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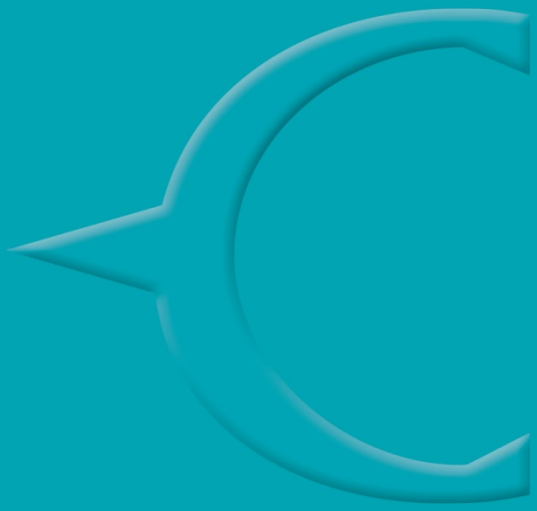

Employees Retirement System of the City of St. Louis

Actuarial Valuation as of October 1, 2017

Produced by Cheiron

January 2018

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LETTER OF TRANSMITTAL

January 25, 2018

Board of Pension Trustees
Employees Retirement System of the City of St. Louis
1114 Market Street, Suite 900
St. Louis, Missouri 63101

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the Employees Retirement System of the City of St. Louis as of October 1, 2017. The valuation is organized as follows:

- In Section I **Board Summary,** we describe the purpose of an actuarial valuation and summarize the key results found in this valuation.

- The **Main Body** of the report presents details on the System's:

  - Section II - Assets
  - Section III - Liabilities
  - Section IV - Contributions
  - Section V - Accounting Statement Information

- In the **Appendices,** we conclude our report with detailed information describing the System's membership (Appendix A), actuarial assumptions and methods employed (Appendix B), and a summary of pertinent plan provisions (Appendix C).

The results of this report rely on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results will vary accordingly. The actuarial assumptions were adopted by the Board based on our recommendations from the experience study performed for the period October 1, 2009 through September 30, 2014.

The purpose of this report is to present the annual actuarial valuation of the Employees Retirement System of the City of St. Louis. This report is for the use of the Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements. The report does not include calculations related to GASB Statements No. 67 and 68, which are provided in a separate report.

In preparing our report, we relied on information supplied by the Employees Retirement System of the City of St. Louis staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice as set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This actuarial report was prepared solely for the Employees Retirement System of the City of St. Louis for the purposes described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice and Cheiron assumes no duty or liability to any other user.

Sincerely,
Cheiron

Stephen T. McElhaney, FSA, FCA, EA
Principal Consulting Actuary

Michael J. Noble, FSA, FCA, EA
Principal Consulting Actuary

SECTION I - BOARD SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe and identify as of the valuation date:

- The financial condition of the System,
- Past and expected trends in the financial progress of the System,
- The employers' contributions for Fiscal Year ending 2018, and
- Information required for accounting statements.

In the balance of this Board Summary we present (A) the basis upon which this year's valuation was completed, (B) the key findings of this valuation including a summary of all key financial results, (C) an examination of the historical trends, and (D) the projected financial outlook for the System.

A. Valuation Basis

This October 1, 2017 valuation represents Cheiron's eighth valuation performed for the Employees Retirement System of the City of St. Louis.

B. Key Findings of this Valuation

The key results of the October 1, 2017 actuarial valuation are as follows:

- The actuarially determined employer contribution rate for the City as a percent of total compensation increased from 12.22% as of October 1, 2016 to 12.36% as of October 1, 2017.
- For the "Lawsuit Beneficiary Employers", the actuarially determined contribution rate has been decreased by 0.09% of compensation. Further information about this adjustment can be found in the description of the amortization method in Appendix B.
- The unfunded actuarial liability for the Employees Retirement System (ERS) decreased from $176 million on October 1, 2016 to $172 million on October 1, 2017.
- The System's funded ratio, the ratio of actuarial asset value over liabilities increased from 81.9% as of October 1, 2016 to 82.7% as of October 1, 2017.
- There was also an actuarial experience gain during the year of $3.6 million.
    - During the year ended September 30, 2017, the System's assets had a 11.55% return on a market value basis, but due to smoothing of prior investment gains and losses, the return on the actuarial asset value was 7.12% (as compared to 7.50% investment return assumption). This resulted in an actuarial loss on investments of $3.0 million.
    - On the liability side, the System experienced a total gain of $4.3 million. This gain is comprised of $3.4 million from participants in pay status receiving a COLA less than expected and $2.5 million from salary increases being less than expected. These gains are offset by losses from other active participant behavior not matching the assumptions including a $2.3 loss due to inactive mortality.
    - An additional reduction of UAL of $2.3 million was created because contributions were more than expected.

SECTION I - BOARD SUMMARY

Following is Table I-1 which summarizes all the key results of the valuation with respect to the System's membership, assets and liabilities, and contributions. The results are presented and compared for both the current and prior plan year.

Table I-1
Employees Retirement System of the City of St. Louis
Summary of Principal Results

Valuation as of:	October 1, 2016	October 1, 2017	% Change
Participant Counts			
Active Participants*	5,303	5,279	(0.45%)
Disabled Participants	205	192	(6.34%)
Retirees and Beneficiaries	4,281	4,380	2.31%
Terminated Vested Participants	2,516	2,499	(0.68%)
Total	**12,305**	**12,350**	**0.37%**
Annual Salaries of Active Members	$ 226,907,701	$ 227,253,901	0.15%
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 51,702,149	$ 54,205,272	4.84%
Assets and Liabilities			
Actuarial Liability (AL)	$ 974,143,079	$ 990,630,355	1.69%
Actuarial Value of Assets (AVA)	797,664,391	818,839,562	2.65%
Unfunded Actuarial Liability (UAL)	$ 176,478,688	$ 171,790,793	(2.66%)
Funded Ratio (AVA / AL)	81.9%	82.7%	
Market Value of Assets (MVA)	764,901,073	816,915,650	6.80%
Funded Ratio (MVA / AL)	78.5%	82.5%	
Contributions as a Percentage of Payroll	**Fiscal Year 2017**	**Fiscal Year 2018**	
Normal Cost Rate	5.81%	5.90%	
Administrative Expense Rate	0.30%	0.30%	
City UAL Rate	6.11%	6.16%	
Total City Contribution Rate	12.22%	12.36%	
Reduction in UAL Rate for Lawsuit Beneficiary Employers	0.09%	0.09%	
Total Contribution Rate for Lawsuit Beneficiary Employers	12.13%	12.27%	
Actuarially Determined Contribution	$ 27,684,090	$ 28,061,249	1.36%

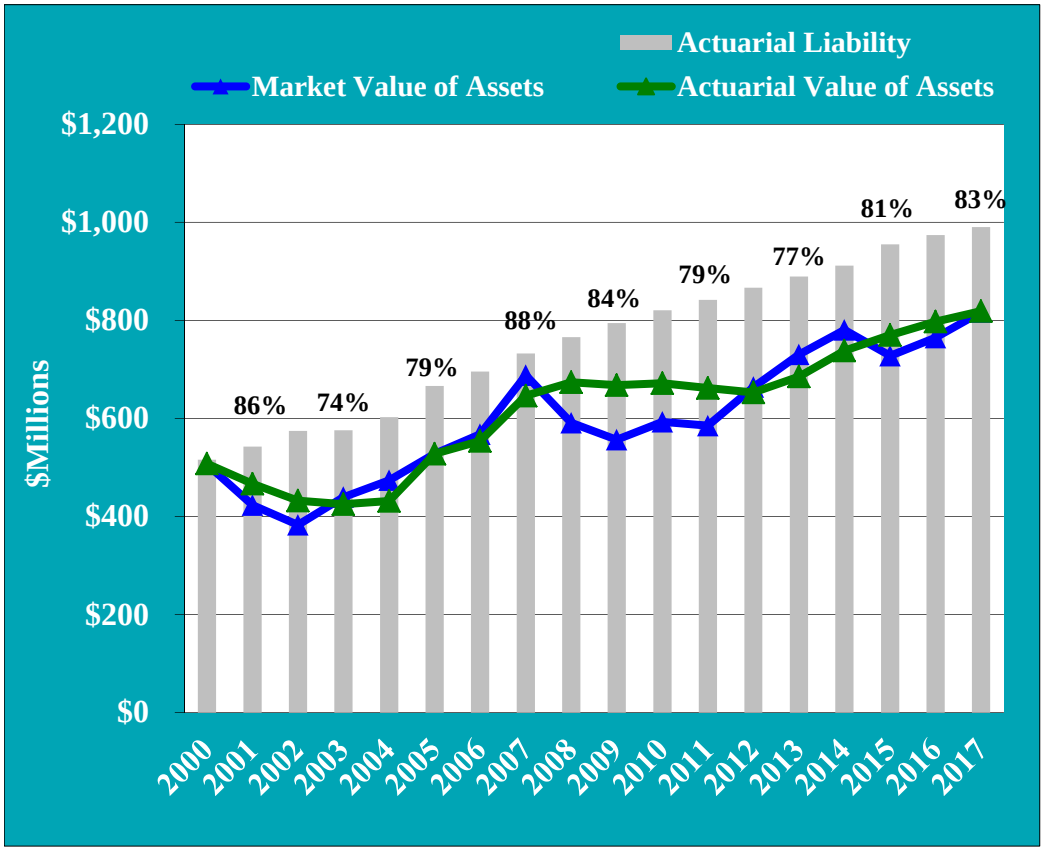
* Includes 392 DROP participants as of October 1, 2016 and 406 DROP participants as of October 1, 2017.

C. Historical Trends

Despite the fact that for most retirement systems the greatest attention is given to the current valuation results and in particular the size of the current unfunded actuarial liability and the employer's contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is more important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

Assets and Liabilities

There was a significant increase in the market value of assets (MVA) from $765 million to $817 million, due to an 11.55% return during the year. With the asset smoothing method in place, the actuarial value of assets has tracked a slightly smoother path through the volatility of the market over recent years. The actuarial value of assets (AVA) increased from 2016 to 2017 returning 7.12% which includes the four years of investment gains offset by the substantial investment loss for the year ending in 2015.

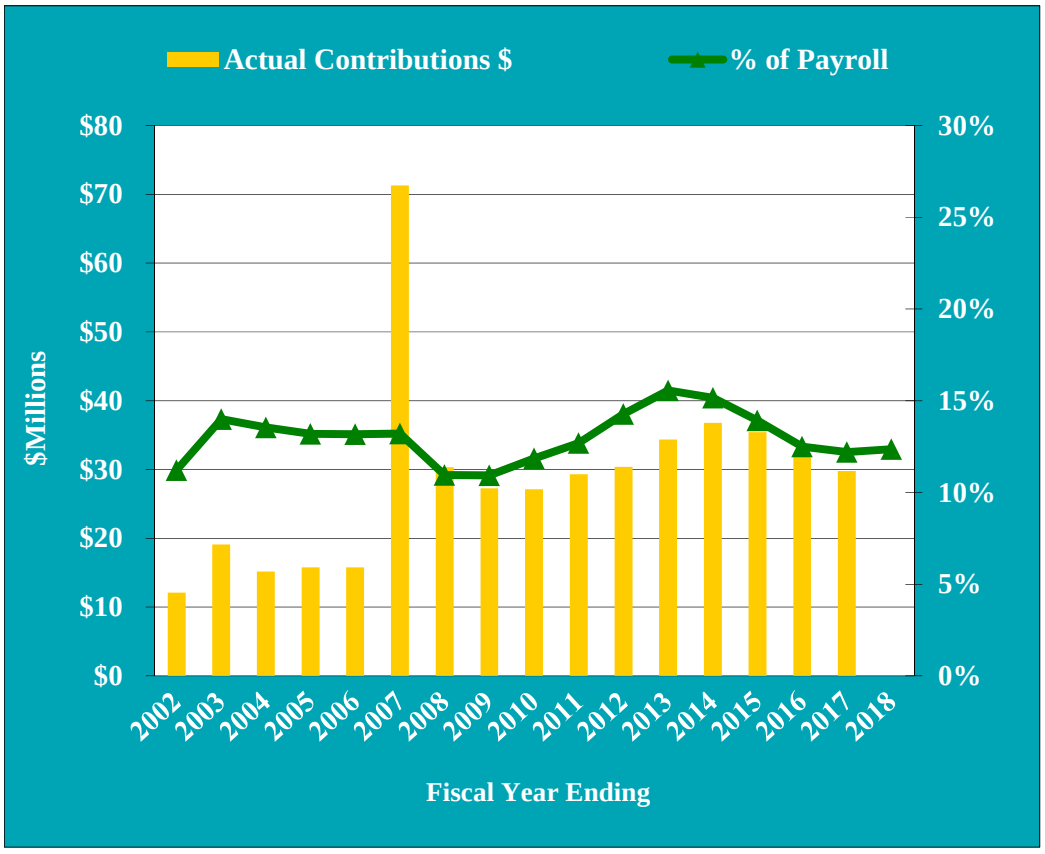


SECTION I - BOARD SUMMARY

The chart on the prior page compares the actuarial value of assets to the actuarial liabilities and shows the funded ratio, which is a comparison of the Actuarial Value of Assets and Actuarial Liability. This chart shows that the funded ratio had decreased for the four valuations prior to 2013 due to the delayed recognition of the substantial market losses in 2008 and 2009, but has increased with the market rebounds since 2012.

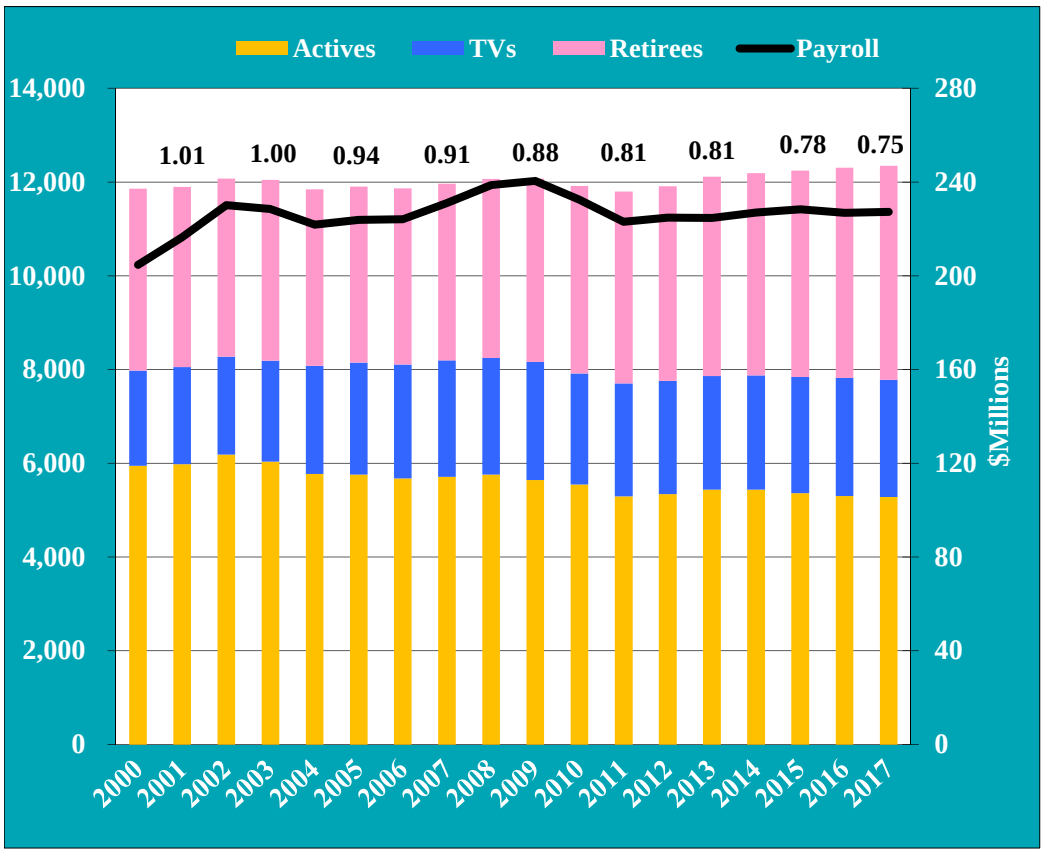
Contribution Rates

The yellow bars in the graph below show the dollar amount of contributions made to the System (depicted on the left hand scale) since Fiscal Year Ending 2002. The green line shows the actuarial contribution rate (combined for all employers) as a percent of payroll (depicted on the right hand scale). Members do not make contributions to the System. The actuarial contribution rate increased from 12.22% of payroll in 2016 to 12.36% of payroll in 2017 due to demographic changes and an increase in the unfunded liability rate due to lower than expected growth in total payroll..



SECTION I - BOARD SUMMARY

Participant Trends



The above chart provides a measure for the maturity in the System, by comparing the ratio of active members to inactive members (retirees and terminated-vesteds). The active-to-inactive ratio has declined since 2001 from 1.01 actives supporting each inactive member to 0.75 actives supporting each inactive member today. This decline is not necessarily bad in itself, but as more of the liability moves from actives to inactives, the plan will experience more volatility in contribution rates when actuarial gains and losses are recognized.

D. Future Expected Financial Trends

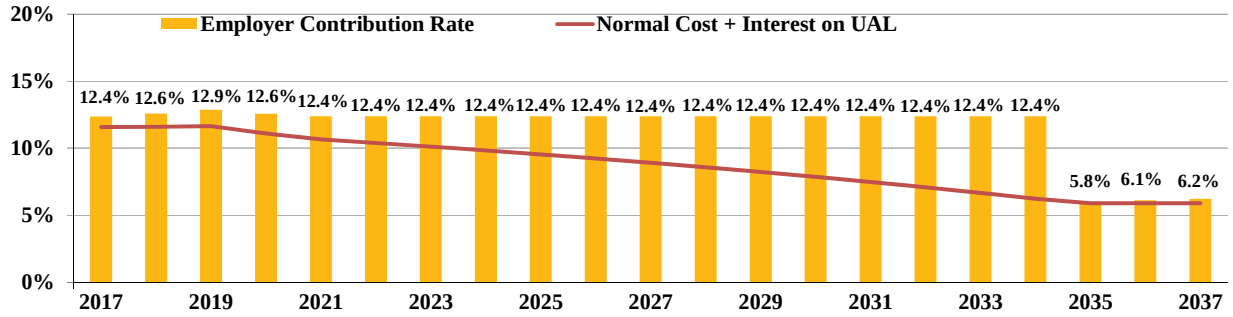
The analysis of projected financial trends is perhaps the most important component of this valuation. In this Section, we present the implications of the October 1, 2017 valuation results in terms of (1) the projected employer contributions, and (2) projected System's funded status (ratio of assets over liabilities). For each projection set, we assume three different future investment return scenarios: baseline returns of 7.50%, optimistic returns of 9.00%, and pessimistic returns of 6.00%. The projections assume there will be no future gains or losses on the liability.

1. Contribution Rate Projections

The first set of charts show the employer's projected actuarially determined combined contribution rates (gold bars). The years shown in the charts are plan years beginning October 1st.

Baseline returns of 7.50%

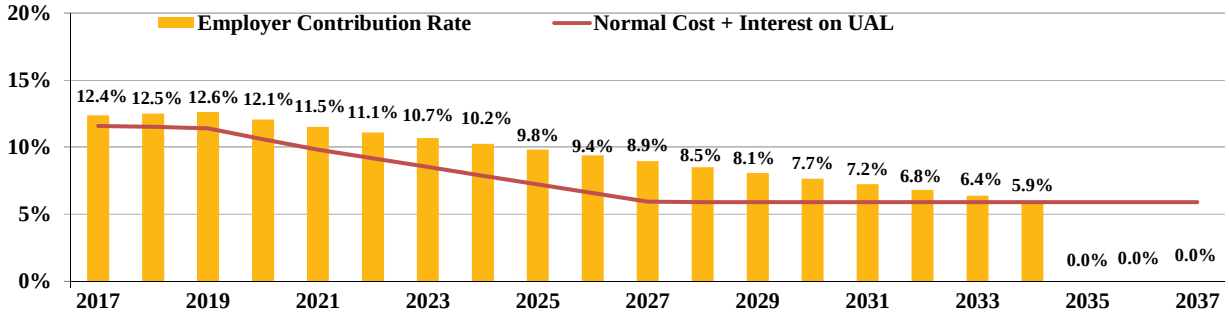
The chart below shows that the actuarially determined contribution rate will initially increase from 12.4% to 12.9% in 2019 and then remain level at 12.4% for 16 years until the unfunded liability has been erased. In 2035, the contribution rate drops to 5.8%. These projections assume that the System earns the assumed investment rate of 7.50% on market value. The expected increase in contribution over the next few years is due to continued recognition of the 2015 investment loss into the actuarial value of assets.



SECTION I - BOARD SUMMARY

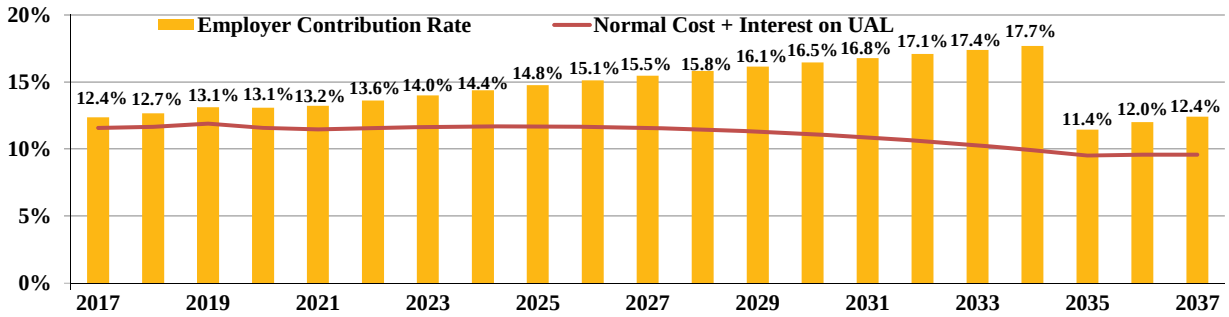
Optimistic returns of 9.00%

If the System earns 1.50% greater than the assumed rate in each year of the projection, the actuarially determined contribution rate will steadily decrease to about 6.0% in 17 years. In 2035, the contribution would drop to 0.0% as the surplus assets will be sufficient to cover the majority of both the expected normal cost and administrative expenses.



Pessimistic returns 6.00%

If the System earns 1.50% less than the assumed rate in each year of the projection, the actuarially determined contribution rate will steadily increase to 17.7% as of 2034 before dropping to a rate of 11.4% after the initial unfunded liability has been paid off.



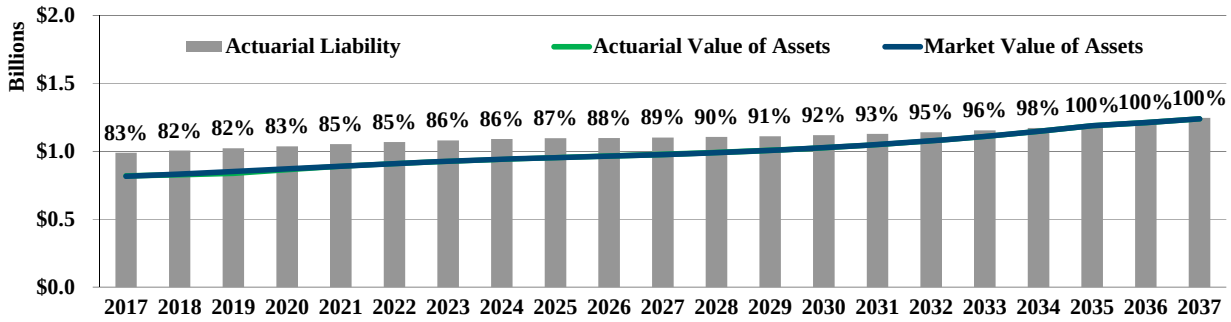
SECTION I - BOARD SUMMARY

2. Asset and Liability Projections

This next set of projection charts compare the market value of assets (blue line) and the actuarial or smoothed value of assets (green line) to the System's actuarial liabilities (gray bars). In addition, above the bars, we show the System's funded ratio (ratio of actuarial value of assets to actuarial liabilities). The projections assume that the actuarially determined contributions, as shown in the previous charts, are made each year. The years shown in the chart signify the valuation date as of October 1st.

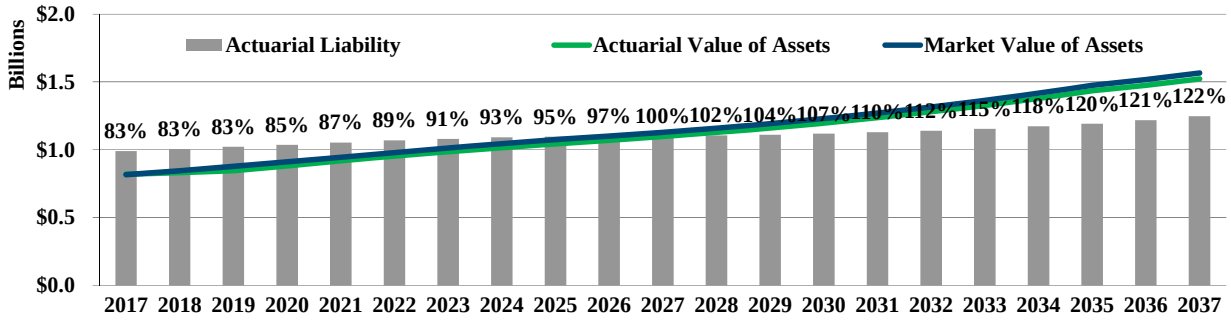
Baseline returns of 7.50%

Assuming that the System earns the assumed investment rate of 7.50%, the funded ratio will steadily increase from 83% to 100% during the 20 year period.



Optimistic returns of 9.00%

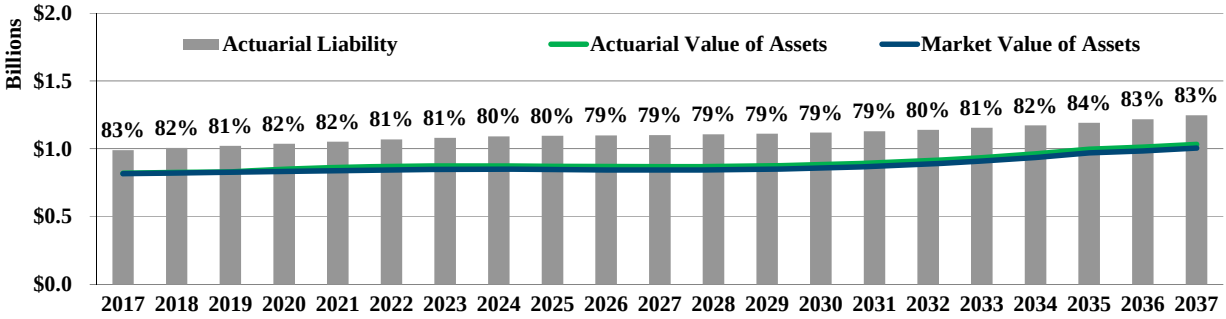
If the System earns 1.50% greater than the assumed rate of return in each year of the projection, the funded ratio is projected to increase to 100% by 2027.



SECTION I - BOARD SUMMARY

Pessimistic returns of 6.00%

If the System earns 1.50% less than the assumed rate of return in each year of the projection, the funded ratio will decrease to 79% by 2026 but recover to 83% by the end of the 20 year period due to the significant increase in contributions attributable to the underfunding.



SECTION II - ASSETS

Pension Plan assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on the System assets including:

- Disclosure of the System assets as of October 1, 2016 and October 1, 2017;
- Statement of the changes in market values during the year;
- Development of the Actuarial Value of Assets;
- An assessment of investment performance; and
- A projection of the System's expected cash flows for the next ten years.

Disclosure

There are two types of asset values disclosed in this valuation, the market value of assets and the actuarial value of assets. The market value represents a "snap-shot" or "cash-out" value which provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not as suitable for long-range planning as are the actuarial value of assets which reflect smoothing of annual investment returns.

Table II-1 below discloses and compares each asset value as of September 30, 2016 and 2017.

Table II-1
Statement of Assets at Market Value as of September 30,

Assets	2016	2017	% Change
Cash	$ 78,502	$ 156,516	99.38%
Receivables	881,784	926,657	5.09%
Temporary investments	10,288,825	11,406,226	10.86%
U.S Government Securities	23,680,590	23,427,864	(1.07%)
Corporate Bonds	29,987,239	30,335,609	1.16%
Global Bond Portfolio	31,572,007	31,991,381	1.33%
Stocks	183,836,061	198,735,935	8.10%
Energy Master Limited Partnerships	46,154,213	44,792,227	(2.95%)
Domestic Bond Funds	83,983,870	86,173,018	2.61%
Managed Real Estate Fund	92,764,744	88,420,093	(4.68%)
Managed International Equity Funds	188,615,336	225,386,201	19.50%
Managed Hedge Fund of Funds	73,660,228	75,879,449	3.01%
Accounts Payable	(602,326)	(715,526)	18.79%
Market Value of Assets	**$ 764,901,073**	**$816,915,650**	6.80%

SECTION II - ASSETS

Changes in Market Value

Table II-2 below shows the components of change between the market value of assets as of September 30, 2016 and September 30, 2017.

Table II-2
Changes in Market Values

Value of Assets – September 30, 2016			**$**	**764,901,073**
Additions				
Payments from Members	$	134,248		
Employer Contributions		29,782,200		
Interest and Dividends		10,385,240		
Investment Return		79,440,653		
Total Additions	**$**	**119,742,341**		
Deductions				
Investment Expenses	$	3,431,657		
Benefit Payments		63,532,834		
Administrative Expenses		763,273		
Total Deductions	**$**	**67,727,764**		
Value of Assets – September 30, 2017			**$**	**816,915,650**

SECTION II - ASSETS

Actuarial Value of Assets

The next table, Table II-3, shows how the actuarial value of assets is developed. The actuarial value of assets method was initialized at market value as of October 1, 2005.

The actuarial value of assets represents a "smoothed" value developed by the actuary to reduce, or eliminate, erratic results which could develop from short-term fluctuations in the market value of assets. For this System, the actuarial value has been calculated by taking the market value of assets less 80% of the investment gain (loss) during the preceding year, less 60% of the investment gain (loss) during the second preceding year, less 40% of the investment gain (loss) during the third preceding year, and less 20% of the investment gain (loss) in the fourth preceding year. The investment gain (loss) is calculated by taking the difference between the expected value of assets based on an expected return of 7.50% for the year ended September 30,2017 and the actual value of assets. If the actuarial value of assets is less than 80% or more than 120% of the market value, an adjustment is made to the actuarial value to bring the value within this corridor. The table below illustrates the calculation of actuarial value of assets for the October 1, 2017 valuation.

Table II-3
Development of Actuarial Value of Assets

Market value of assets at September 30, 2016		$ 764,901,073
Employer Contributions		29,782,200
Payments from Members		134,248
Benefit payments		(63,532,834)
Administrative Expenses		(763,273)
Expected return at 7.50%%		56,101,650
Expected Value at September 30, 2017		$ 786,623,064
Actual Value at September 30, 2017		816,915,650
Investment (gain)/ loss		$ (30,292,586)
	Total Gain/(Loss)	**Excluded Portion**
Exclude 0% of 2013 gain/(loss)	$ 32,979,563	$ 0
Exclude 20% of 2014 gain/(loss)	11,726,911	2,345,382
Exclude 40% of 2015 gain/(loss)	(90,682,656)	(36,273,062)
Exclude 60% of 2016 gain/(loss)	12,949,499	7,769,699
Exclude 80% of 2017 gain/(loss)	30,292,586	24,234,069
Total excluded gain/(loss) for AVA calculation		$ (1,923,912)
Market value of assets at September 30, 2017		$ 816,915,650
Total gain/(loss) excluded		(1,923,912)
Actuarial value of assets at September 30, 2017		$ 818,839,562

SECTION II - ASSETS

Investment Performance

The market value of assets (MVA) returned 11.55% during plan year ending September 30, 2017, which is greater than the assumed 7.50% return. A return of 7.12% was experienced on the actuarial value of assets (AVA), resulting in a slight actuarial loss for the year. Below, we show additional historical returns.

Table II-4
Historical Returns

	MVA	AVA
2007	14.65%	10.17%
2008	-12.76%	5.85%
2009	-3.09%	1.52%
2010	10.11%	3.42%
2011	1.79%	1.25%
2012	16.95%	1.56%
2013	13.04%	7.99%
2014	9.63%	10.65%
2015	-3.79%	7.62%
2016	9.32%	7.58%
2017	11.55%	7.12%

Projection of System's Future Cash Flows

Table II-5
Projection of System's Expected Cash Flows

Year Beginning October 1,	Benefit Payments and Administrative Expenses	Contributions	Net Cash Flow
2017	$ 71,446,967	$ 28,063,765	$ (43,383,202)
2018	71,431,894	29,636,177	(41,795,717)
2019	74,423,111	31,627,937	(42,795,174)
2020	75,739,690	32,479,979	(43,259,712)
2021	76,531,751	33,813,772	(42,717,979)
2022	82,519,836	35,878,955	(46,640,881)
2023	85,386,523	38,013,015	(47,373,508)
2024	92,042,307	40,217,312	(51,824,995)
2025	94,540,165	42,492,427	(52,047,738)
2026	95,288,806	44,838,399	(50,450,407)

Expected contributions assume contribution rates as shown in the graph on page 6 and that payroll will increase at the actuarially assumed rate of 3.0% per year. Expected benefit payments are projected for the closed group valued at October 1, 2017. Projecting any farther than ten years using a closed-group would not yield reliable predictions due to the omission of new hires.

SECTION III - LIABILITIES

In this section, we present detailed information on the System liabilities including:

- **Disclosure** of the System liabilities as of October 1, 2016 and October 1, 2017, and
- Statement of **changes** in these liabilities during the year.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of All Future Benefits:** Used for measuring all future System obligations, represents the amount of money needed today to fully fund all benefits of the System both earned as of the valuation date and those to be earned in the future by current plan participants, under the current plan provisions.

- **Actuarial Liability:** Calculated as of the valuation date as the present value of benefits allocated to service prior to that date. Effective October 1, 2015, the actuarial liability is determined using the Entry Age Normal method.

These liabilities are for funding purposes and are not appropriate for measuring the cost of settling plan liabilities by purchasing annuities or paying lump sums.

Table III-1, which follows, discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of plan assets yields, for each respective type, a **net surplus** or an **unfunded liability**.

Table III-1
Liabilities/Net (Surplus)/Unfunded

	October 1, 2016	October 1, 2017
Present Value of Future Benefits		
Active Participant Benefits	$ 529,090,139	$ 522,183,366
Participants currently receiving payments	455,983,006	478,606,627
Participants with a deferred vested benefit	61,178,884	62,140,552
Present Value of Future Benefits (PVB)	**$ 1,046,252,029**	**$ 1,062,930,545**
Actuarial Liability		
Active Participant Benefits	$ 456,981,189	$ 449,883,176
Participants currently receiving payments	455,983,006	478,606,627
Participants with a deferred vested benefit	61,178,884	62,140,552
Actuarial Liability (AL)	**$ 974,143,079**	**$ 990,630,355**
Actuarial Value of Assets (AVA)	$ 797,664,391	$ 818,839,562
Net (Surplus)/Unfunded (AL – AVA)	**$ 176,478,688**	**$ 171,790,793**

SECTION III - LIABILITIES

Changes in Liabilities

Each of the Liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- System amendments changing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above, and also due to changes in plan assets resulting from:

- Employer contributions different than expected
- Investment earnings different than expected
- A change in the method used to measure plan assets

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the System. Below, we present key changes in liabilities since the last valuation.

In the table that follows, we show the components of change in the actuarial liability between October 1, 2016 and October 1, 2017.

Table III-2

	Actuarial Liability
Liabilities October 1, 2016	$ 974,143,079
Liabilities October 1, 2017	990,630,355
Liability Increase (Decrease)	16,487,276
Change Due to:	
Plan Amendments	0
Method Changes	0
Assumption Changes	0
Experience (Gain)/Loss	(4,322,571)
Benefits Accumulated and Other Sources	20,809,847

SECTION III - LIABILITIES

In addition, we breakdown the change in actuarial liability further by showing the total actuarial (gain)/loss by source, as shown in Table III-3 below.

Table III-3
(Gain)/Loss by Source as of October 1, 2017

COLA less than expected	$	(3,370,368)
Inactive mortality less than expected		2,349,018
Salary increase less than expected for continuing actives		(2,453,326)
Actives retiring earlier than expected		1,262,797
Actives terminating earlier than expected		(2,029,341)
New entrants		873,318
Change to retiree DROP balances		(964,984)
Other sources		10,315
Experience (Gain)/Loss	**$**	**(4,322,571)**

SECTION IV - CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the funding method employed as of the October 1, 2017 valuation is the **Entry Age Normal Actuarial Cost Method**. This method is used to determine the normal cost rate at which an average level percent of pay is required to fund the retirement benefits for all participants between their dates of hire and assumed dates of retirement. The EAN actuarial liability is the difference between the plan's total present value of future benefits and the present value of future normal costs. The difference between the Entry Age Normal actuarial liability and the actuarial value of assets is the unfunded actuarial liability. Effective October 1, 2015, an administrative expense rate of 0.30% of payroll was added to the normal cost.

The unfunded actuarial liability as of October 1, 2015 is amortized over a fixed 20-year period as a level percentage of payroll. Future gains and losses and changes in actuarial assumptions will be amortized in layers over separate 20 year periods.

Table IV-1 below presents and compares the employer contribution rates for the System for this valuation and the prior one.

Table IV-1
Employer Contribution Rate

	Fiscal Year Ending 2017	Fiscal Year Ending 2018
Normal Cost Rate	5.81%	5.90%
Administrative Expense Rate	0.30%	0.30%
UAL Amortization Payment for City	6.11%	6.16%
Actuarially Determined Contribution Rate for City	12.22%	12.36%
Reduction in UAL Amortization Payment for Lawsuit Beneficiary Employers	0.09%	0.09%
Actuarially Determined Contribution Rate for Lawsuit Beneficiary Employers	12.13%	12.27%

SECTION IV - CONTRIBUTIONS

The Unfunded Actuarial Liability (UAL) is amortized over layered 20 year periods beginning with the total UAL as of October 1, 2015. The amortization payment as a percent of payroll is different for City Employers and for Lawsuit Beneficiary Employers. Table IV-2 shows the detailed calculation of the current year UAL amortization rates for the City and Lawsuit Beneficiary Employers.

Table IV-2
Amortization Schedule

	Date	Initial Amortization Period	Unamortized Amount	Remaining Amortization Period	Amortization Amount	Applicable Payroll	UAL Rate
2015 Initial Unfunded Actuarial Liability	10/1/2015	20	$183,417,784	18	$14,869,899		
2016 Actuarial (gain)/loss[1]	10/1/2016	20	(8,001,322)	19	(626,068)		
2017 Actuarial (gain)/loss[1]	10/1/2017	20	(3,625,669)	20	(274,524)		
Total UAL			$171,790,793		$13,969,307		
Unamortized Amounts from Library Settlement			(399,415)	18	(32,381)	$ 36,974,549 [2]	-0.09%
Total without regard to Library Settlement			**$ 172,190,208**		**$14,001,688**	**$ 227,253,901** [3]	**6.16%**

[1] (Gain) or loss includes differences between actual and expected contributions
[2] Payroll for Lawsuit Beneficiary Employers
[3] Total payroll for all participating employers

SECTION V - ACCOUNTING STATEMENT INFORMATION

GFOA Recommended Information

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in a public retirement system's Comprehensive Annual Financial Report (CAFR) in order to receive recognition for excellence in financial reporting. Although the Employees Retirement System does not issue a CAFR under GFOA guidelines, we have included certain schedules in this section for possible inclusion within the System's audited financial statements. These schedules are based on the funding actuarial liabilities.

- Table V-1: Analysis of Financial Experience
- Table V-2: Solvency Test
- Table V-3: Schedule of Funding Progress

Table V-1
Analysis of Financial Experience
Gain and Loss in Unfunded Actuarial Liability During Years Ended September 30
Resulting from Differences Between Assumed Experience and Actual Experience

	Gain (or Loss) for Year ending September 30,					
Type of Activity	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Investment Experience	$ (42,041,794)	$ (87,586)	$ 17,899,526	$ (2,743,842)	$ 553,258	$ (3,004,069)
Liability Experience	7,779,666	8,391,763	7,265,891	6,114,189	3,695,678	4,322,571
Gain (or Loss) During Year from Combined Experience	$ (34,262,128)	$ 8,304,177	$ 25,165,417	$ 3,370,347	$ 4,248,936	$ 1,318,502
Non-Recurring Gain (or Loss) Items	0	0	0	20,389,054	0	0
Composite Gain (or Loss) During Year	$ (34,262,128)	$ 8,304,177	$ 25,165,417	$ 23,759,401	$ 4,248,936	$ 1,318,502

SECTION V - ACCOUNTING STATEMENT INFORMATION

Table V-2
Solvency Test[1]
Aggregate Actuarial Liabilities for

Actuarial Valuation Date October 1	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Actuarial Liabilities Covered by Reported Assets (1)	(2)	(3)
2017	$ 0	$ 540,747,179	$ 449,883,176	$ 818,839,562	100%	100%	62%
2016	0	517,161,890	456,981,189	797,664,391	100%	100%	61%
2015	0	501,123,197	453,997,444	770,006,025	100%	100%	59%
2014	0	494,664,459	417,314,687	737,967,928	100%	100%	58%
2013	0	475,937,321	413,511,258	685,397,323	100%	100%	51%
2012	0	460,581,077	406,310,985	653,001,852	100%	100%	47%
2011	0	441,520,555	400,242,766	661,932,240	100%	100%	55%
2010	0	419,717,802	400,951,838	671,608,995	100%	100%	63%

[1] We will build to the required 10 years of disclosure information.

SECTION V - ACCOUNTING STATEMENT INFORMATION

Table V-3
Schedule of Funding Progress

Actuarial Valuation Date October 1	Actuarial Value of Assets (a)	Actuarial Liability (b)	Unfunded Actuarial Liability (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	Percentage of Covered Payroll [(b) - (a)] / (c)
2017	$ 818,839,562	$ 990,630,355	$ 171,790,793	82.66%	$ 227,253,901	75.59%
2016	797,664,391	974,143,079	176,478,688	81.88%	226,907,701	77.78%
2015	770,006,025	955,120,641	185,114,616	80.62%	228,422,585	81.04%
2014	737,967,928	911,979,146	174,011,218	80.92%	227,039,143	76.64%
2013	685,397,323	889,448,579	204,051,256	77.06%	224,623,445	90.84%
2012	653,001,852	866,890,445	213,888,593	75.33%	224,822,252	95.14%
2011	661,932,240	841,763,321	179,831,081	78.64%	223,060,719	80.62%
2010	671,608,995	820,669,641	149,060,646	81.84%	232,451,661	64.13%
2009	667,667,205	794,686,379	127,019,174	84.02%	240,409,390	52.83%
2008	674,016,719	765,842,026	91,825,307	88.01%	238,701,628	38.47%
2007	646,569,478	732,576,024	86,006,546	88.26%	231,029,237	37.23%
2006	554,065,539	695,889,716	141,824,177	79.62%	224,120,314	63.28%

APPENDIX A - MEMBERSHIP INFORMATION

Employees Retirement System of the City of St. Louis Table of Plan Coverage	October 1, 2016	October 1, 2017	% change
Active Members in Valuation			
Count	5,303	5,279	-0.5%
Average Age	48.5	48.5	0.1%
Average Service	12.3	12.2	-1.2%
Total Payroll	$ 226,907,701	$ 227,253,901	0.2%
Average Anticipated Payroll	$ 42,789	$ 43,049	0.6%
Total Active Vested Members	3,573	3,587	0.4%
DROP Members in Valuation (included in Active Members)			
Count	392	406	3.6%
Average Age	61.6	61.5	-0.1%
Average Service	24.5	24.9	1.8%
Total DROP Account Balances	$ 15,338,710	$ 15,653,296	2.1%
Average DROP Account Balances	$ 39,129	$ 38,555	-1.5%
Vested Terminated Members	2,516	2,499	-0.7%
Pensioners			
Number in Pay Status			
Retirees	3,794	3,868	2.0%
Disabled Retirees	205	192	-6.3%
Total	3,999	4,060	1.5%
Average Age	72.9	72.9	0.0%
Average Monthly Benefit	$ 968	$ 1,000	3.2%
Beneficiaries in Pay Status			
Number in Pay Status	487	510	5.1%
Number with Deferred Benefits	0	2	N/A

APPENDIX A - MEMBERSHIP INFORMATION

Employees Retirement System of the City of St. Louis
Inactive Participants by Type and Monthly Benefit Amount

Monthly Amount	Total	Terminated Retirees	Terminated Vested	Disability	Beneficiaries	Deferred Beneficiaries
Total	7,071	3,868	2,499	192	510	2
Under $500	3,901	1,651	1,974	70	205	1
$500-1,000	1,467	812	434	84	136	1
$1,000-1,500	716	547	63	27	79	0
$1,500-2,000	454	377	21	9	47	0
$2,000-2,500	209	190	2	1	16	0
$2,500-3,000	108	91	4	1	12	0
$3,000-3,500	70	64	1	0	5	0
$3,500-4,000	37	34	0	0	3	0
$4,000-4,500	39	37	0	0	2	0
$4,500-5,000	31	29	0	0	2	0
$5,000 & over	39	36	0	0	3	0

APPENDIX A - MEMBERSHIP INFORMATION

Employees Retirement System of the City of St. Louis
Status Reconciliation

	Active	Leave of Absence	DROP	Disabled	Retired	Beneficiary	Terminated Vested	Deferred Beneficiary	Total
Participant Count as of October 1, 2016	**4,900**	**11**	**392**	**205**	**3,794**	**487**	**2,516**	**0**	**2,516**
New hires	587	0	0	0	0	0	0	0	587
Leave of Absence	(13)	13	0	0	0	0	0	0	0
Rehires	51	(5)	0	0	(4)	0	(31)	0	11
Enter DROP	(117)	0	118	0	0	0	(1)	0	0
Return from DROP	47	0	(47)	0	0	0	0	0	0
Term Vested	(145)	(2)	0	0	0	0	147	0	0
Retired	(106)	(1)	(52)	0	260	0	(101)	0	0
Disabled	(1)	0	0	1	0	0	0	0	0
Deceased (with Beneficiary)	(5)	0	0	(5)	(31)	42	(3)	2	0
Deceased (without Beneficiary)	(7)	0	(5)	(9)	(154)	(14)	(5)	0	(194)
Transfer Out	0	0	0	0	0	0	(4)	0	(4)
Term Not Vested	(332)	(3)	0	0	0	0	0	0	(335)
Benefits Expired	0	0	0	0	0	(5)	0	0	(5)
Status Correction	1	0	0	0	3	0	(19)	0	(15)
Net Change	(40)	2	14	(13)	74	23	(17)	2	45
Participant Count as of October 1, 2017	**4,860**	**13**	**406**	**192**	**3,868**	**510**	**2,499**	**2**	**12,350**

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Mortality Rates:

Healthy: RP-2000 Healthy Mortality with 3 year set-forward with generational projections using Scale AA

Disabled: RP-2000 Disabled Mortality with 3 year set-forward with generational projections using Scale AA

The table below shows the probability of death at sample ages with the mortality table described above projected to the year 2017. A generational table is projected forward each year to account for continuous mortality improvements.

	Healthy Mortality (%)		Disabled Mortality (%)	
Age	Male	Female	Male	Female
20	0.0269	0.0150	1.6290	0.5663
25	0.0331	0.0185	1.9026	0.5862
30	0.0579	0.0332	2.0727	0.6280
35	0.0885	0.0495	2.0727	0.6173
40	0.1133	0.0725	1.9690	0.5762
45	0.1489	0.1090	2.1138	0.7431
50	0.2141	0.1649	2.4130	1.0808
55	0.3806	0.3422	2.8388	1.7194
60	0.7611	0.7023	3.5412	2.3227
65	1.4062	1.2347	4.4780	3.0519
70	2.3502	2.1094	5.6686	4.2030
75	4.1014	3.2797	7.6831	5.5434
80	7.5627	5.5470	10.8186	7.7951
85	13.3639	9.6868	14.3930	11.0555
90	21.8271	16.1946	21.8271	16.1946
95	30.4746	21.6453	30.4746	21.6453
100	37.6580	26.1557	37.6580	26.1557

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

2. Disability Rates before Retirement:

	Disability (%)	
Age	Male	Female
20	0.0200	0.0200
25	0.0200	0.0200
30	0.0200	0.0200
35	0.0200	0.0200
40	0.0560	0.0480
45	0.1000	0.0960
50	0.3528	0.2400
55	0.5000	0.3360
60	0.7500	0.3500

3. Withdrawal Rates before Retirement:

Creditable Service	Withdrawal (%)	Creditable Service	Withdrawal (%)
0	20.00	11	3.25
1	17.50	12	3.00
2	15.00	13	2.75
3	12.50	14	2.50
4	10.00	15	2.25
5	9.00	16	2.00
6	8.00	17	1.75
7	7.50	18	1.50
8	7.00	19	1.25
9	4.50	20+	1.25
10	3.50		

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

4. Retirement Rates:

Age	Retirement Rate (%)	Age	DROP Rate (%)
50	2.00	50	12.50
51	2.00	51	12.50
52	2.00	52	12.50
53	2.00	53	12.50
54	2.00	54	12.50
55	2.00	55	20.00
56	2.00	56	20.00
57	2.00	57	20.00
58	5.00	58	20.00
59	5.00	59	20.00
60	10.00	60	20.00
61	10.00	61	10.00
62	25.00	62	10.00
63	10.00	63	10.00
64	10.00	64	10.00
65	30.00	65	10.00
66	25.00	66	10.00
67	25.00	67	10.00
68	25.00	68	10.00
69	25.00	69	10.00
70	100.00	70	100.00

In addition, in the first year that a participant satisfies the requirements under the "Rule of 85," the DROP rate is assumed to be 75% if the age in the first year of eligibility is 56 or younger, 60% for ages 57 to 60, 50% for ages 61 to 65, and 15% for ages greater than 65 (100% at age 70).

5. Retirement Age for Inactive Vested Participants

For members who terminate employment with 30 or more years of creditable service or are eligible for a Rule of 85 pension, immediate commencement of benefits is assumed. All others are assumed to retire at age 61.

6. DROP Participants

Participants in the DROP are assumed to remain in the DROP for 5 years. Interest to the DROP account is assumed to be creditable at 6% per annum for those participants who enter the DROP after January 21, 2003. 50% of those participants electing DROP are expected to return to active employment for two years before retiring.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

7. Unknown Data for Participants

Same as those exhibited by participants with similar known characteristics. For inactive vested participants with unknown benefit amounts, $250 per month is assumed.

8. Rehires

No explicit assumption or load.

9. Sick Leave

Sick leave may be used to increase either Final Average Compensation, Creditable Service, or both. Starting with the October 1, 2010 valuation, the actual unused credited sick leave hours on file were used in the valuation. Effective in July 2010, the accumulation of unused sick leave hours that can be used for benefit purposes was frozen.

10. Percent Married

80% for all participants.

11. Age of Spouse

Females (or males) are three years younger (or older) than their spouses.

12. Net Investment Return

7.50% per year, net of investment expenses.

13. Administrative Expenses

0.30% of payroll.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

14. Salary Increases

Varies by service, ranging from 3.00% to 4.25%.

Service	Salary Increase (%)
0	4.25
1	4.07
2	3.92
3	3.79
4	3.69
5	3.61
6	3.53
7	3.46
8	3.36
9	3.29
10	3.23
11	3.18
12	3.14
13	3.10
14	3.08
15	3.05
16	3.03
17	3.02
18	3.01
19	3.01
20	3.00

15. Increases in Social Security Table Wage Base

3.0% per year.

16. Cost-of-Living Adjustment

2.5% per year for 10 years and 0% thereafter.

17. Increase in Section 415 and Section 401(a)(17) limits

2.5% per year.

18. Rationale for actuarial assumptions

The actuarial assumptions were adopted by the Board of Trustees based upon recommendations made in an actuarial experience study covering the years 2009 through 2014.

19. Changes in actuarial assumptions since last valuation

None

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Actuarial Value of Assets

The market value of assets less unrecognized returns in each of the last five years, but no earlier than October 1, 2005. Initial unrecognized return is equal to the difference between the actual market return and expected market return, and is recognized over a five-year period. The actuarial value is further adjusted, if necessary, to be within 20% of the market value. The actuarial asset value was initialized at the market value as of October 1, 2005.

2. Actuarial Cost Method

The cost method for valuation of liabilities used for this valuation is the Entry Age Normal (EAN) method. This method is used to determine the normal cost rate at which an average level percent of pay is required to fund the retirement benefits for all Participants between their dates of hire and assumed dates of retirement. The EAN actuarial liability is the difference between the plan's total present value of future benefits and the present value of future normal costs. The unfunded actuarial liability is the difference between the actuarial liability and the actuarial value of assets.

3. Amortization Method

The unfunded actuarial liability as of October 1, 2015 is amortized over a fixed 20-year period as a level percentage of payroll. Future gains and losses and changes in actuarial assumptions will be amortized in layers over separate 20 year periods.

To reflect the settlement between the Library, the Board of Trustees and the City of St. Louis, two Unfunded Accrued Liability Amortization rates are calculated. The Library, Zoo, Art Museum, Tower Grove Park, Taxicab Commission and Mental Health Board, collectively called the "Lawsuit Beneficiary Employers", have a reduced UAL Amortization rate to reflect the payments received due to the settlement as of the valuation date. First, the UAL amortization payment is determined for the combined plan (base payment). Second, the value of settlement payments made by the City are set up as gain bases and the Lawsuit Beneficiary Employers have a reduction in the contribution rate determined from the payment on these gain bases and their projected payroll. The City's UAL amortization payment is determined only on the base payment. The Lawsuit Beneficiary Employers' UAL amortization payment is the base payment minus the amortization of the gain bases that result from settlement payments.

4. Changes in Actuarial Methods since last valuation

None

APPENDIX C - SUMMARY OF PLAN PROVISIONS

1. Plan Year

October 1 through September 30.

2. Final Average Compensation

One-half the sum of:
(a) The total compensation earned during the last two highest consecutive years of Creditable Service prior to termination (subject to the Section 401(a)(17) limit); and
(b) The balance of sick leave pay as of the date of retirement less sick leave hours paid upon termination and less sick leave hours considered as Creditable Service. Said balance cannot exceed 25% of a member's total sick leave pay as of the date of retirement. The amount of credited sick leave was frozen on July 17, 2010.

3. Benefit Compensation Base

Amount of annual compensation with respect to which old age and survivor's insurance benefits would be provided to the member under the Social Security Act in effect on the date the Benefit Compensation Base is determined calculated when the member terminates employment.

4. Normal Retirement

Age Requirement:	65.
Service Requirement:	Five years of Creditable Service.
Amount:	The product of: (a) 1.30% of Final Average Compensation up to the Benefit Compensation Base, plus 2.05% of Final Average Compensation in excess of the Benefit Compensation Base, and (b) Creditable Service. Minimum $200 per month for retirees with 12 or more years of creditable service.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

5. Rule of 85 Retirement

Age/Service Requirement:	Sum of age and Creditable Service at date of termination equals or exceeds 85.
Amount:	The product of: (a) 1.30% of Final Average Compensation up to the Benefit Compensation Base, plus 2.05% of Final Average Compensation in excess of the Benefit Compensation Base, and (b) Creditable Service.

6. Early Retirement

Age/Service Requirement:	Age 60 with five years of Creditable Service; or age 55 with 20 years of Creditable Service; or any age with 30 years of Creditable Service.
Amount:	Normal retirement amount reduced by 1/3% for each month benefit begins before age 65.

7. Disability

Age Requirement	None.
Service Requirement	Five years of Creditable Service and an active employee at disablement.
Amount	Normal retirement amount based on Creditable Service and Final Average Compensation at disability, payable immediately.

8. DROP (Deferred Retirement Option Plan)

Members who have achieved eligibility for retirement can continue active employment and defer receipt of their retirement allowance for a period not to exceed five years. During the DROP period, the member's retirement allowance will be paid directly into a separate account.

Service during the DROP period shall not be counted as Creditable Service, nor shall it count toward determination of retirement allowance. A member's DROP account shall not be adjusted for any cost-of-living increases during participation in the DROP. No member returning to non-DROP status shall make any withdrawal from his/her DROP account until after termination of employment.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

The account balance is credited with interest annually. In no event does the total account balance exceed the accumulated value of five-years-payments with interest.

The annuity awarded upon full termination and subsequent benefit receipt reflects the unused sick-leave conversion to Creditable Service and/or Final Average compensation. During participation in the DROP, the annual deposit to the account does not reflect any conversion of unused sick leave as each participant continues to accrue sick leave hours. The unused credited sick leave hours was frozen as of July 17, 2010.

9. Vesting

Age Requirement: None.

Service Requirement: Five years of Creditable Service.

Amount: Normal or early service retirement amount.

10. Spouse Pre-Retirement Death Benefit

Age Requirement: None.

Service Requirement: Five years of Creditable and an active employee.

Amount: If married, 100% of the benefit the employee would have received had he or she retired the day before he or she died and elected the joint and 100% survivor option. If the employee died prior to eligibility for early service retirement, the spouse's benefit is deferred to the employee's earliest retirement date.

Death benefits may also be payable to members who have terminated employment. The costs of those benefits are paid for by the reduction of the accrued benefit payable to the inactive vested participant.

11. Post-Retirement Death Benefit

If married, the employee and spouse may elect to have pension benefits paid in the form of a 100% joint and survivor annuity. A member may also elect a ten year certain and life equivalent form of benefit. If any one of these options is elected, the benefit amount otherwise payable is reduced to reflect the coverage. If not elected, benefits are payable for the life of the employee without reduction.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

12. Cost-of-Living Adjustment (COLA)

Based on the change in the Consumer Price Index (CPI) for the fiscal year, subject to a maximum increase of 3.125% per year (3.0% for retirements between March 21, 1972 and March 26, 1974; none for retirements prior to March 21, 1972), with a cumulative percentage increase (equal to the sum of the annual percentage increases) limited to 25%. If the increase in CPI is less than 1.0%, no adjustment is made. If the change is a decrease, the cost-of-living adjustment shall be zero unless the decrease is 3.125% or more. Adjustments begin on the second January 1 after payments begin.

13. Creditable Service

Number of years and completed months of service during which the member receives compensation after April 1, 1960. Creditable Service for employment prior to April 1, 1960 is granted only if the member was an employee of an employer of the System on April 1, 1960. Unused credited sick leave shall be considered as Creditable Service provided the member does not receive payment for the sick leave. The amount of credited sick leave was frozen on July 17, 2010.

14. Membership

Immediate upon employment.

15. Section 415 limit

$220,000, effective January 1, 2018.

16. Section 401(a)(17) limit

$275,000, effective January 1, 2018.

17. Changes Since Last Valuation

None