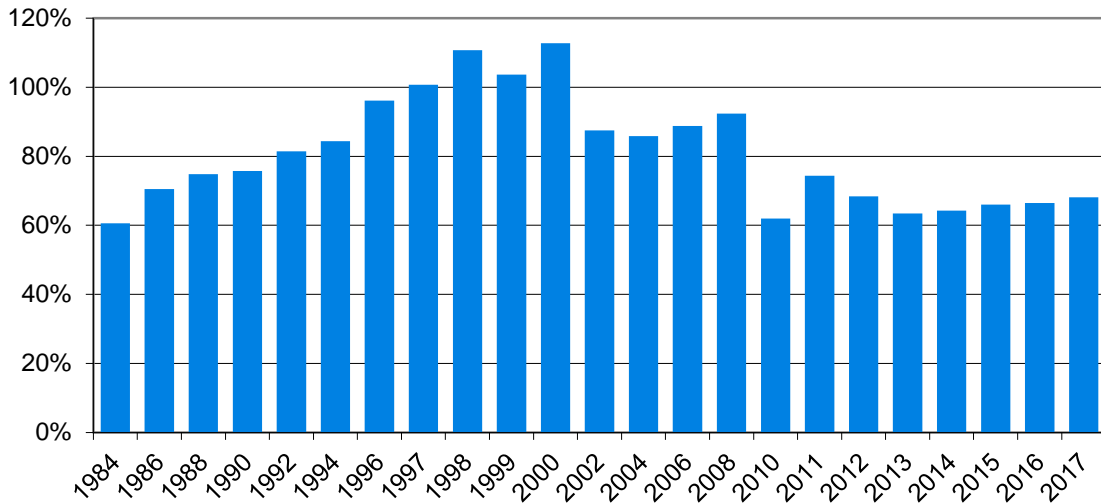
\* Includes non-vested terminated members whose contributions are still on deposit with SCERS as of valuation date.

\*\* Amortization method is closed 30-year beginning with January 1, 2013 valuation. 2017 values shown are over 26 years.

**Graph 1 Historical Asset and Liability Comparison**



**Graph 2 Historical Funding Ratios**



Year	(in \$Millions)				Funding Ratio
	PVFB	Assets	PVFC	UAAL	
2006	\$ 2,448.5	\$ 1,791.8	\$ 431.0	\$ 225.8	88.8%
2008	2,825.8	2,119.4	531.2	175.2	92.4%
2010	3,328.7	1,645.3	674.9	1,008.5	62.0%
2011	3,379.6	2,013.7	670.6	695.4	74.3%
2012	3,494.1	1,954.3	634.8	905.0	68.3%
2013	3,679.8	1,920.1	654.5	1,105.2	63.5%
2014	4,007.3	2,094.3	747.2	1,165.8	64.2%
2015	4,231.3	2,266.7	798.7	1,165.9	66.0%
2016	4,458.1	2,397.1	853.0	1,208.0	66.5%
2017	4,672.6	2,564.1	906.2	1,202.3	68.1%

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## Section 2 Scope of the Report



This report presents the actuarial valuation of the Seattle City Employees' Retirement System as of January 1, 2017.

A summary of the findings resulting from this valuation is presented in the previous section. Section 3 describes the assets of the System. A summary of the assets is set forth in Table 2. Sections 3, 4, and 5 describe how the obligations of the System are to be met under the actuarial cost method in use.

Section 6 discloses additional historical information.

Section 7 sets forth estimated actuarial gains or losses from the various sources. Section 8 shows projections of the System's funding under both optimistic and pessimistic scenarios. Section 9 shows projections of SCERS benefit payments and dollar contributions over a 10-year period following the actuarial valuation.

Appendix A is a summary of the actuarial procedures and assumptions used to compute the liabilities and contributions shown in this report.

The current benefit structure, as determined by the provisions of the governing law on January 1, 2017, is summarized in Appendix B. Schedules of valuation data classifying the data used in the valuation by various categories of contributing members, former contributing members and beneficiaries make up Appendix C.

Comparative statistics are presented on the System's membership and contribution rates. Appendix D is a glossary of actuarial terms used in this report.

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### Section 3 Assets



In many respects, an actuarial valuation can be regarded as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is January 1, 2017. On that date, the assets available for the payment of benefits are appraised. These assets are compared with the actuarial liabilities, which are generally well in excess of the assets. The actuarial process thus leads to a method of determining what contributions by members and their employers are needed to pay expected benefits.

This section of the report deals with the asset determination. In the next section, the actuarial liabilities will be discussed. Section 5 will deal with the process for determining required contributions, based on the relationship between the assets and the actuarial liabilities.

### Financial Exhibits

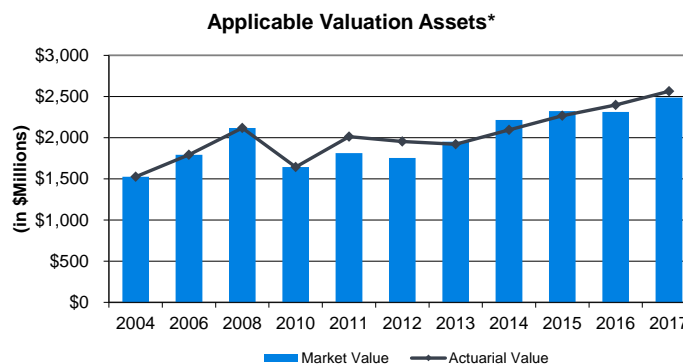
Table 2 shows the calculation of the Actuarial Value of Assets as of January 1, 2017. Note that a net loss is currently being deferred. This means that, if the system earns 7.50% in the future, the AVA will experience an actuarial loss over upcoming years as the remaining portions of deferred losses are recognized. In both the Executive Summary and Section 8 of this report, we discuss projections of the minimum actuarially required contribution rates resulting from this projected actuarial loss on the AVA.

Tables 3 and 4 summarize the financial resources of the System on January 1, 2017 on a Market Value basis. Table 3 shows the Market Value of Assets at January 1, 2017 and January 1, 2016. Table 4 shows the changes in Market Value of Assets during the year ending January 1, 2016 and the year ending January 1, 2017.

Tables 3 and 4 are taken directly from data furnished to us by SCERS staff. We have accepted these tables for use in this report without audit, but we have reviewed them for reasonableness and consistency with previous reports.

### Actuarial Asset Method

Beginning with the January 1, 2011 actuarial valuation, SCERS adopted five-year asset smoothing. This smoothing process recognizes the asset gain or loss occurring in each year evenly over a five-year period. The following graph shows a historical comparison of the actuarial and market assets used for valuation purposes. Note that prior to 2011 the AVA was equal to the MVA.



\* Prior to 2010, actuarial valuations were only performed every second year.

**Table 2 Calculation of Actuarial Value of Assets at January 1, 2017**  
(All dollar amounts in millions)

Five-Year Asset Smoothing										
Year Ended	Market Value at Beginning of Year	Total Contributions	Benefit Payments Plus Admin. Expenses	Expected Investment Return	Market Value of Assets		Asset Gain/(Loss)	Current Phase Out	Deferred Amount	
					Expected*	Actual				
December 31, 2012	\$ 1,753.5	\$ 119.6	\$ 152.4	\$ 134.6	\$ 1,855.3	\$ 1,951.4	\$ 96.1	0%	-	
December 31, 2013	1,951.4	137.4	161.8	150.3	2,077.3	2,216.9	139.6	20%	\$ 27.9	
December 31, 2014	2,216.9	154.0	170.7	165.7	2,365.9	2,322.7	(43.2)	40%	(17.3)	
December 31, 2015	2,322.7	166.9	183.7	173.6	2,479.5	2,313.0	(166.5)	60%	(99.9)	
December 31, 2016	2,313.0	180.2	194.7	172.9	2,471.4	2,488.5	17.1	80%	13.7	
									Total Deferred at Jan. 1, 2017:	(75.6)
									Market Value of Assets at Jan. 1, 2017:	2,488.5
									Less Total Deferred at Jan. 1, 2017:	(75.6)
									<b>Actuarial Value of Assets at Jan. 1, 2017:</b>	<b><u>\$ 2,564.1</u></b>

\* Expected Market Value of Assets based on the actuarial investment return assumption for the prior year, taking into account actual cash flows during year.

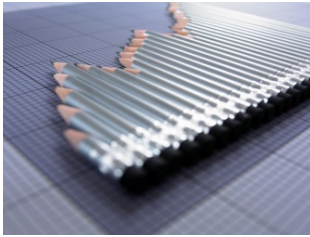
**Table 3 Summary of Plan Net Assets (at Market Value)**

	January 1, 2017		January 1, 2016	
	Market Value	Distribution	Market Value	Distribution
<b>Assets</b>				
Cash and short-term investments	\$ 342,730,048	13.8%	\$ 195,572,787	8.5%
Securities lending collateral	11,130,677	0.4%	50,952,037	2.2%
Receivables				
Employee	\$ 3,434,870	0.1%	\$ 3,496,137	0.2%
Employer	6,143,927	0.2%	4,787,895	0.2%
Interest and Dividends	3,486,918	0.1%	3,449,203	0.1%
Sales Proceeds Receivable	87,345,080	3.5%	6,175,041	0.3%
Total Receivables	\$ 100,410,795	4.0%	\$ 17,908,276	0.8%
Investments at fair value				
Fixed Income	\$ 539,527,403	21.7%	\$ 599,493,556	25.9%
Equity	1,350,196,766	54.3%	1,126,488,036	48.7%
Real estate	287,996,774	11.6%	270,796,297	11.7%
Alternative	173,578,426	7.0%	114,895,997	5.0%
Total investments	\$ 2,351,299,369	94.5%	\$ 2,111,673,886	91.3%
Total assets	\$ 2,805,570,889	112.7%	\$ 2,376,106,986	102.7%
<b>Liabilities</b>				
Pension & Other payables	\$ 1,370,010	-0.1%	\$ 2,004,636	-0.1%
Securities lending obligation	11,125,376	-0.4%	53,633,431	-2.3%
Investment commitments payable	304,577,339	-12.2%	7,447,756	-0.3%
Total Liabilities	\$ 317,072,725	-12.7%	\$ 63,085,823	-2.7%
<b>Market Value of Net Assets Held in Trust For Pension Benefits</b>				
	\$ 2,488,498,164	100.0%	\$ 2,313,021,163	100.0%

**Table 4 Summary of Changes in Plan Net Assets (at Market Value)**

	<u>January 1, 2017</u> Market Value	<u>January 1, 2016</u> Market Value
<b>Additions</b>		
Contributions		
Employer	\$ 108,454,496	\$ 101,153,403
Employee	<u>71,755,857</u>	<u>65,779,216</u>
Total contributions	\$ 180,210,353	\$ 166,932,619
Investment activities		
Investment income (loss)		
Net change in fair value of investments	\$ 163,299,357	\$ (22,933,464)
Interest	10,569,831	11,377,655
Dividends	<u>24,780,531</u>	<u>27,836,456</u>
Net investment income (loss)	\$ 198,649,719	\$ 16,280,647
Securities lending activities		
Securities lending income	\$ 100,217	\$ 56,694
Borrowing rebates	<u>165,375</u>	<u>674,010</u>
Total securities lending income	\$ 265,592	\$ 730,704
Securities lending management fees	<u>(66,376)</u>	<u>(182,660)</u>
Net income from securities lending	\$ 199,216	\$ 548,044
Investment activity expenses		
Investment management fees	\$ (8,186,323)	\$ (9,096,421)
Investment consultant fees	(295,000)	(295,000)
Investment custodial fees	<u>(426,443)</u>	<u>(353,637)</u>
Total investment activity expenses	\$ (8,907,766)	\$ (9,745,058)
Total additions	\$ 370,151,522	\$ 174,016,252
<b>Deductions</b>		
Benefits	\$ 168,967,298	\$ 159,349,807
Refunds of contributions	16,456,570	16,137,840
Administrative expenses	<u>9,250,653</u>	<u>8,211,137</u>
Total deductions	\$ 194,674,521	\$ 183,698,784
Net Increase/(Decrease)	\$ 175,477,001	\$ (9,682,532)
Net position held in trust for pension benefits		
Beginning of Year	\$ 2,313,021,163	\$ 2,322,703,695
<b>End of Year</b>	<b>\$ 2,488,498,164</b>	<b>\$ 2,313,021,163</b>

## Section 4 Actuarial Liabilities



### Actuarial Present Value of Future Benefits

In the previous section, an actuarial valuation was related to an inventory process and an analysis was given of the inventory of assets of the System as of the valuation date, January 1, 2017. In this section, the discussion will focus on the commitments of the System, which will be referred to as its actuarial liabilities (or, actuarial value of future benefits).

In an active system, the present value of future actuarial liabilities will almost always exceed the actuarial assets. This is usually expected in all but a fully closed down fund, where no further contributions of any sort are anticipated. This deficiency has to be provided for by future contributions. The funding method for the system sets out a schedule of future contributions that will deal with any deficiency in an orderly fashion. The determination of the level of future contributions needed is discussed in the next section (Section 5) of this report.

Table 5 contains an analysis of the actuarial present value of all future benefits for contributing members, former contributing members, and beneficiaries. The analysis is given by type of benefit.

The actuarial liabilities summarized in Table 5 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 a measure of both benefits already earned and future benefits to be earned. Thus, for all current members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of their surviving beneficiaries.

The actuarial assumptions used to determine the liabilities are based on the results of the 2014 Investigation of Experience Report. New assumptions were adopted by the Board effective with the January 1, 2014 actuarial valuation. See Appendix A of this report for details.

### Actuarial Cost Method

The method used to determine how the actuarial cost for an individual (or for the System as a whole) is allocated to past and future years is referred to as the actuarial cost method. For this valuation, the individual entry age normal cost (EANC) method has been used.

Under this method, the actuarial liabilities discussed above are allocated into two primary calculation components:

1. A normal cost
2. An actuarial accrued liability

## Normal Cost and Actuarial Accrued Liability

The normal cost under the EANC method is developed so that benefits are allocated as a level percentage of payroll for each member, from the member's membership date to the member's termination date. One key feature of the EANC method is that normal costs tend to be stable from year to year (assuming no change in assumptions or benefit provisions) because most members' entry age cost percentages do not change materially from year to year, and because the population typically does not change considerably from year to year. The normal cost rates as a percentage of payroll for the current and prior valuation are shown by benefit type in Table 6. These normal cost contribution rates are intended to be contributed in each year in order to fund the ongoing cost of benefit accruals.

The annual normal cost rate may be considered the ongoing cost of benefit accruals for any given plan year. When the present value of all future normal costs is subtracted from the present value of total benefits, the result is the actuarial accrued liability (AAL). This can be thought of as the current value of all past normal costs, or the amount that would be in the fund if all prior actuarial assumptions had been exactly met. The AAL represents the portion of the present value of total benefits that the cost method allocates to past service.

To the extent that this AAL exceeds plan assets, an Unfunded Actuarial Accrued Liability (UAAL) exists. Table 7 calculates the UAAL, if any, for the current and prior valuations. Note that currently, a UAAL exists for SCERS; the payoff of this UAAL is discussed in more detail in Section 5 (City Contributions) of this report.

**Table 5 Actuarial Present Value of Future Benefits (PVFB)**

(All dollar amounts in millions)

	January 1, 2017	January 1, 2016
<b>A. Active Members</b>		
Service Retirement	\$ 2,550.0	\$ 2,444.9
Vested Retirement	69.9	65.6
Disability Retirement	7.7	7.3
Survivor Benefits	23.3	22.7
Refund of Member Contributions	<u>46.6</u>	<u>42.5</u>
<b>Total</b>	<b>\$ 2,697.5</b>	<b>\$ 2,583.0</b>
<b>B. Inactive Members and Annuitants</b>		
Service Retirement	\$ 1,670.0	\$ 1,585.3
Disability Retirement	10.1	10.5
Beneficiaries	103.5	98.4
Inactive Members	<u>191.5</u>	<u>180.9</u>
<b>Total</b>	<b>\$ 1,975.1</b>	<b>\$ 1,875.1</b>
<b>C. Grand Total PVFB</b>	<b>\$ 4,672.6</b>	<b>\$ 4,458.1</b>

**Table 6 Normal Cost Contribution Rates as Percentages of Salary**

	January 1, 2017	January 1, 2016
Service Retirement	12.59 %	12.55 %
Vested Retirement	1.21	1.22
Disability Retirement	0.07	0.07
Survivor Benefits	0.17	0.17
Refund of Member Contributions	1.19	1.19
Administrative Expenses	<u>0.60</u>	<u>0.60</u>
<b>Total</b>	<b>15.83 %</b>	<b>15.80 %</b>



**Table 7      Unfunded Actuarial Accrued Liability (UAAL)**

(All dollar amounts in millions)

	January 1, 2017	January 1, 2016
A. Actuarial present value of all future benefits for present and former members and their survivors (Table 3)	\$ 4,672.6	\$ 4,458.1
B. Less actuarial present value of total future normal costs for present members	906.2	853.0
C. Actuarial accrued liability* [A - B]	\$ 3,766.4	\$ 3,605.1
D. Less actuarial value of assets available for benefits (Table 2)	<u>2,564.1</u>	<u>2,397.1</u>
E. Unfunded actuarial accrued liability (Funding Excess, if negative) [C - D]	\$ 1,202.3	\$ 1,208.0
F. Funding Ratio [D ÷ C]	68.1%	66.5%

\* The actuarial accrued liability as of January 1, 2018 is projected to be \$3,961.6 million.

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## Section 5 City Contributions



As shown in Table 7 in the previous section of this report, the AAL exceeds the current Actuarial Value of Assets. In other words, as of the January 1, 2017 valuation, a UAAL exists for SCERS.

Because a UAAL exists, the total calculated minimum actuarially required contribution rate will consist of two components:

1. The normal cost contribution rate as of January 1, 2017
2. An amortization payment intended to pay off the UAAL in accordance with the SCERS funding policy

### Funding

The current SCERS funding policy was updated by a Seattle City Council resolution in August 2013. The funding policy specifies that the UAAL will be amortized as a level percentage of payroll over a closed 30-year period as of the January 1, 2013 actuarial valuation. This means that, for the January 1, 2017 valuation, the amortization contribution rate must pay off the current UAAL over a 26-year period.

### Actuarial Gains and Losses

When experience is different from actuarial expectation, an actuarial gain or loss occurs. Ongoing actuarial gains and losses decrease and increase the UAAL. Section 7 of this report illustrates the historical actuarial gains and losses on the UAAL by source.

### Amortization of UAAL

Table 8 details the components of the minimum actuarially required contribution rate of 25.00% by breaking it into the necessary funding components: normal cost and amortization of UAAL. It then illustrates the split between member and employer contribution rates, assuming that member contributions are allocated entirely toward paying the ongoing normal cost of benefits.

As of the January 1, 2017 valuation, the minimum actuarially required contribution rate for the employer has decreased to 14.97% beginning January 1, 2018. This is mainly due to the less than expected increase in average salaries.

The total contribution rate of 25.32% being paid in 2017 was calculated in order to amortize the January 1, 2016 UAAL over a 27-year period; however, this rate is not projected to perfectly amortize the January 1, 2017 UAAL over 26 years due to gains that have occurred during 2016. Table 9 details the expected amortization of the UAAL over the 26-year closed period beginning January 1, 2017.

**Amortization of UAAL  
(continued)**

The total contribution rate can be immediately (i.e., as of the beginning of the next calendar year) decreased from 25.32% of pay to 25.00% of pay to be projected to amortize the UAAL over the scheduled 26 years from January 1, 2017. If the contribution rate is not decreased, the UAAL would be projected to be amortized over a shorter period than 26 years. Because this figure is based on an Actuarial Value of Assets that is currently deferring a net loss, this 25.00% is projected to increase over the next several years (after next year) if no other actuarial asset gains or losses were to occur.

In Section 8 of this report, we have included a five-year projection of the actuarial required contribution, including optimistic and pessimistic investment return scenarios.

**Table 8 Contribution Rates as Percentages of Salary**

	Actuarial Required Contribution Beginning	
	January 1, 2017	January 1, 2016
A. Total normal cost rate	15.83 %	15.80 %
B. UAAL amortization rate	<u>9.17</u>	<u>9.52</u>
C. Actuarial required contribution rate	25.00 %	25.32 %
D. Member contribution rate	<u>10.03</u>	<u>10.03</u>
E. Allocation of employer contribution rate*		
Normal cost	5.80 %	5.77 %
Amortization payment	<u>9.17</u>	<u>9.52</u>
Total employer contribution rate	14.97 %	15.29 %

\* If member contributions are all allocated to paying normal cost.

**Table 9 Amortization of Unfunded Actuarial Accrued Liability (UAAL)\***  
 (All dollar amounts in millions)

Year	Payroll	Total Contribution Rate	Normal Cost Rate	UAAL Rate	UAAL			
					Beginning Balance	Amortization Payment	Interest	Ending Balance
2017	\$ 726	25.32%	15.83%	9.49%	\$ 1,202.3	\$ 68.9	\$ 87.6	\$ 1,221.1
2018	758	25.00%	15.83%	9.17%	1,221.1	69.5	89.0	1,240.6
2019	792	25.00%	15.83%	9.17%	1,240.6	72.6	90.4	1,258.4
2020	828	25.00%	15.83%	9.17%	1,258.4	75.9	91.6	1,274.0
2021	865	25.00%	15.83%	9.17%	1,274.0	79.3	92.6	1,287.3
2022	904	25.00%	15.83%	9.17%	1,287.3	82.9	93.5	1,298.0
2023	945	25.00%	15.83%	9.17%	1,298.0	86.6	94.2	1,305.5
2024	988	25.00%	15.83%	9.17%	1,305.5	90.6	94.6	1,309.4
2025	1033	25.00%	15.83%	9.17%	1,309.4	94.7	94.7	1,309.5
2026	1080	25.00%	15.83%	9.17%	1,309.5	99.0	94.6	1,305.0
2027	1129	25.00%	15.83%	9.17%	1,305.0	103.5	94.1	1,295.5
2028	1180	25.00%	15.83%	9.17%	1,295.5	108.2	93.2	1,280.5
2029	1233	25.00%	15.83%	9.17%	1,280.5	113.1	91.9	1,259.4
2030	1289	25.00%	15.83%	9.17%	1,259.4	118.2	90.1	1,231.3
2031	1347	25.00%	15.83%	9.17%	1,231.3	123.5	87.8	1,195.6
2032	1408	25.00%	15.83%	9.17%	1,195.6	129.1	84.9	1,151.4
2033	1472	25.00%	15.83%	9.17%	1,151.4	135.0	81.4	1,097.8
2034	1539	25.00%	15.83%	9.17%	1,097.8	141.1	77.1	1,033.8
2035	1609	25.00%	15.83%	9.17%	1,033.8	147.5	72.1	958.4
2036	1682	25.00%	15.83%	9.17%	958.4	154.2	66.2	870.4
2037	1758	25.00%	15.83%	9.17%	870.4	161.2	59.3	768.5
2038	1837	25.00%	15.83%	9.17%	768.5	168.4	51.4	651.5
2039	1920	25.00%	15.83%	9.17%	651.5	176.0	42.4	517.9
2040	2007	25.00%	15.83%	9.17%	517.9	184.0	32.1	365.9
2041	2098	25.00%	15.83%	9.17%	365.9	192.4	20.4	193.9
2042	2193	25.00%	15.83%	9.17%	193.9	201.1	7.1	(0.0)

\* Amortization shown does not include the projected impact of currently deferred asset gains and losses.

## Section 6 Additional Actuarial Information



The schedule of funding progress is shown in Table 10 and compares assets and liabilities over the years. Primarily due to the poor investment returns of 2000 through 2003, as well as the extreme market downturn of 2008, the Plan is not fully funded. Another material factor in the current funding shortfall is the benefit enhancements triggered in 2007 (i.e., 65% Floor COLA and the 1.5% COLA for all retirees).

Exhibit 11 compares the Actuarial Value of Valuation Assets to the types of Actuarial Accrued Liabilities, applying them first to Active Member contributions, then to retirees and beneficiaries, and then the remaining amount to the Active Members benefits. This is referred to as the Solvency Test. Although not required under GASB, this test is part of the CAFR guidelines specified by the Government Finance Officers Association (GFOA).

**Table 10 Schedule of Funding Progress**

(All dollar amounts in millions)

Actuarial Valuation Date January 1	Actuarial Value of Assets	Actuarial Accrued Liabilities (AAL)	Unfunded Actuarial Accrued Liabilities (UAAL)	Funded Ratio	Covered Payroll*	UAAL as a Percentage of Covered Payroll
1986	\$ 395.7	\$ 561.3	\$ 165.6	70.5%	\$ 182.0	91.0%
1988	445.4	595.3	149.9	74.8	199.0	75.3
1990	558.8	737.9	179.1	75.7	212.3	84.4
1992	660.0	810.5	150.5	81.4	239.4	62.9
1994	781.8	926.2	144.4	84.4	291.8	49.5
1996	980.2	1,019.7	39.5	96.1	310.6	12.7
1997	1,094.8	1,087.3	(7.5)	100.7	316.9	(2.4)
1998 **	1,224.6	1,266.7	42.1	96.7	341.5	12.3
1999	1,375.0	1,326.6	(48.4)	103.6	370.4	(13.1)
2000	1,582.7	1,403.1	(179.6)	112.8	383.6	(46.5)
2002	1,383.7	1,581.4	197.7	87.5	405.1	48.8
2004	1,527.5	1,778.9	251.4	85.9	424.7	59.2
2006	1,791.8	2,017.5	225.8	88.8	447.0	50.5
2008	2,119.4	2,294.6	175.2	92.4	501.9	34.9
2010	1,645.3	2,653.8	1,008.5	62.0	580.9	173.6
2011	2,013.7	2,709.0	695.4	74.3	563.2	123.5
2012	1,954.3	2,859.3	905.0	68.3	557.0	162.5
2013	1,920.1	3,025.3	1,105.2	63.5	567.8	194.6
2014	2,094.3	3,260.1	1,165.8	64.2	597.9	195.0
2015	2,266.7	3,432.6	1,165.9	66.0	630.9	184.8
2016	2,397.1	3,605.1	1,208.0	66.5	641.7	188.3
2017	2,564.1	3,766.4	1,202.3	68.1	708.6	169.7

\* Covered Payroll includes compensation paid to all active employees on which contributions are calculated. Covered Payroll differs from the Active Member Valuation Payroll shown in Table 1, which is an annualized compensation of only those members who were active on the actuarial valuation date.

\*\* Reflects increased COLA benefits adopted by the City Council after the valuation was completed.



**Table 11 Solvency Test**

(All dollar amounts in millions)

Actuarial Valuation Date January 1	Actuarial Value of Valuation Assets	Actuarial Accrued Liabilities for				Portion of Actuarial Accrued Liabilities Covered by Assets			
		(A)	(B)	(C)	(D)	(A)	(B)	(C)	(D)
		Active Member Contributions	Inactives, Retirees and Beneficiaries	Active Members (Employer Financed Portion)	Total				
1986	\$ 395.7	\$ 110.7	\$ 263.1	\$ 187.5	\$ 561.3	100.0%	100.0%	11.7%	70.5%
1988	445.4	136.0	303.6	155.7	595.3	100.0	100.0	3.7	74.8
1990	558.8	164.0	332.8	241.1	737.9	100.0	100.0	25.7	75.7
1992	660.0	202.6	357.9	250.0	810.5	100.0	100.0	39.8	81.4
1994	781.8	248.4	383.1	294.7	926.2	100.0	100.0	51.0	84.4
1996	980.2	294.1	409.3	316.3	1,019.7	100.0	100.0	87.5	96.1
1997	1,094.8	313.1	449.8	324.4	1,087.3	100.0	100.0	100.0	100.7
1998 *	1,224.6	337.3	551.8	377.6	1,266.7	100.0	100.0	88.9	96.7
1999	1,375.0	358.4	577.6	390.6	1,326.6	100.0	100.0	100.0	103.6
2000	1,582.7	385.2	599.4	418.5	1,403.1	100.0	100.0	100.0	112.8
2002	1,383.7	434.3	675.6	471.5	1,581.4	100.0	100.0	58.1	87.5
2004	1,527.5	482.5	758.9	537.5	1,778.9	100.0	100.0	53.2	85.9
2006	1,791.8	539.7	902.2	575.6	2,017.5	100.0	100.0	60.8	88.8
2008	2,119.4	590.1	1,084.9	619.6	2,294.6	100.0	100.0	71.7	92.4
2010	1,645.3	684.7	1,176.4	792.7	2,653.8	100.0	81.7	0.0	62.0
2011	2,013.7	683.7	1,290.9	734.4	2,709.0	100.0	100.0	5.3	74.3
2012	1,954.3	730.9	1,393.7	734.7	2,859.3	100.0	87.8	0.0	68.3
2013	1,920.1	757.3	1,513.4	754.6	3,025.3	100.0	76.8	0.0	63.5
2014	2,094.3	792.4	1,657.0	810.7	3,260.1	100.0	78.6	0.0	64.2
2015	2,266.7	829.7	1,753.5	849.4	3,432.6	100.0	82.0	0.0	66.0
2016	2,397.1	851.2	1,875.1	878.8	3,605.1	100.0	82.4	0.0	66.5
2017	2,564.1	888.1	1,975.1	903.2	3,766.4	100.0	84.9	0.0	68.1

\* Reflects increased COLA benefits adopted by the City Council after the valuation was completed.

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## Section 7 Actuarial Gains or Losses



An analysis of actuarial gains or losses was performed in conjunction with the January 1, 2015, January 1, 2016, and January 1, 2017 actuarial valuations.

The results of our analysis of the financial experience of the System in the three most recent actuarial valuations are presented in Table 12. Each gain or loss shown represents our estimate of how much the given type of experience caused the UAAL to change in the period since the previous actuarial valuation.

Gains and losses due to demographic sources are approximate. Demographic experience is analyzed in greater detail in our periodic assumption studies.

**Table 12 Analysis of Actuarial Gains or Losses\***

(All dollar amounts in millions)

	Gain/(Loss) For Period		
	2016	2015	2014
<b>Investment Income</b>			
Investment income on AVA was greater (less) than assumed.	\$ 2.3	\$ (22.1)	\$ 32.6
<b>Pay Increases</b>			
Pay increases were less (greater) than expected.	14.5	(7.3)	(3.9)
<b>Age and Service Retirements</b>			
Members retired at older (younger) ages or with less (greater) final average pay than expected.	20.9	17.2	13.0
<b>Disability Retirements</b>			
Disability claims were less (greater) than expected.	(0.1)	(0.1)	(0.1)
<b>Death-in-Service Benefits</b>			
Survivor claims were less (greater) than expected.	-	-	-
<b>Withdrawal from Employment</b>			
More (less) reserves were released by withdrawals than expected.	(18.9)	(24.0)	(25.4)
<b>Death after Retirement</b>			
Retirees died younger (lived longer) than expected.	<u>(1.0)</u>	<u>9.0</u>	<u>5.6</u>
<b>Total Gain or (Loss) during Period from Financial Experience</b>	\$ 17.7	\$ (27.3)	\$ 21.7
<b>Non-Recurring Items:</b>			
Changes in actuarial assumptions and plan amendments caused a gain (loss).	-	-	-
Data revisions	-	-	-
Change in actuarial asset valuation method caused a gain (loss).	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
<b>Composite Gain (Loss) During Period</b>	\$ 17.7	\$ (27.3)	\$ 21.7

\* Effects related to losses are shown in parentheses. Numerical results are expressed as a decrease (increase) in the UAAL.

## Section 8 Contribution Rate Projections and Increases



This section of the January 1, 2017 actuarial valuation is devoted to a detailed discussion of the contribution rates currently needed, and projected to be needed, in order to effectively fund the System.

This section illustrates two key points:

1. As mentioned throughout this report, the current AVA is deferring a net loss. As a result, if no actuarial asset gains or losses were to occur over the next several years (i.e., the market return equals 7.50%), the minimum actuarially required contribution rate would be projected to increase slightly (and the Funding Ratio would be projected to decrease) as the remaining deferred losses are fully phased in.
2. Currently, the City is expected to contribute a total rate of 25.00% of payroll (employer and member) beginning January 1, 2018, on the basis of the current valuation report. The actual contribution rate needed will vary in the future. We have shown projections to roughly quantify the potential impact of good and bad experience.

### Projection of Minimum Actuarially Required Contribution Rate

We have performed a five-year projection of the minimum actuarially required contribution rate under three different scenarios:

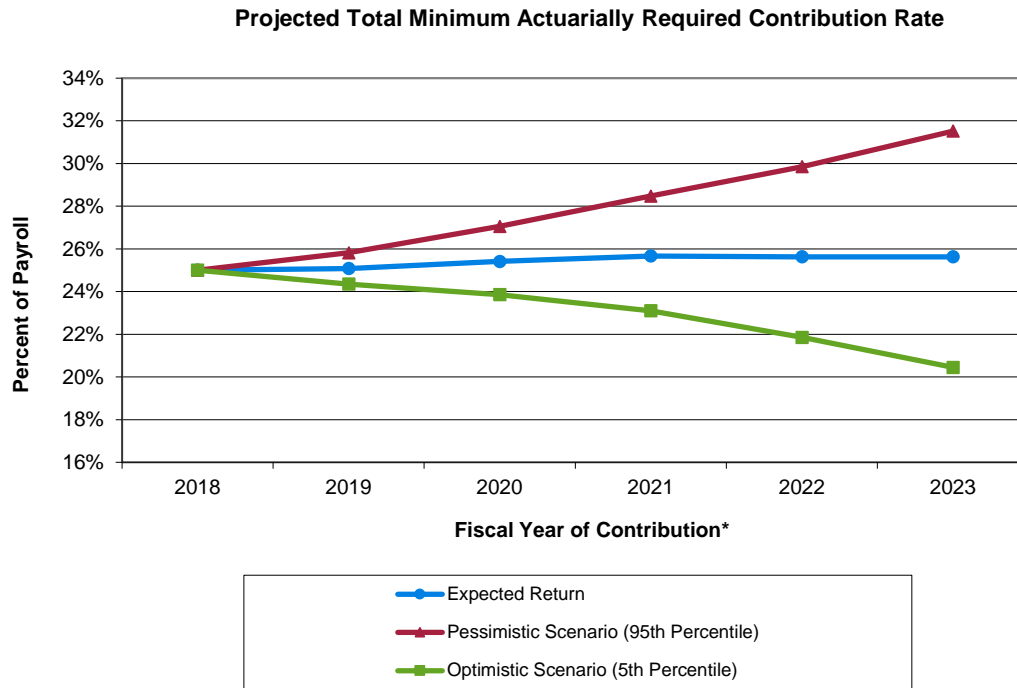
1. Assuming that the investment return assumption of 7.50% is met in each future year.
2. Assuming that the assets return at the 5<sup>th</sup> percentile.
3. Assuming that the assets return at the 95<sup>th</sup> percentile.

The result is effectively a 90% confidence interval (based on asset returns) of the projected contribution rates in these years. Note that in each scenario, all other actuarial assumptions are assumed to be met.

The projections assume the City contributes the minimum actuarially required contribution rate each year in the future. This rate is based on a 26-year closed amortization period as of January 1, 2017 and includes a 0.50% population growth assumption. Future returns at the 5<sup>th</sup> and 95<sup>th</sup> percentile are based on Milliman's capital market assumptions and SCERS's target asset allocation as of January 1, 2017.

Table 13 provides the results of these projections.

**Table 13 Projected Total Contribution Rates**



**Projected Minimum Actuarially Required Total Contribution Rate**

Contribution Year*	If Asset Return at 95th Percentile	Assuming 7.50% Future Returns	If Asset Return at 5th Percentile
2018	25.00%	25.00%	25.00%
2019	25.82%	25.08%	24.35%
2020	27.05%	25.41%	23.86%
2021	28.47%	25.67%	23.10%
2022	29.85%	25.63%	21.86%
2023	31.52%	25.63%	20.45%

\* Contribution year lags calculation year by one year. For example: Contribution Year 2018 is based on the 2017 valuation results, amortized over 26 years beginning in 2017, if the increase takes place in 2018.

**Assumed Returns for Projection**

The projection above uses the 5<sup>th</sup> and 95<sup>th</sup> percentile returns based on SCERS' target asset allocation and Milliman's January 1, 2017 capital market assumptions. These percentile returns vary by the number of years of return; for example, the Contribution Year 2018 number assumes one year of return at the one-year 5<sup>th</sup> or 95<sup>th</sup> percentile rate; the Contribution Year 2019 number assumes two years of return at the two-year 5<sup>th</sup> or 95<sup>th</sup> percentile rate.

The percentile rates assumed for this analysis are shown in the table below:

	Compounded Average Return for Period	
	Percentile	
	95 <sup>th</sup>	5 <sup>th</sup>
<i>1-Year Period</i>	-11.3%	26.0%
<i>2-Year Period</i>	-6.6%	19.7%
<i>3-Year Period</i>	-4.4%	17.0%
<i>4-Year Period</i>	-3.1%	15.4%
<i>5-Year Period</i>	-2.2%	14.4%

**Contribution Decreases**

As of January 1, 2017, a minimum actuarially required contribution rate of 25.00% is projected to be needed in order to amortize the UAAL over a 26-year period beginning January 1, 2017.

This represents a decrease of 0.32% of pay compared with the current 25.32% of pay being contributed (by the employer and members combined) based on a target of a 100% Funding Ratio by January 1, 2043. Note that due to the future recognition of deferred asset losses, the contribution rate is expected to increase in the next valuation, if all assumptions are met.

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## Section 9 Projection of Benefit Payments and Contribution Dollars



### Projection of Benefit Payments and Contribution Dollars

This section of the January 1, 2017 actuarial valuation illustrates projected SCERS benefit payments and dollar contributions over a 10-year period following the actuarial valuation.

These projections assume all actuarial assumptions, including 7.50% investment returns (on a market basis) in each future year, are met in the future.

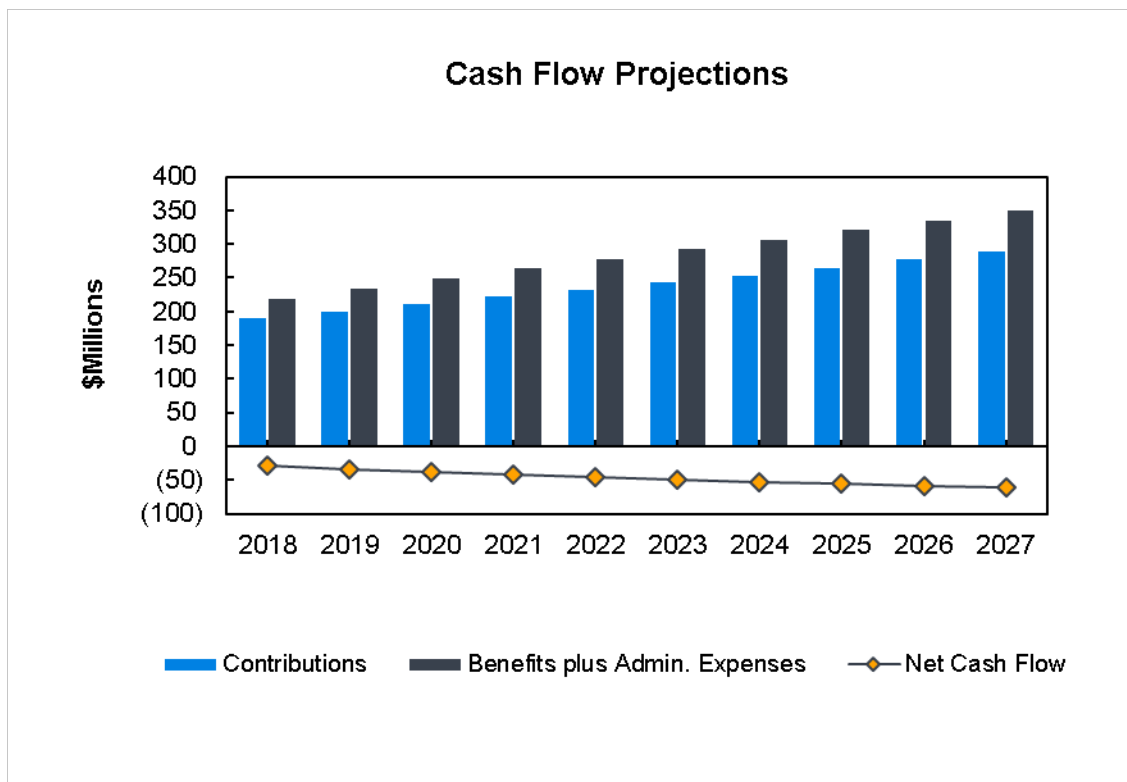
The projection of contribution dollars makes the following three additional key assumptions:

1. Valuation payroll is assumed to grow with both wage inflation of 4.00% and annual population growth of 0.50% (per current SCERS assumptions).
2. The City is assumed to make the minimum actuarially required contribution rate calculated in each projection year.
3. Future recognition of currently deferred asset gains or losses is reflected in the projection.

Table 14 shows the results of these projections.

**Table 14 10-Year Projection of Benefit Payments and Contributions\***

Year	Projected Payroll	Projected Admin. Expenses	Projected Benefit Payments	Projected Total Cash Outflow	Projected Total Contributions	Projected Net Cash Flow
2018	\$ 758.4	\$ 4.6	\$ 213.4	\$ 218.0	\$ 189.6	\$ (28.4)
2019	792.7	4.8	228.9	233.7	198.8	(34.9)
2020	828.5	5.0	244.1	249.1	210.5	(38.5)
2021	866.0	5.2	258.4	263.6	222.3	(41.3)
2022	905.1	5.4	272.4	277.8	232.0	(45.9)
2023	946.0	5.7	286.5	292.2	242.5	(49.7)
2024	988.8	5.9	300.7	306.6	253.4	(53.2)
2025	1,033.5	6.2	314.6	320.8	264.9	(55.9)
2026	1,080.2	6.5	328.6	335.1	276.8	(58.2)
2027	1,129.0	6.8	342.6	349.4	289.4	(60.0)



\* Benefit payments do not include administrative expenses. Contributions include employer and member contributions.

## Appendix A Actuarial Procedures and Assumptions



This section of the report describes the actuarial procedures and assumptions used in this valuation. The assumptions used in this valuation were adopted by the SCERS Board at its May 2014 meeting. They are based on Milliman's Investigation of Experience for the period ending December 31, 2013. Further discussion and the rationale for the assumptions are shown in that report.

The actuarial assumptions used in the valuation are intended to estimate the future experience of the members of the System and of the System itself in areas that affect the projected benefit flow and anticipated investment earnings. Any variations in future experience from that expected from these assumptions will result in corresponding changes in the estimated costs of the System's benefits. Table A-1 summarizes the actuarial assumptions.

Table A-2 presents expected annual salary increases for various years of service. Tables A-3 through A-6 show rates of decrement for service retirement, disability, mortality, and other terminations of employment. Table A-7 shows probabilities of refund upon termination.

### Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets, and (b) the actuarial present value of future normal costs is called the unfunded actuarial accrued liability or UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

### Records and Data

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data were supplied by the System and are accepted for valuation purposes without audit.

### Replacement of Terminated Members

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

### City Contributions

The City contribution rate is determined as of the prior year's valuation such that the combined member and City contribution rate is sufficient to amortize the UAAL over a closed 30-year period beginning January 1, 2013. The amortization payment is based on a level percent of pay.

<b>Administrative Expense</b>	The annual contribution assumed to be necessary to meet general administrative expenses of the system, excluding investment expenses, is 0.60% of members' salaries. This figure is included in the calculation of the normal cost rate.
<b>Valuation of Assets</b>	The assets are valued using a five-year smoothing method based on the difference between the expected market value and the actual market value of the assets in each year. The expected market value is the prior year's market value increased with the net increase in the cash flow, all increased with interest during the past fiscal year at the expected investment return rate assumption.
<b>Investment Earnings</b>	The annual rate of investment earnings of the assets of the System is assumed to be 7.50%. This rate is compounded annually and is net of investment expenses.
<b>Postretirement Benefit Increases</b>	<p>Postretirement benefit increases include:</p> <ul style="list-style-type: none"><li>▪ Automatic 1.5% Annual COLA – This benefit applies to all members.</li><li>▪ 65% Restoration of Purchasing Power (ROPP) – The member's benefit is the greater of 65% of the annual initial benefit adjusted for CPI or their applicable benefit. This minimum benefit is available to all retirees and beneficiaries. The financial impact of the ROPP benefit is valued assuming an annual price inflation rate of 3.25%.</li></ul> <p>Additional contingent COLA increases that were adopted in 2001, but not effective until the System reaches at least a 100% funding ratio, are not included in the valuation results.</p>
<b>Valuation Services</b>	<p>The projected salary for the valuation year is equal to the member's hourly pay rate multiplied by 2088 with the following adjustments:</p> <ul style="list-style-type: none"><li>▪ Annualized pay for members who entered in year preceding valuation year.</li><li>▪ Multiplied hourly pay rate by minimum of 1,040 and actual hours worked in prior year for part-time employees.</li></ul>
<b>Future Salaries</b>	Table A-2 illustrates the rates of future (after the valuation year) salary increases assumed for the purpose of the valuation. In addition to increases in salary due to promotions and longevity, this scale includes an assumed 4.00% per annum rate of increase in the general wage level of the membership.
<b>Service Retirement</b>	Table A-3 shows the annual assumed rates of retirement among members eligible for service retirement or reduced retirement. Separate rates are also used during the first year a member is eligible for service retirement.
<b>Disability</b>	The rates of disability used in this valuation are illustrated in Table A-4. It is assumed that one-third of all disabilities are duty related and two-thirds occur while off duty.
<b>Mortality</b>	The mortality rates used in this valuation are illustrated in Table A-5. A written description of each table used is included in Table A-1.

<b>Other Terminations of Employment</b>	The rates of assumed future withdrawal from active service for reasons other than death, disability, or retirement are shown for representative ages in Table A-6. Note that this assumption only applies to members who terminate and are not yet eligible for retirement.
<b>Probability of Refund</b>	<p>Terminating members may forfeit a vested right to a deferred benefit if they elect a refund of their accumulated contributions. Table A-7 gives the assumed probability, at selected ages, that a terminating member will elect to receive a refund of his accumulated contributions instead of a deferred benefit.</p> <p>If a member terminates with more than 20 years of service, there is assumed to be a 20% probability that the member will elect a refund.</p> <p>Note that the probability of refund assumption only applies to members who terminate with a vested benefit and are not yet eligible for retirement.</p>
<b>Interest on Member Contributions</b>	Interest on member contributions made prior to January 1, 2012 is assumed to accrue at a rate of 5.75% per annum, compounded annually. Interest on member contributions made on or after January 1, 2012 is assumed to accrue at 4.75%.
<b>Portability</b>	The cost of portability with other public retirement systems is not included in this valuation.
<b>Probability of Marriage</b>	We assumed 60% of the active members are married or have a registered domestic partner.
<b>Commencement for Terminated Vested Members</b>	Vested members who terminate but elect to leave their contributions in the System are assumed to commence receiving benefits at age 62.

**Table A-1 Summary of Valuation Assumptions**

**January 1, 2017**

I. Economic assumptions		
A. Price inflation		3.25%
B. General wage increases		4.00
C. Investment return		7.50
D. Increase in membership		0.50
E. Interest on member accounts		5.75/4.75*
II. Demographic assumptions		
A. Salary increases due to promotion and longevity		Table A-2
B. Retirement		Table A-3
C. Disability		Table A-4
D. Mortality** among contributing members		Table A-5
Men	RP 2000 Employees Table for Males, with ages set back six years.	
Women	RP 2000 Employees Table for Females, with ages set back six years.	
E. Mortality** among service retired members and beneficiaries		Table A-5
Men	RP2000 Combined Healthy Males, with ages set back two years.	
Women	RP2000 Combined Healthy Females, with ages set back one year.	
F. Mortality** among disabled members		Table A-5
Men	RP2000 Disabled Males, with ages set back four years.	
Women	RP2000 Disabled Females, with ages set back four years.	
G. Other terminations of employment		Table A-6
H. Probabilities of vesting on termination		Table A-7

\* Member contributions made prior to January 1, 2012 are assumed to accrue interest at 5.75%; contributions made on or after that date are assumed to accrue at 4.75%.

\*\* All mortality tables are generational using Projection Scale AA to reflect expected future mortality improvement.

**Table A-2 Future Salaries**

Annual Rate of Increase		
Years of Service	Promotion and Longevity	Total*
0 to 1	4.50%	8.68%
1 to 2	3.50	7.64
2 to 3	2.75	6.86
3 to 4	2.00	6.08
4 to 5	1.50	5.56
9 to 10	0.80	4.83
14 to 15	0.45	4.47
19 to 20	0.29	4.30
24 to 25	0.25	4.26
29 to 30	0.25	4.26
35 or more	0.25	4.26

\* Total rate shown reflects compounded effect of merit increase and assumed wage growth of 4.00%.

**Table A-3 Retirement**

Age	Annual Probability					
	Men			Women		
	Eligible for Full Benefits			Eligible for Full Benefits		
	Eligible for Reduced Benefits	Less than 30 years of service	30 years or more of service	Eligible for Reduced Benefits	Less than 30 years of service	30 years or more of service
Less than 50	0.0%	8.0%	8.0%	0.0%	10.0%	10.0%
50	5.0	8.0	10.0	5.0	10.0	10.0
51	5.0	8.0	10.0	5.0	10.0	10.0
52	5.0	8.0	12.0	5.0	10.0	12.0
53	3.0	8.0	12.0	3.0	10.0	12.0
54	3.0	8.0	12.0	3.0	10.0	12.0
55	6.0	8.0	12.0	6.0	10.0	12.0
56	5.0	8.0	12.0	5.0	10.0	12.0
57	5.0	8.0	12.0	5.0	13.0	12.0
58	5.0	8.0	12.0	5.0	13.0	12.0
59	5.0	8.0	15.0	8.0	13.0	15.0
60	6.0	14.0	15.0	8.0	15.0	15.0
61	9.0	12.0	15.0	12.0	13.0	15.0
62	15.0	20.0	30.0	15.0	20.0	26.5
63	12.0	18.0	22.0	12.0	18.0	20.0
64	9.5	18.0	22.0	13.0	18.0	20.0
65		40.0	32.0		40.0	30.0
66		40.0	32.0		40.0	38.0
67		40.0	32.0		40.0	38.0
68		30.0	26.0		33.0	32.0
69		30.0	26.0		33.0	32.0
70		*	*		*	*

\* Immediate retirement is assumed for every person age 70 or over.



Table A-4 Disability\*

Age	Annual Rates	
	Men	Women
20	.00%	.00%
25	.00	.00
30	.02	.02
35	.02	.02
40	.03	.03
45	.03	.03
50	.04	.04
55	.04	.04
60	.04	.04
65	.00	.00

\* It is assumed that one-third of all disabilities are duty related and two-thirds are non-duty related.

**Table A-5 Mortality**

Age	Annual Probability*					
	Contributing Members		Members Retired for Service and Beneficiaries of Members		Disabled Members	
	Men	Women	Men	Women	Men	Women
22	0.03 %	0.02 %	0.03 %	0.02 %	2.26 %	0.74 %
27	0.04	0.02	0.04	0.02	2.26	0.74
32	0.04	0.02	0.04	0.03	2.26	0.74
37	0.05	0.03	0.08	0.05	2.26	0.74
42	0.08	0.05	0.11	0.08	2.26	0.74
47	0.11	0.08	0.15	0.12	2.26	0.74
52	0.16	0.12	0.21	0.19	2.64	0.98
57	0.23	0.18	0.36	0.31	3.29	1.45
62	0.33	0.28	0.67	0.58	3.93	1.97
67	0.54	0.43	1.27	1.10	4.66	2.53
72	N/A	N/A	2.22	1.86	5.69	3.32
77	N/A	N/A	3.78	3.10	7.33	4.58
82	N/A	N/A	6.44	5.08	9.76	6.35
87	N/A	N/A	11.08	8.64	12.83	8.78
92	N/A	N/A	18.34	14.46	16.22	12.25

\*The mortality rates shown above are generationally projected on an individual basis using Projection Scale AA for the valuation.

**Table A-6 Other Terminations of Employment Among Members Not Eligible to Retire**

Years of Service	Annual Rates for Men	Annual Rates for Women
0 to 1	6.5%	8.5%
1 to 2	5.8	8.3
2 to 3	5.3	8.0
3 to 4	4.8	7.8
4 to 5	4.4	7.5
5 to 6	4.1	7.0
6 to 7	3.8	6.3
7 to 8	3.5	5.7
8 to 9	3.2	5.1
9 to 10	2.9	4.5
10 to 11	2.6	4.1
11 to 12	2.3	3.8
12 to 13	2.1	3.4
13 to 14	1.9	3.1
14 to 15	1.7	2.7
15 to 16	1.5	2.4
16 to 17	1.4	2.0
17 to 18	1.2	1.7
18 to 19	1.1	1.4
19 to 20	1.0	1.2
20 to 21	0.9	1.1
21 to 22	0.8	1.0
22 to 23	0.8	0.9
23 to 24	0.7	0.8
24 to 25	0.7	0.8
25 to 26	0.6	0.7
26 to 27	0.6	0.7
27 to 28	0.5	0.6
28 to 29	0.5	0.6
29 to 30	0.4	0.5
30 or more	0.5	0.5

Table A-7 Probability of Refund

Age	Probabilities of Refund upon Termination*
25	70.0%
30	65.0
35	55.0
40	48.0
45	43.0
50	38.0
55	36.0
60	40.0

*\* If service is 20 or more years at termination,  
probability of refund is equal to 20%.*

## Appendix B Provisions of Governing Law



All actuarial calculations are based upon our understanding of the provisions governing the Seattle City Employees' Retirement System, Chapter 4.36 of the Seattle City Code. The benefit and contribution provisions are summarized briefly below, along with corresponding references to the City code. This summary encompasses the major provisions of the System; it does not attempt to cover all of the detailed provisions. We have not valued any benefit changes applicable to members hired after December 31, 2016.

<b>Effective Date</b>	The effective date of the retirement system was July 1, 1929. (Section 4.36.080)
<b>Members' Contribution Rate</b>	The members' contribution rate is 10.03% of salary as of January, 2012. Certain members who were contributing at a lower rate on June 23, 1972 continue to contribute at a lower rate. (Section 4.36.540A)
<b>City Contribution Rate</b>	The City contribution rate is the amount that is actuarially determined to be necessary to fund that portion of the retirement allowances not covered by the members' contributions. This amount shall be at least the members' contribution rate. (Section 4.36.545)
<b>Final Compensation</b>	Final compensation is based on highest average compensation (excluding overtime) during any consecutive 24 months. (Sections 4.36.040 and 4.36.050)
<b>Service Retirement</b>	<p><i>Eligibility</i></p> <p>30 years of service;</p> <p>Age 52 and 20 years of service;</p> <p>Age 57 and 10 years of service; or</p> <p>Age 62 and 5 years of service.</p> <p><i>Normal Form</i></p> <p>Straight life benefit.</p> <p><i>Optional Forms</i></p> <p>Actuarial equivalent according to the mortality and interest basis adopted by the Retirement Board for such purposes.</p>

**Service Retirement  
(continued)**

*Amount of Allowance*

The total monthly allowance is generally 2% times final compensation times total years of creditable service.

However, if the member does not qualify in one of the following ways, the 2% factor is reduced by 0.1% for each year that retirement precedes the earliest date the member would be:

- (a) Any age with 30 years of service.
- (b) Age 51-59, providing the member's age and years of service total 80 or more.
- (c) Age 60 or older with 20 years of service.
- (d) Age 65 or older with five years of service.

The reduction is somewhat less than 0.1% for members with less than 20 years of service.

For those hired on or after January 1, 1988, creditable service excludes the first six months of service.

*Maximum Allowance*

The formula-based retirement allowance (as described above) of any member shall be limited to 60% of final compensation, except where the minimum allowance described below applies.

*Minimum Allowance*

A monthly benefit based on twice the actuarial value of accumulated member contributions. This is not subject to the 60% of final compensation maximum. (Sections 4.36.600, 4.36.605, 4.36.610 and 4.36.640)

Note: Effective January 1, 2011, the conversion of the contributions to an annuity benefit in the minimum allowance reflects option factors that use the new mortality rates.

## Disability Retirement

### *Eligibility*

Ten years of service credited within the 15 years preceding disability retirement. If disability occurs in the course of City employment, there is no service requirement.

### *Normal Form*

Modified cash refund annuity. An optional survivor's benefit is available if the spouse is the beneficiary.

### *Amount of Allowance*

The total monthly disability allowance is the greater of:

- (a) 1.5% times final compensation times completed years of creditable service.
- (b) 1.5% times final compensation times total years of creditable service that could have been earned to age 62, but not to exceed one-third of final compensation.

### *Maximum Allowance*

The maximum disability allowance is 60% of final compensation.

### *Minimum Allowance*

The minimum disability allowance is \$140 per month.

(Sections 4.36.645 and 4.36.650)

## Death Benefits

### *Retired Members*

Death benefits to retired members are payable according to the form of retirement allowance elected.

### *Active Members*

- (a) Payment to the beneficiary of accumulated contributions, including interest; or
- (b) If the member had completed 10 years of service at the time of death, a surviving spouse or a registered domestic partner may elect to receive, in place of (a) above, either:
  - (1) A monthly allowance for life equal to the benefit the spouse would have received had the member just retired with a 100% contingent annuitant option in force; or
  - (2) A cash payment of no more than one-half of the member's accumulated contributions, along with a correspondingly reduced retirement allowance.

(Section 4.36.680)

## Withdrawal Benefits

### *Form*

Payment of accumulated contributions, with interest.

(Section 4.36.665A)

**Vested Withdrawal  
Benefits**

*Eligibility*  
Five years of service.

*Amount of Allowance*  
Same as service retirement benefit.

*Benefits Commence*  
Age 52, if 20 or more years of service;  
Age 57, if 10-19 years of service; or  
Age 62, regardless of years of service.  
(Section 4.36.665)

**Postretirement Benefit  
Increases**

*Provisions*  
Effective January 1, 2007, the City Council adopted a 65% Restoration of Purchasing Power benefit and an automatic 1.5% annual COLA to all members.  
If the System reaches a 100% Funding Ratio, the restoration amount increases to 70%.  
(Section 4.36.615)

**Death Benefit System**

*Eligibility*  
Mandatory for all active members; optional for retired members.

*Benefits*  
\$2,000 upon the death of an active member or a participating retired member.

*Assessment*  
Members pay an assessment of \$12 per year; the City pays a matching amount. If these assessments are not adequate, additional amounts may be transferred from the interest earnings in the retirement fund.  
(Sections 4.36.690 and 4.36.695)

**Additional  
Contributions**

*Provisions*  
Members may voluntarily make contributions in excess of the regular rate; these are make-up contributions that apply only in specific situations.

*Retirement Benefit*  
A monthly annuity which is the actuarial equivalent of accumulated additional contributions with interest.

*Other Benefits*  
Accumulated additional contributions, with interest, generally become payable upon termination other than retirement.  
(Sections 4.36.030 and 4.36.540A)



## Appendix C Valuation Data



This valuation is based upon the membership of the system as of January 1, 2017. Membership data were supplied by the System and accepted for valuation purposes without audit. However, extensive tests were performed to ensure that the data are sufficiently accurate for valuation purposes.

The data for all contributing members, former contributing members, and their survivors are summarized in Table C-1.

Tables C-2 through C-4 present distributions of members receiving service retirement benefits, members receiving disability retirement benefits, and survivors receiving benefits. Shown in the tables are the numbers of persons receiving benefits, the total annual benefits received (including payments for the annual bonus), and the average annual benefit per recipient.

Table C-5 contains summaries of the data for contributing members. Values shown in the tables are the numbers of members and their total and average annual salaries.

The valuation also includes liabilities attributable to members who have terminated employment but have neither retired nor withdrawn their contributions.

Table C-1 Summary of Membership Data

	Contributing Members			Annuitants		
	Number	Annual Salaries (\$1,000)	Average Annual Salaries	Number	Annual Benefits (\$1,000)	Average Annual Benefits
Males	5,134	419,232	81,658	3,231	98,141	30,375
Females	4,017	306,348	76,263	3,151	76,791	24,370
January 1, 2017	9,151	\$ 725,580	\$ 79,288	6,382	\$ 174,933	\$ 27,411
January 1, 2016	8,882	686,748	77,317	6,223	165,836	26,650
January 1, 2015	8,746	647,800	74,068	6,019	155,597	25,852
January 1, 2014	8,603	606,888	70,548	5,880	147,145	25,026
January 1, 2013	8,465	579,396	68,449	5,742	137,836	24,006
January 1, 2012	8,430	560,412	66,476	5,580	128,645	23,056
January 1, 2011	8,599	569,472	66,225	5,428	118,920	21,909
January 1, 2010	9,071	596,892	65,802	5,304	108,886	20,529
January 1, 2008	8,842	529,062	59,835	5,201	102,772	19,760
January 1, 2006	8,521	468,096	54,934	5,011	83,988	16,761
January 1, 2004	8,382	441,562	52,680	4,876	74,341	15,246
January 1, 2002	8,758	418,908	47,831	4,733	61,801	13,058
January 1, 2000	8,669	382,620	44,137	4,681	55,542	11,865
January 1, 1999	7,779	333,984	42,934	4,644	52,482	11,301
January 1, 1998	7,926	329,028	41,512	4,649	50,394	10,840
January 1, 1996	8,078	314,448	38,926	4,619	44,271	9,585

**Table C-2 Members Receiving Service Retirement Benefits as of January 1, 2017 – Inactive Lives**

	<50	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+	Totals
Number of Persons											
Male	1	10	107	347	771	779	468	302	172	163	3,120
Female	0	10	130	372	710	577	250	156	114	116	2,435
Total	1	20	237	719	1,481	1,356	718	458	286	279	5,555
Annual Benefits in Thousands											
Male \$	* \$	415 \$	4,213 \$	13,271 \$	25,651 \$	23,978 \$	13,725 \$	7,615 \$	3,987 \$	3,765 \$	96,620 \$
Female	0	457	5,165	12,531	20,085	14,604	5,329	3,072	1,832	1,397	64,472
Total	*	872	9,378	25,802	45,736	38,582	19,054	10,687	5,819	5,162	161,092
Average Annual Benefits											
Male \$	* \$	41,500 \$	39,374 \$	38,245 \$	33,270 \$	30,780 \$	29,327 \$	25,215 \$	23,180 \$	23,098 \$	30,968 \$
Female	0	45,700	39,731	33,685	28,289	25,310	21,316	19,692	16,070	12,043	26,477
Total	*	43,600	39,570	35,886	30,882	28,453	26,538	23,334	20,346	18,502	28,999

**Table C-3 Members Receiving Disability Retirement Benefits as of January 1, 2017 – Inactive Lives**

	<50	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+	Totals
Number of Persons											
Male	1	3	3	4	3	4	4	3	1	0	26
Female	2	1	6	10	4	1	3	2	0	0	29
Total	3	4	9	14	7	5	7	5	1	0	55
Annual Benefits in Thousands											
Male	\$ * \$	58 \$	58 \$	71 \$	47 \$	54 \$	55 \$	38 \$	* \$	0 \$	381
Female	33	*	103	179	73	*	29	24	0	0	441
Total	33	58	161	250	120	54	84	62	*	0	822
Average Annual Benefits											
Male	\$ * \$	19,333 \$	19,333 \$	17,750 \$	15,667 \$	13,500 \$	13,750 \$	12,667 \$	* \$	0 \$	14,654
Female	16,500	*	17,167	17,900	18,250	*	9,667	12,000	0	0	15,207
Total	11,000	14,500	17,889	17,857	17,143	10,800	12,000	12,400	*	0	14,931

\* Benefit amounts for groups with only one member not shown.

**Table C-4 Survivors Receiving Retirement Benefits as of January 1, 2017 – Inactive Lives**

	<50	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+	Totals
Number of Persons											
Male	0	0	3	10	7	7	8	5	6	4	50
Female	6	9	22	39	64	76	67	72	100	173	628
Total	6	9	25	49	71	83	75	77	106	177	678
Annual Benefits in Thousands											
Male \$	0 \$	0 \$	50 \$	175 \$	70 \$	145 \$	82 \$	76 \$	51 \$	24 \$	673
Female	95	175	439	791	1,219	1,539	1,208	1,244	1,751	2,398	10,859
Total	95	175	489	966	1,289	1,684	1,290	1,320	1,802	2,422	11,532
Average Annual Benefits											
Male \$	0 \$	0 \$	16,667 \$	17,500 \$	10,000 \$	20,714 \$	10,250 \$	15,200 \$	8,500 \$	6,000 \$	13,460
Female	15,833	19,444	19,955	20,282	19,047	20,250	18,030	17,278	17,510	13,861	17,291
Total	15,833	19,444	19,560	19,714	18,155	20,289	17,200	17,143	17,000	13,684	17,009

Note: In addition, 35 male survivors are receiving \$467,376 and 59 female survivors are receiving \$1,019,355 in Option B or Option C for a certain period only.

**Table C-5 Distribution of Employees and Salaries as of January 1, 2017 – Active Lives**

**Number of Employees - By Age Group - Males**

Nearest Year of Service	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Totals
0		10	27	49	33	27	39	20	15	5	2		227
1	1	16	63	83	72	60	49	29	47	19	3		442
2		15	32	53	71	50	43	34	28	22	2	1	351
3-4		7	54	92	112	83	83	56	50	49	11	4	601
5-9			31	106	135	137	134	116	110	66	31	7	873
10-14			4	47	129	154	144	127	133	107	38	9	892
15-19				1	29	83	146	160	159	128	56	16	778
20-24						8	66	82	89	58	22	8	333
25-29							19	77	106	83	41	12	338
30-34								10	51	61	31	5	158
35-39								1	30	50	15	5	101
40+									1	15	16	8	40
Totals	1	48	211	431	581	602	723	712	819	663	268	75	5,134

**Monthly Salaries in Thousands - By Age Group - Males**

Nearest Year of Service	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Totals
0	\$	\$ 37	\$ 142	\$ 280	\$ 204	\$ 153	\$ 238	\$ 149	\$ 92	\$ 36	\$ 9		\$ 1,340
1	2	58	296	465	442	385	328	181	312	158	19		2,646
2		54	159	355	475	368	298	234	163	136	14	10	2,266
3-4		25	279	577	780	580	610	387	390	356	73	26	4,083
5-9			156	639	949	1,008	919	826	782	465	216	41	6,001
10-14			24	275	853	1,048	1,013	831	921	664	224	43	5,896
15-19				5	175	604	1,034	1,166	1,185	878	378	100	5,525
20-24						52	498	585	649	411	152	42	2,389
25-29							140	596	759	626	296	82	2,499
30-34								75	399	464	230	37	1,205
35-39								9	232	421	118	29	809
40+									7	111	115	44	277
Totals	2	174	1,056	2,596	3,878	4,198	5,078	5,039	5,891	4,726	1,844	454	34,936



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**Table C-5 Distribution of Employees and Salaries as of January 1, 2017 – Active Lives (continued)**

<b>Average Monthly Salaries - By Age Group - Males</b>													
Nearest Year of Service	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Totals
0	\$	\$ 3,700	\$ 5,259	\$ 5,714	\$ 6,182	\$ 5,667	\$ 6,103	\$ 7,450	\$ 6,133	\$ 7,200	\$ 4,500	\$	\$ 5,903
1	2,000	3,625	4,698	5,602	6,139	6,417	6,694	6,241	6,638	8,316	6,333		5,986
2		3,600	4,969	6,698	6,690	7,360	6,930	6,882	5,821	6,182	7,000	10,000	6,456
3-4		3,571	5,167	6,272	6,964	6,988	7,349	6,911	7,800	7,265	6,636	6,500	6,794
5-9			5,032	6,028	7,030	7,358	6,858	7,121	7,109	7,045	6,968	5,857	6,874
10-14			6,000	5,851	6,612	6,805	7,035	6,543	6,925	6,206	5,895	4,778	6,610
15-19				5,000	6,034	7,277	7,082	7,288	7,453	6,859	6,750	6,250	7,102
20-24						6,500	7,545	7,134	7,292	7,086	6,909	5,250	7,174
25-29							7,368	7,740	7,160	7,542	7,220	6,833	7,393
30-34								7,500	7,824	7,607	7,419	7,400	7,627
35-39								9,000	7,733	8,420	7,867	5,800	8,010
40+									7,000	7,400	7,188	5,500	6,925
Totals	2,000	3,625	5,005	6,023	6,675	6,973	7,024	7,077	7,193	7,128	6,881	6,053	6,805

**Table C-6 Distribution of Employees and Salaries as of January 1, 2017 – Active Lives**

**Number of Employees - By Age Group - Females**

Nearest Year of Service	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Totals
0		9	35	40	34	19	11	19	10	8	1		186
1		17	52	71	60	36	37	36	29	13	3		354
2		11	39	52	54	39	33	26	23	14	1		292
3-4		4	45	75	89	56	56	49	42	26	4	1	447
5-9			29	66	110	103	72	90	57	50	20	3	600
10-14			1	43	91	98	114	110	90	67	26	11	651
15-19				1	29	73	113	119	112	78	28	17	570
20-24						13	60	52	64	51	24	3	267
25-29						2	23	97	108	81	45	5	361
30-34								12	55	55	27	3	152
35-39									26	41	25	5	97
40+									1	15	19	5	40
Totals	0	41	201	348	467	439	519	610	617	499	223	53	4,017

**Monthly Salaries in Thousands - By Age Group - Females**

Nearest Year of Service	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Totals
0	\$	\$ 32	\$ 170	\$ 216	\$ 206	\$ 100	\$ 72	\$ 121	\$ 79	\$ 37	\$ 4		\$ 1,037
1		58	255	402	380	212	257	245	174	95	19		2,097
2		37	191	293	370	252	211	172	143	105	8		1,782
3-4		13	223	455	552	365	379	321	302	183	24	9	2,826
5-9			118	369	675	675	455	553	408	335	116	11	3,715
10-14			7	208	551	652	796	726	570	430	173	50	4,163
15-19				3	142	503	774	872	755	503	150	52	3,754
20-24						86	374	348	426	363	138	7	1,742
25-29						13	141	694	706	554	283	30	2,421
30-34								69	395	411	192	23	1,090
35-39									190	265	175	33	663
40+									6	91	110	32	239
Totals	0	140	964	1,946	2,876	2,858	3,459	4,121	4,154	3,372	1,392	247	25,529



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**Table C-6 Distribution of Employees and Salaries as of January 1, 2017 – Active Lives (continued)**

<b>Average Monthly Salaries - By Age Group - Females</b>													
Nearest Year of Service	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Totals
0	\$	\$ 3,556	\$ 4,857	\$ 5,400	\$ 6,059	\$ 5,263	\$ 6,545	\$ 6,368	\$ 7,900	\$ 4,625	\$ 4,000		\$ 5,575
1		3,412	4,904	5,662	6,333	5,889	6,946	6,806	6,000	7,308	6,333		5,924
2		3,364	4,897	5,635	6,852	6,462	6,394	6,615	6,217	7,500	8,000		6,103
3-4		3,250	4,956	6,067	6,202	6,518	6,768	6,551	7,190	7,038	6,000	9,000	6,322
5-9			4,069	5,591	6,136	6,553	6,319	6,144	7,158	6,700	5,800	3,667	6,192
10-14			7,000	4,837	6,055	6,653	6,982	6,600	6,333	6,418	6,654	4,545	6,395
15-19				3,000	4,897	6,890	6,850	7,328	6,741	6,449	5,357	3,059	6,586
20-24						6,615	6,233	6,692	6,656	7,118	5,750	2,333	6,524
25-29						6,500	6,130	7,155	6,537	6,840	6,289	6,000	6,706
30-34								5,750	7,182	7,473	7,111	7,667	7,171
35-39									7,308	6,463	7,000	6,600	6,835
40+									6,000	6,067	5,789	6,400	5,975
Totals		3,415	4,796	5,592	6,158	6,510	6,665	6,756	6,733	6,758	6,242	4,660	6,355

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<b>Entry Age Actuarial Cost Method</b>	A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.
<b>Funding Ratio</b>	The Actuarial Value of Assets divided by the Actuarial Accrued Liability. May also be calculated as the Market Value of Assets divided by the Actuarial Accrued Liability, in which case it is indicated that the Funding Ratio is shown on a Market Value basis.
<b>Normal Cost</b>	That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.
<b>Projected Benefits</b>	Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.
<b>Surplus Funding</b>	The excess of the Actuarial Value of Assets over the Actuarial Accrued Liability.
<b>Unaccrued Benefit</b>	The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.
<b>Unfunded Actuarial Accrued Liability</b>	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.