



ACTUARIAL VALUATION REPORTS

For Pension Plans Administered by ERS

As of August 31, 2016 | Prepared by Gabriel Roeder Smith & Company

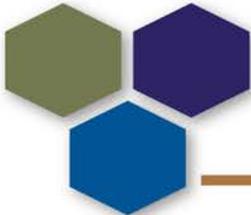


Actuarial Valuations of the ERS Retirement Funds as of August 31, 2016 December 1, 2016

Joe Newton, FSA, EA, MAAA



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Consultants & Actuaries
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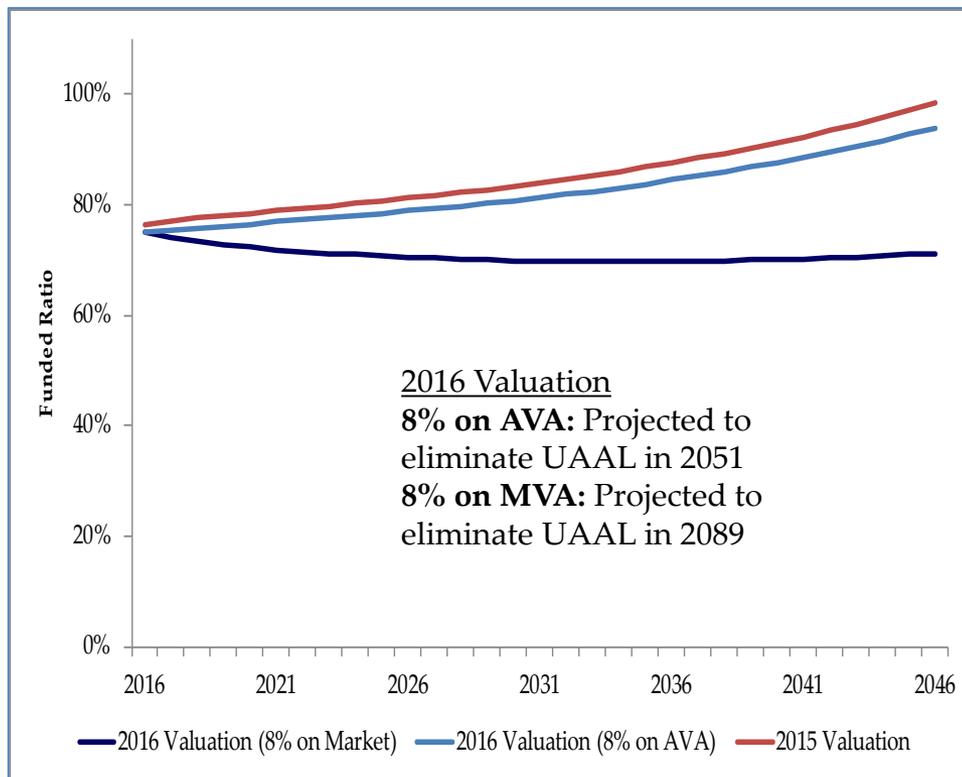


Agenda

- ◆ Purpose of Actuarial Valuation
- ◆ Impact of Asset Returns
- ◆ ERS Funding Valuation Results
- ◆ LECOSRF and JRS2 Funding Valuation Results
- ◆ Accounting Results at August 31, 2016

Where are we headed now?

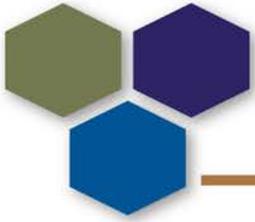
- ◆ ERS projections stepped back slightly
 - ▶ Still on a path to eliminating unfunded liability
- ◆ Short term decrease in 2016 projection from deferred assets losses and negative amortization before trending upward



2015 Valuation

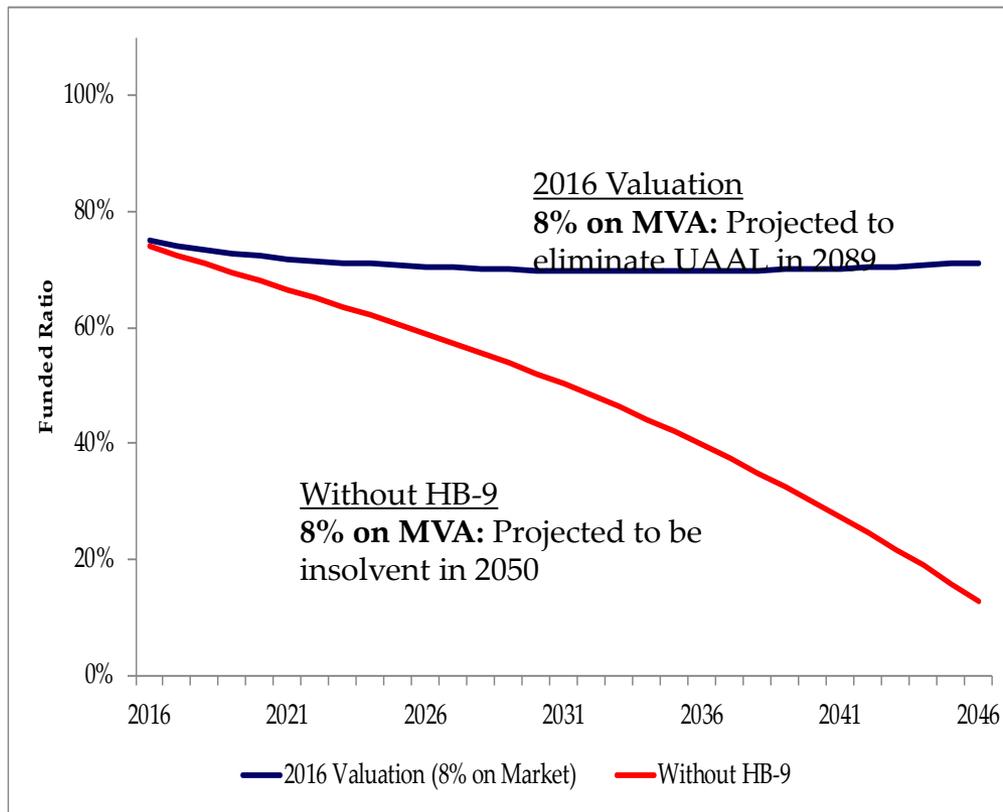
8% on AVA: Projected to eliminate UAAL in 2048

Projections assume that all assumptions are met, including an 8% return on the market value of assets (unless otherwise noted), and future contributions continue at current levels.

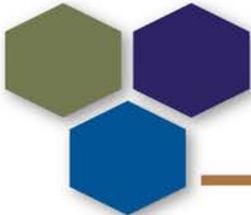


2015 Legislative Impact

- Without contribution increases resulting from HB-9, ERS plan would be projected to be insolvent in 2050 on a market value basis

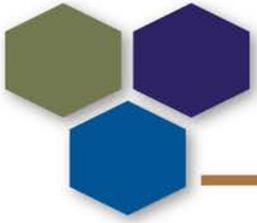


Projections assume that all assumptions are met, including an 8% return on the market value of assets (unless otherwise noted), and future contributions continue at current levels (unless otherwise noted).

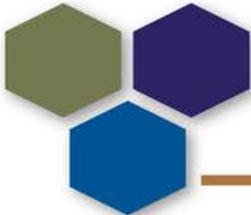


Purpose of Actuarial Valuation

- ◆ Prepared as of August 31, 2016 using member data, financial data, benefit and contribution provisions, actuarial assumptions and methods as of that date
- ◆ Purposes:
 - Measure the actuarial liabilities and funding levels
 - Determine adequacy of current statutory contributions
 - Provide other information for reporting
 - GASB 67/68, Consolidated Annual Financial Report
 - Explain changes in actuarial condition of the plans
 - Track changes over time
 - Analyze future outlook



Impact of Asset Returns



Asset Experience

◆ Asset returns

- ▶ Market Value: 5.3%

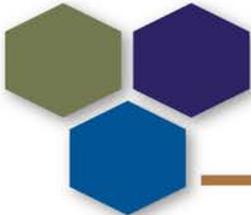
- ▶ Actuarial (or smoothed) Value: 5.9%

- Less than 8.0%, thus creates a loss on the unfunded liability

◆ Losses on the Market Value during the current year in addition to outstanding unrecognized losses from prior valuation

- ▶ \$2.1 billion outstanding loss for ERS in 2016, versus

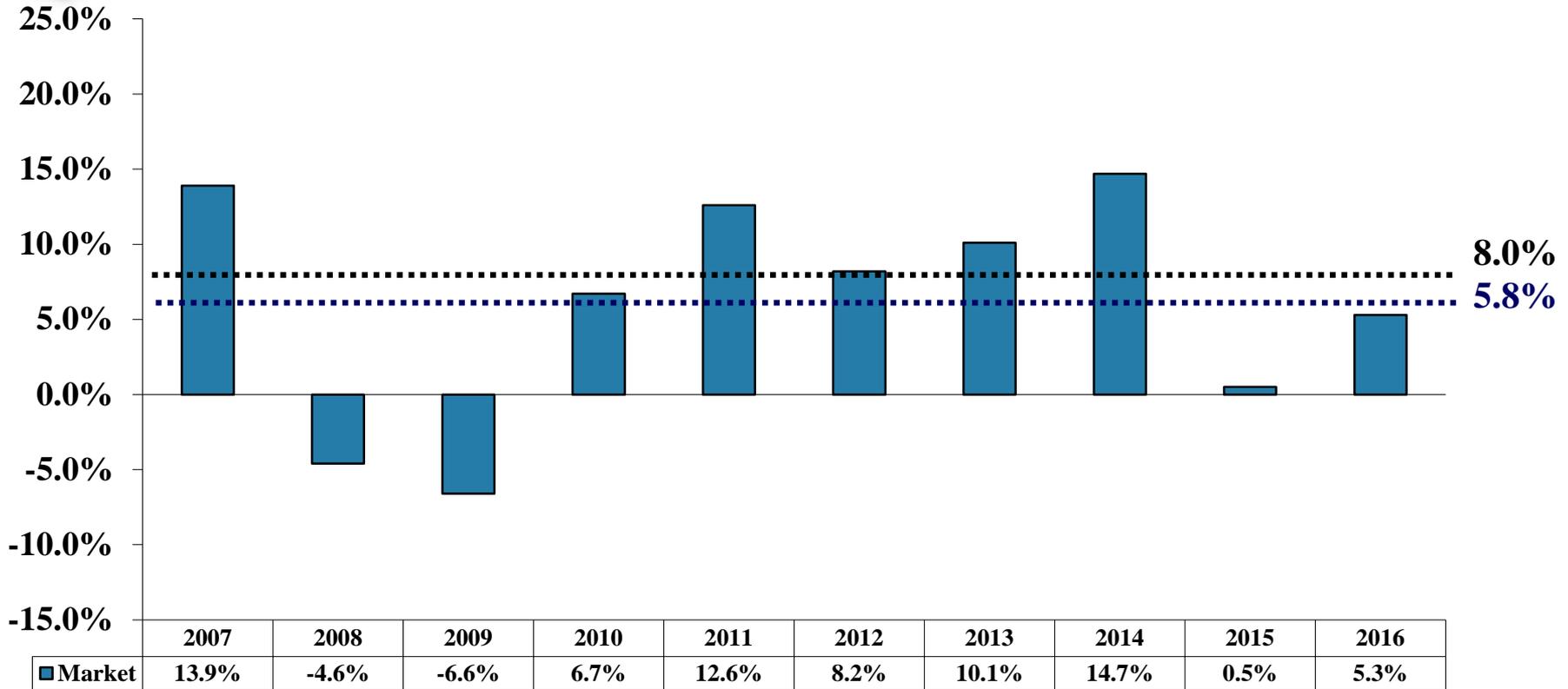
- ▶ \$1.9 billion outstanding loss for ERS in 2015



Asset Experience

- ◆ Actual investment returns delayed the projected time until full funding
 - ▶ 2089, assuming 8% market returns
 - ▶ 2051, assuming 8% on actuarial (smoothed) returns
 - 8% market returns plus additional returns of \$2.1 billion (approximately 8.50%)

Estimated Yields Based on Market Value of Assets



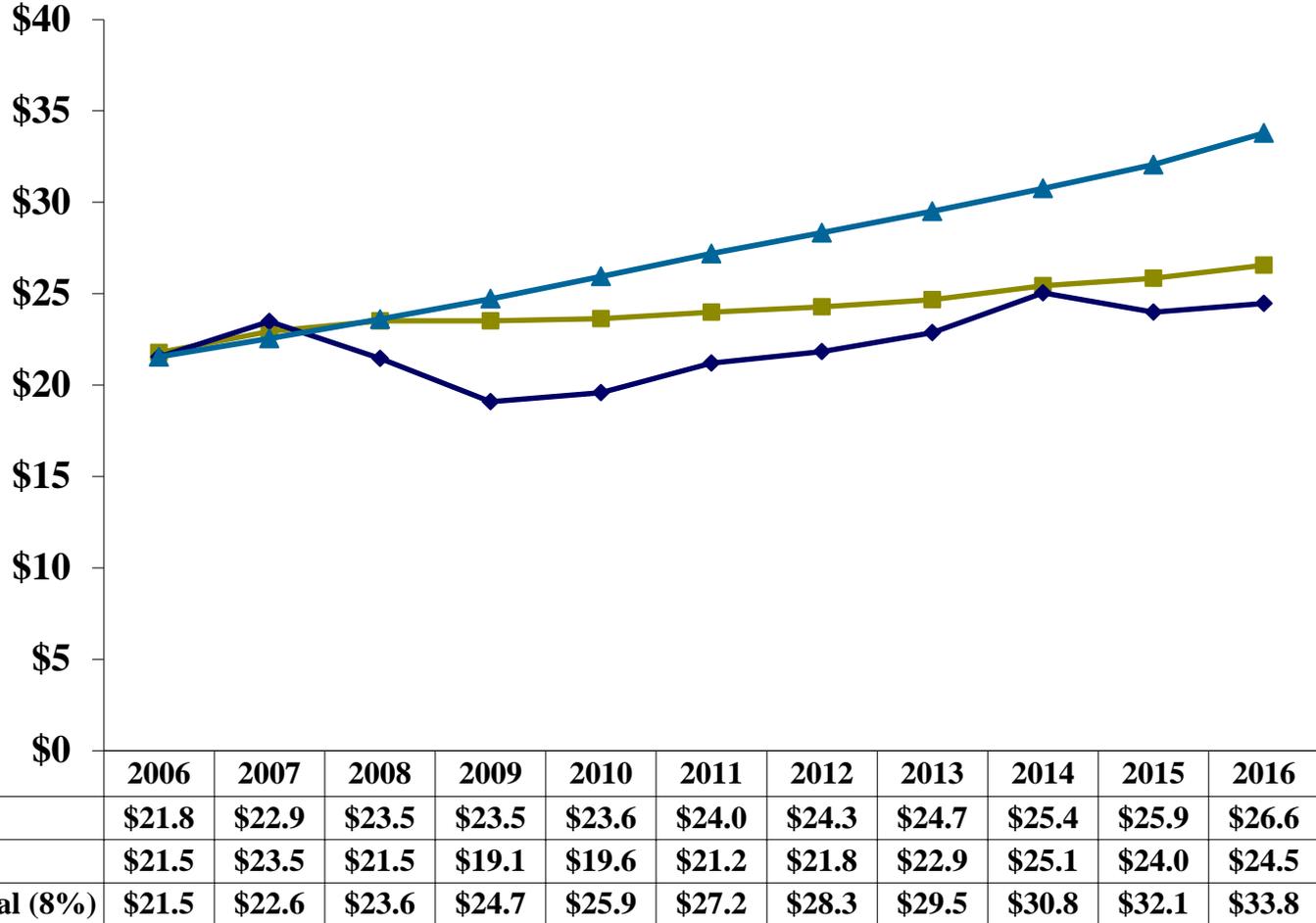
7.7% average compound return (on market value) over last 5 years.

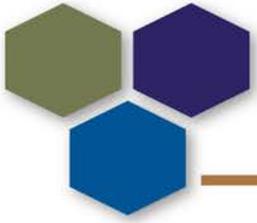
5.8% average compound return (on market value) over last 10 years.

7.4% average compound return (on market value) over last 25 years.

Actuarial, Market and Hypothetical* Values of Assets for ERS

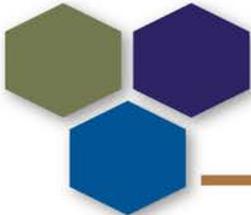
\$ Billions





ERS

Funding Valuation Results at August 31, 2016



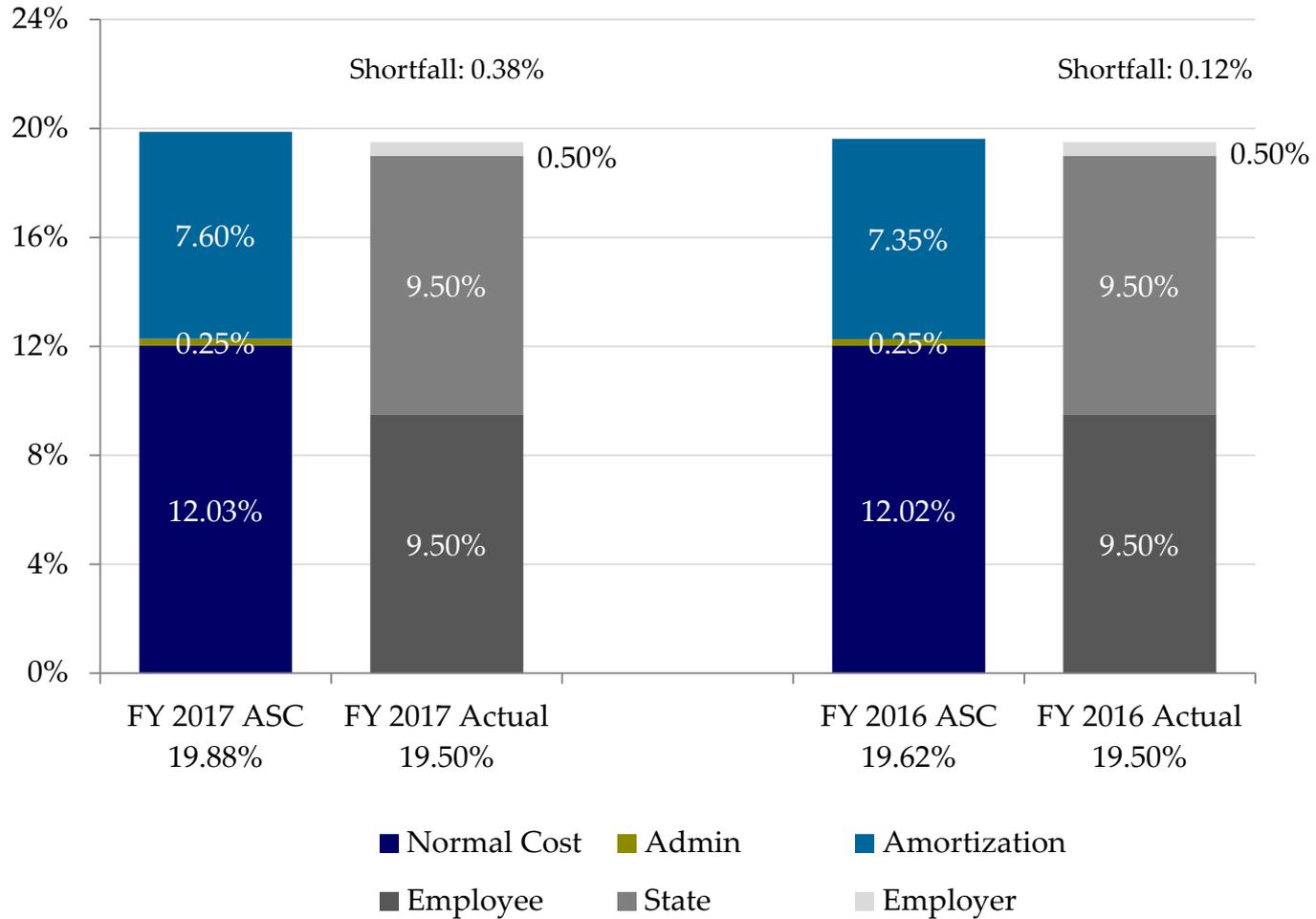
Funded Status

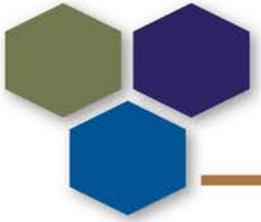
(\$ in millions)

Actuarial Valuation as of August 31, 2016	
	ERS
Actuarial Accrued Liability	\$35,303
Actuarial Value of Assets	<u>26,557</u>
Unfunded Accrued Liability	\$8,746
Funded Ratio	75.2%
Funding Period	35

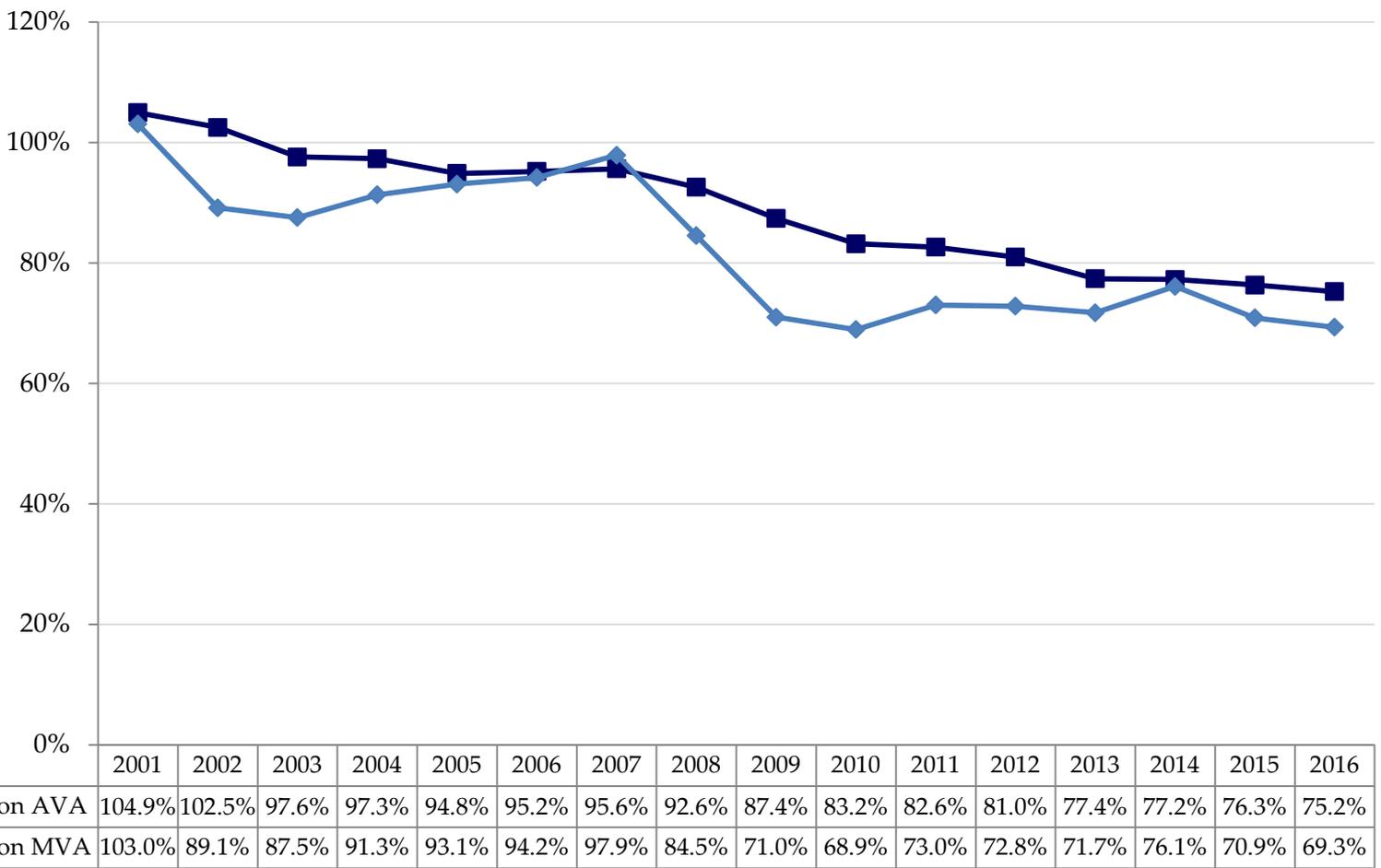
Actuarial Valuation as of August 31, 2015	
	ERS
Actuarial Accrued Liability	\$33,868
Actuarial Value of Assets	<u>25,851</u>
Unfunded Accrued Liability	\$8,018
Funded Ratio	76.3%
Funding Period	33

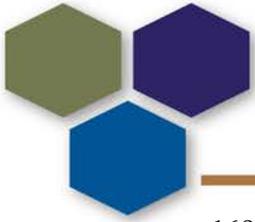
Actuarially Sound Contribution (ERS)





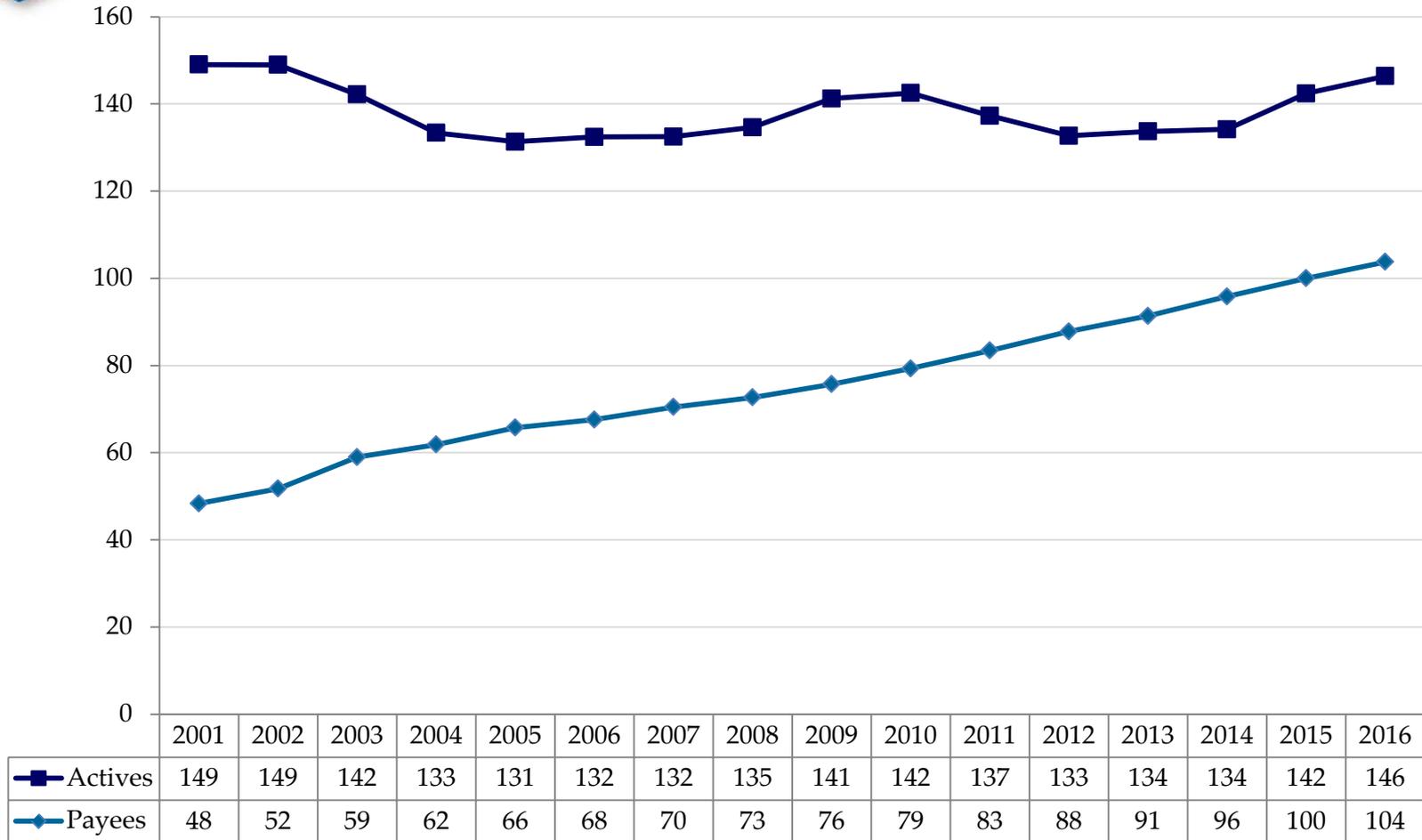
Funded Ratio History (ERS)



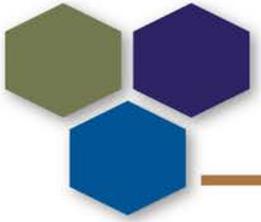


Membership (ERS)

(counts in 1000's)

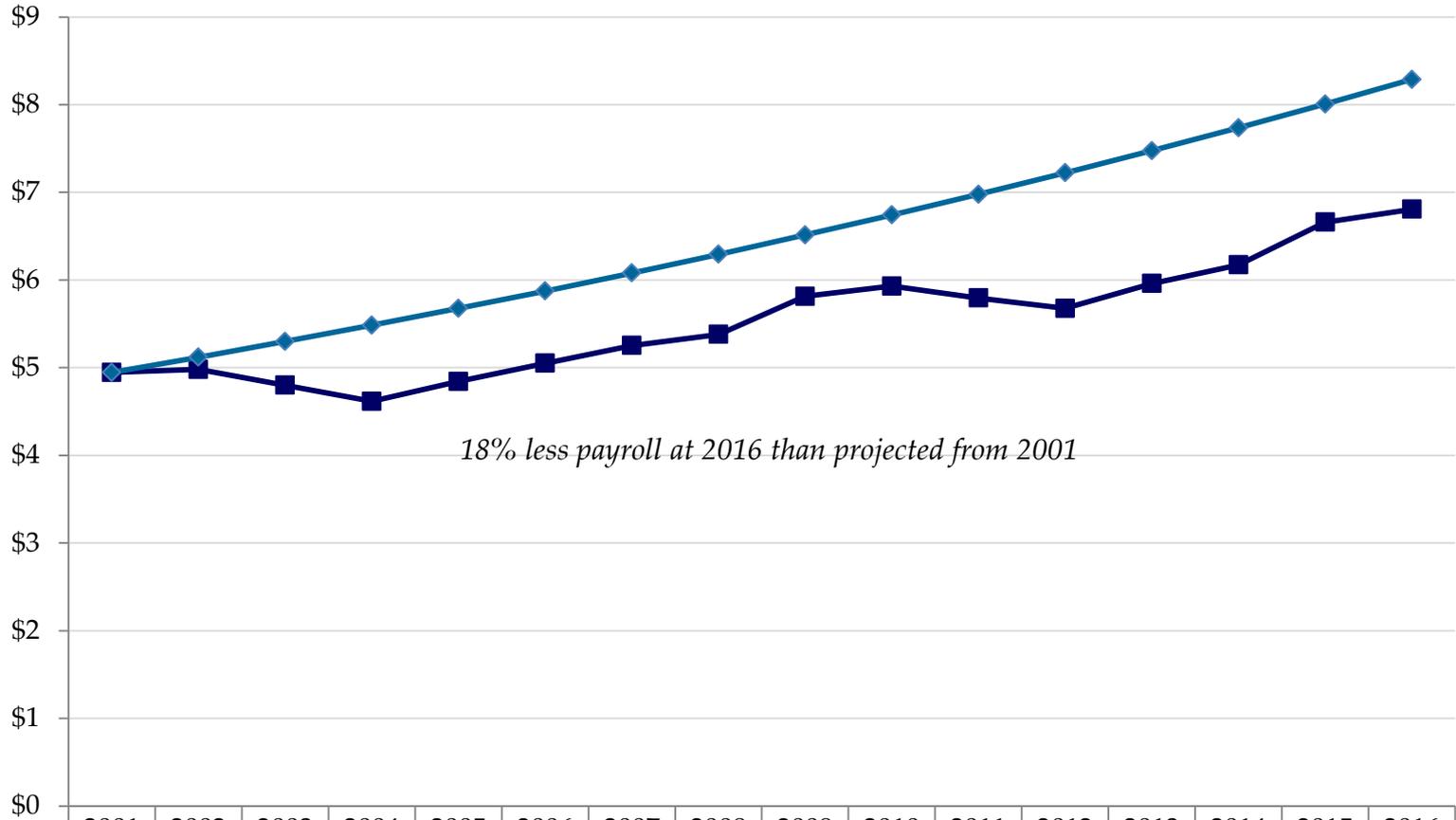


Active membership increase in 2015 includes approximately 7,000 new members from the elimination of the 90-day wait on September 1, 2015.



Payroll – Actual vs. Expected*

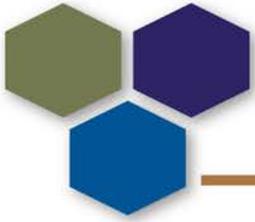
(\$ in billions)



18% less payroll at 2016 than projected from 2001

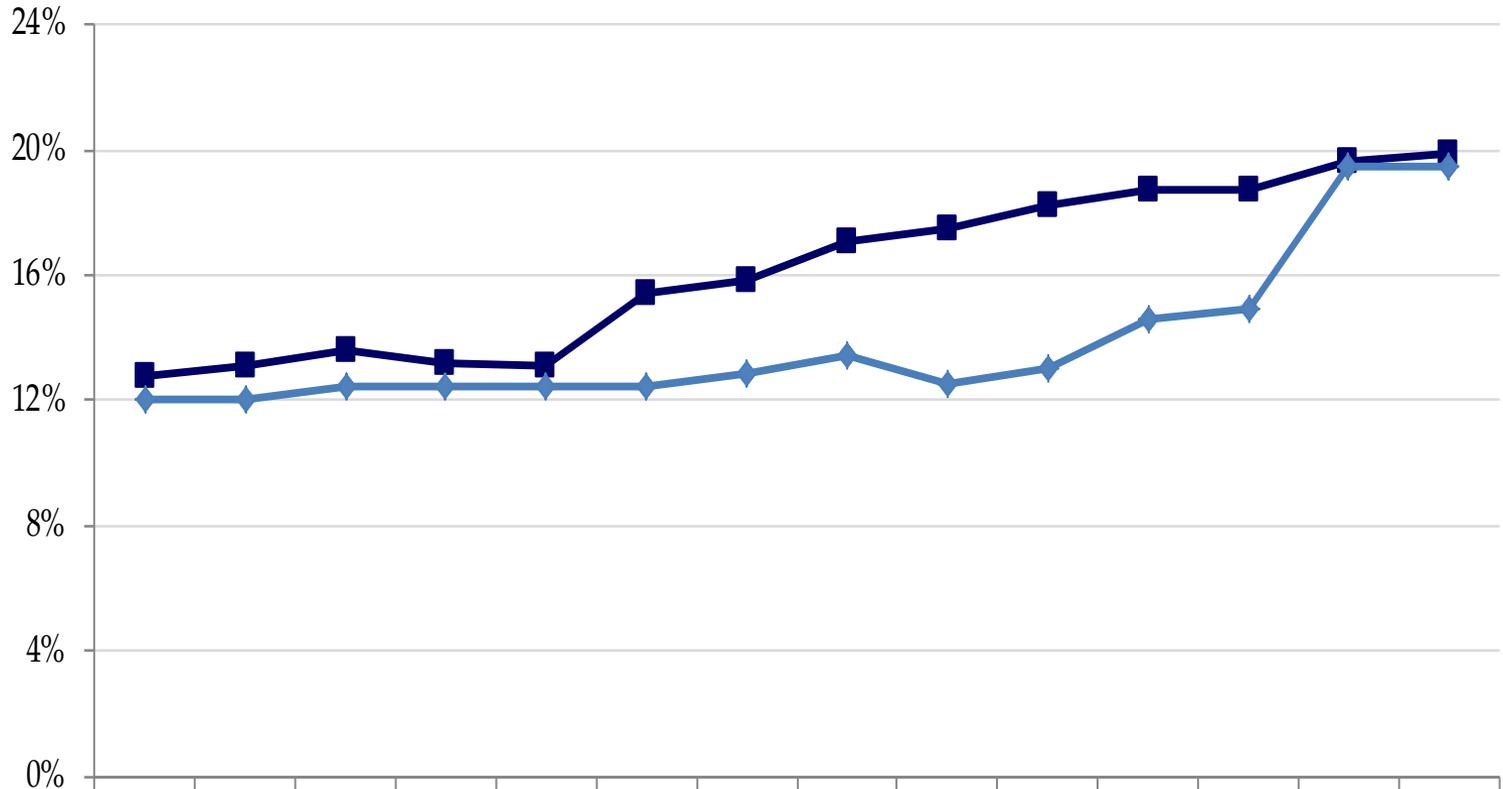
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Actual Payroll	\$4.9	\$5.0	\$4.8	\$4.6	\$4.8	\$5.1	\$5.3	\$5.4	\$5.8	\$5.9	\$5.8	\$5.7	\$6.0	\$6.2	\$6.7	\$6.8
Projected Payroll	\$4.9	\$5.1	\$5.3	\$5.5	\$5.7	\$5.9	\$6.1	\$6.3	\$6.5	\$6.7	\$7.0	\$7.2	\$7.5	\$7.7	\$8.0	\$8.3

*Projected from 2001 assuming 3.5% increase



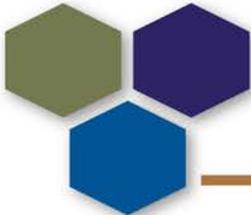
Actual vs. Actuarial Contributions (ERS)

(% of Payroll, by Fiscal Year)



ASC*	12.82%	13.12%	13.59%	13.20%	13.10%	15.45%	15.84%	17.07%	17.47%	18.25%	18.73%	18.76%	19.62%	19.88%
Actual	12.00%	12.00%	12.45%	12.45%	12.45%	12.45%	12.90%	13.45%	12.50%	13.00%	14.60%	14.90%	19.50%	19.50%

*Actuarially Sound Contribution defined as normal cost plus 31-year amortization of unfunded

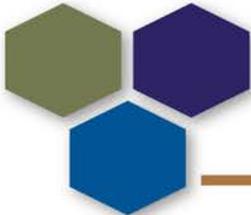


Short-term Projections Using Alternate One-Year Investment Returns (ERS)

	August 31, 2016 Results	Market Return for 12 month period ending August 31, 2017				
		-8%	0%	8%	16%	24%
UAAL (\$ in billions)	\$8.7	\$10.2	\$9.9	\$9.5	\$9.1	\$8.7
Funded Ratio on AVA	75.2%	71.9%	73.0%	74.0%	75.0%	76.1%
ASC	19.88%	20.81%	20.49%	20.17%	19.86%	19.54%
Funding Period on AVA	35	48	43	38	35	32
Funded Ratio on MVA	69.3%	58.6%	63.8%	69.0%	74.3%	79.5%
Funding Period on MVA	73	N/A	N/A	72	37	24

Projections assume that all assumptions are met (except asset returns, as noted) and future contributions continue at current levels.

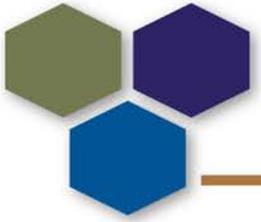
Under 8.0% scenario, the \$0.8 billion increase in UAAL is due to recognition of deferred asset losses.



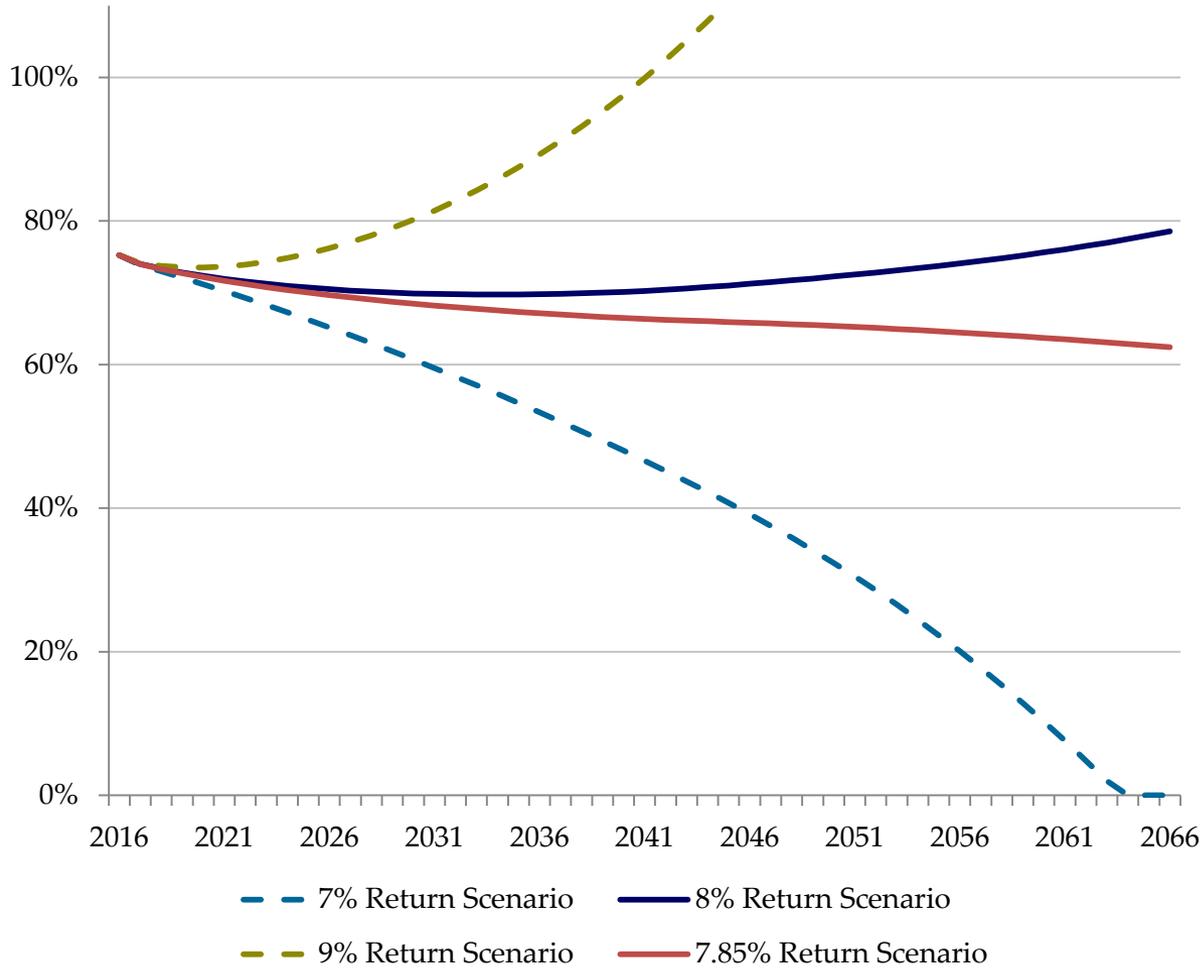
5-Year Funded Ratio and ASC Projections (ERS)

Projection Assuming 8% Investment Returns			
Actuarial Valuation as of August 31,	Funded Ratio on AVA	ASC	Funding Period on AVA
2016	75.2%	19.88%	35
2017	74.0%	20.17%	38
2018	73.4%	20.35%	41
2019	72.8%	20.47%	44
2020	72.4%	20.58%	46

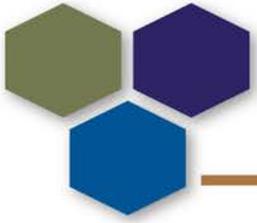
Projections assume that all assumptions are met, including an 8% return on the market value of assets, and future contributions continue at current levels.



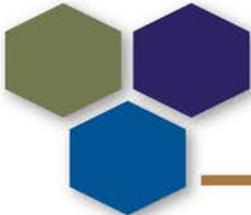
Funded Ratio Projections (ERS)



Projections assume no changes to current assumptions and except actual asset returns, as noted, all other assumptions are met and future contributions continue at current levels.

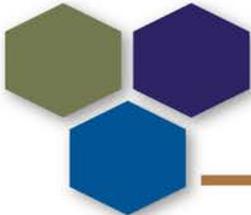


LECOSRF and JRS2 Funding Valuation Results at August 31, 2016



LECOSRF and JRS2 Results

- ◆ LECOSRF had a reduction in funded status
 - ▶ Contributions are not sufficient to sustain the plan
- ◆ JRS2 had a slight improvement in funded status
 - ▶ Demographic gains outweighed the shortfall in investment returns
 - ▶ Based on smoothed plan assets, the current statutory rates sufficient to sustain the plan
 - However, this will not be true after deferred losses have been recognized
- ◆ Although steps have been made to improve the projected funded status of these two plans, further steps are needed

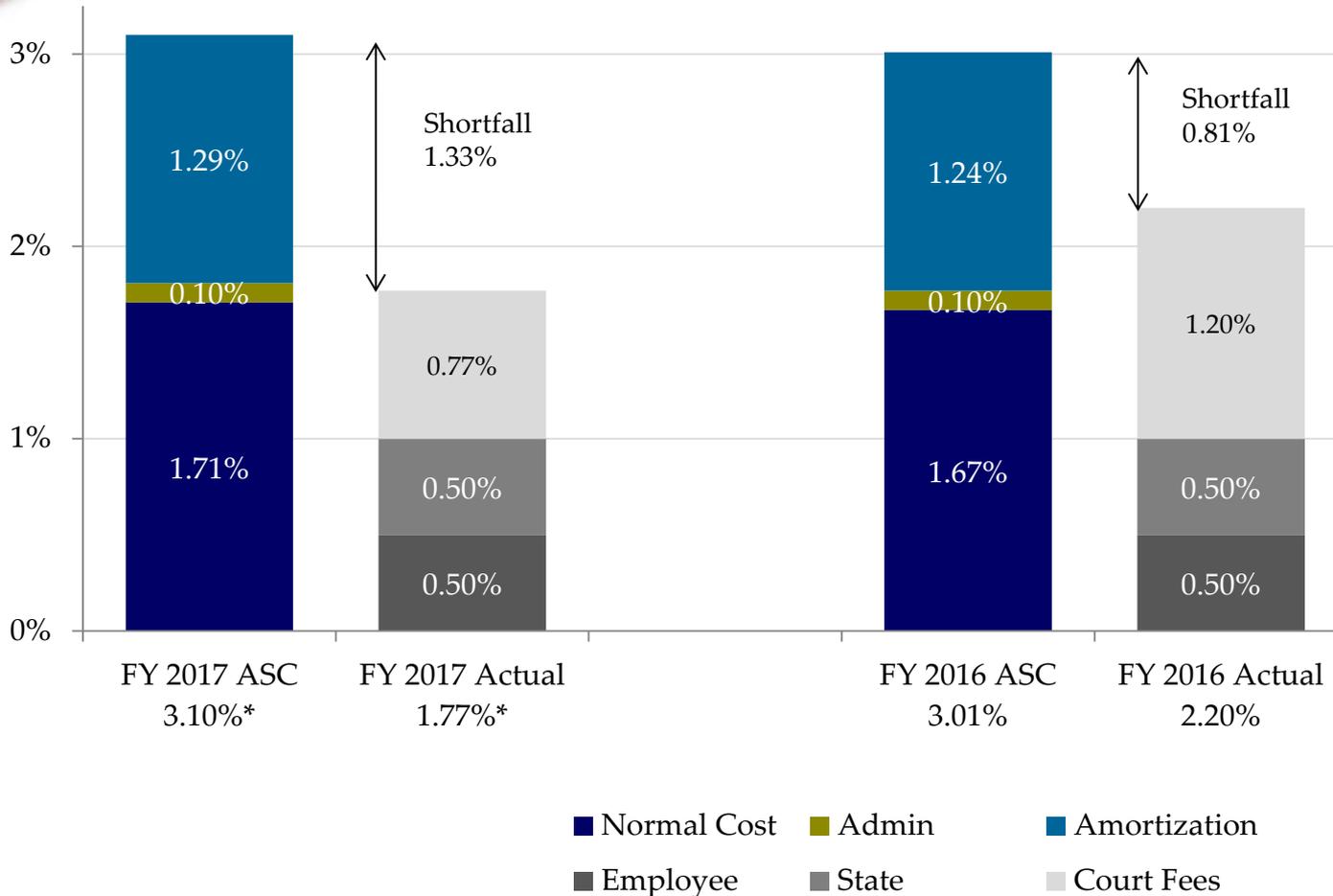


Funded Status

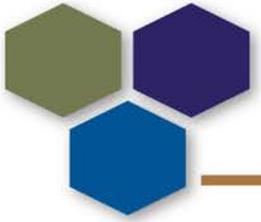
(\$ in millions)

Actuarial Valuation as of August 31, 2016		
	LECOSRF	JRS2
Actuarial Accrued Liability	\$1,312	\$426
Actuarial Value of Assets	<u>933</u>	<u>396</u>
Unfunded Accrued Liability	\$379	\$30
Funded Ratio	71.1%	92.9%
Funding Period	Never	49
Actuarial Valuation as of August 31, 2015		
	LECOSRF	JRS2
Actuarial Accrued Liability	\$1,262	\$404
Actuarial Value of Assets	<u>909</u>	<u>373</u>
Unfunded Accrued Liability	\$353	\$31
Funded Ratio	72.0%	92.2%
Funding Period	Never	Never

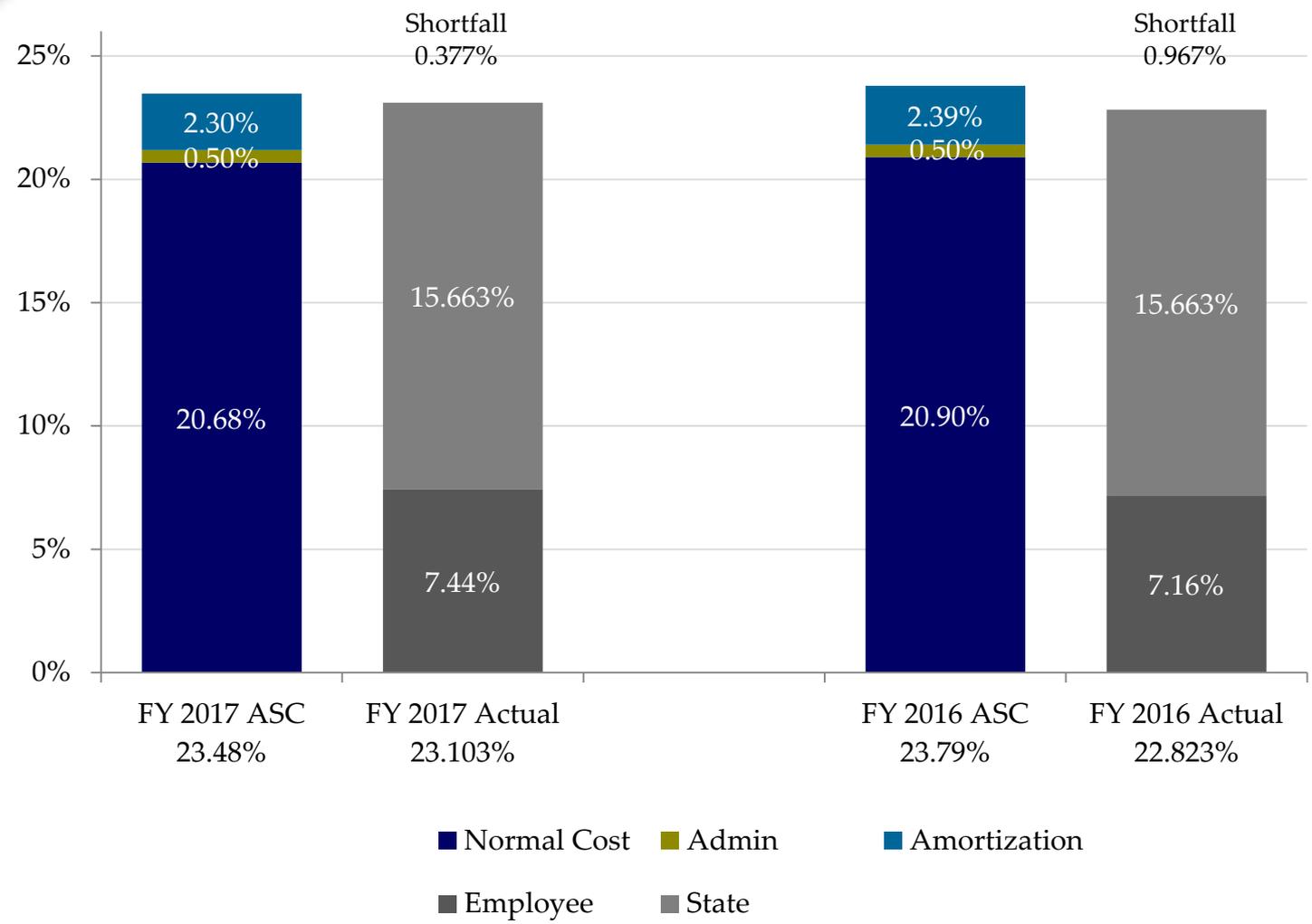
Actuarially Sound Contribution (LECOSRF)

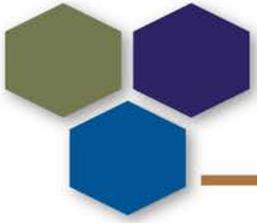


* Stated rate is include the court fees remitted to LECOSRF. In FY 2016 valuation, LECOSRF revenue from court fees was assumed to grow with inflation each year. For FY 2017, after further research, court fees assumed to remain level at \$19.2 million each year.

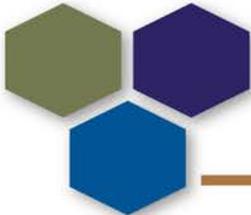


Actuarially Sound Contribution (JRS2)



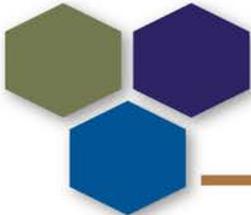


Accounting Valuation Results at August 31, 2016



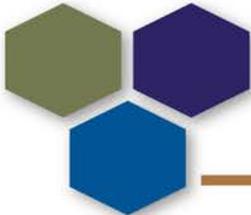
Accounting Valuation Results

- ◆ ERS adopted GASB 67 for plan year ending August 31, 2014
- ◆ GASB 68 measures will be included in Texas state reporting for fiscal year ending August 31, 2016
 - ▶ Net Pension Liability (similar to Unfunded Accrued Liability) will reside on the balance sheet of the State as of August 31, 2016
 - ▶ State has elected to utilize one year reporting lag
 - GASB 67/68 valuation as of August 31, 2015 used for August 31, 2016 State reporting



Determining the Discount Rate

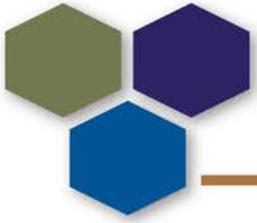
- ◆ Discount rate used in determining the Total Pension Liability (TPL) is a blend of two rates
 - ▶ Long-term expected rate of return on pension plan investments (8.00% based on current investment policy)
 - Can be used to discount plan obligations as long as there are projected assets sufficient to pay projected plan benefits
 - ▶ Yield or index rate for a 20-year, tax-exempt general obligation municipal bond (2.84% as of August 31, 2016)
 - Used to discount plan obligations after the projected assets have been extinguished



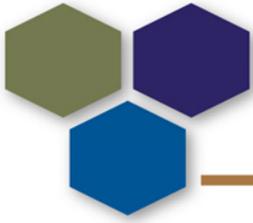
Accounting Valuation Results

◆ (\$ in millions)

August 31, 2016	ERS	LECOSRF	JRS2
Single Discount Rate (SDR)	5.73%	3.69%	6.53%
Total Pension Liability	\$44,223	\$2,214	\$486
Plan Fiduciary Net Position	<u>24,466</u>	<u>860</u>	<u>381</u>
Net Pension Liability (NPL)	19,757	1,354	105
August 31, 2015			
Single Discount Rate (SDR)	6.86%	5.00%	7.06%
Total Pension Liability	\$37,265	\$1,765	\$440
Plan Fiduciary Net Position	<u>23,998</u>	<u>844</u>	<u>365</u>
Net Pension Liability (NPL)	13,266	921	75

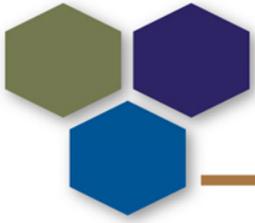


Summary



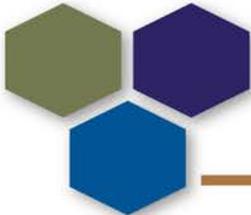
Upcoming Asset Allocation Study and Actuarial Experience Study

- ◆ Over the next 12-15 months ERS will be conducting a thorough review of its investment and actuarial strategies, including the asset allocation and assumed rate of investment return.
 - ▶ Capital market forecasts from investment consultants and other market data show lower expected inflation and expected investment returns
 - ▶ Growth in aggregate member payroll has been less than assumed
 - Assumed 3.5% per year and actual has been closer to 2%
 - Drives expected revenue from future payroll contributions
 - ▶ Mortality studies continue to show improvement in life expectancy
 - Studies have shown varied expectations for rate of future improvement
 - Paying the same benefits for longer periods costs more



Summary

- ◆ Contribution rates and current level of plan benefits are sufficient to sustain the ERS and JRS2
 - ▶ However, there is no margin for adverse deviation or response to additional cost pressures
- ◆ For LECOSRF, current contribution level is not sufficient to sustain the system
 - ▶ Without an increase of contributions over the current schedule, or a reduction of benefits, the funded status will continue to decline



Disclaimers

- ◆ This presentation is intended to be used in conjunction with the actuarial valuation reports issued in November 2016. This presentation should not be relied on for any purpose other than the purpose described in the valuation reports.
- ◆ Circular 230 Notice: Pursuant to regulations issued by the IRS, to the extent this presentation concerns tax matters, it is not intended or written to be used, and cannot be used, for the purpose of (i) avoiding tax-related penalties under the Internal Revenue Code or (ii) marketing or recommending to another party any tax-related matter addressed within. Each taxpayer should seek advice based on the individual's circumstances from an independent tax advisor.
- ◆ This presentation shall not be construed to provide tax advice, legal advice or investment advice.

EMPLOYEES RETIREMENT SYSTEM OF TEXAS
ANNUAL ACTUARIAL VALUATION – FUNDING
AS OF AUGUST 31, 2016

November 17, 2016

Board of Trustees
Employees Retirement System of Texas
200 East 18th Street
Austin, TX 78701

Re: Actuarial Valuation for Funding Purposes as of August 31, 2016

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Employees Retirement System of Texas (ERS) as of August 31, 2016. This report was prepared at the request of the Board and is intended for use by ERS staff and those designated or approved by the Board. This report may be provided to parties other than ERS only in its entirety and only with the permission of the Board.

Actuarial Valuation

The primary purposes of the actuarial valuation report are to determine the adequacy of the current State and employer contribution rates, describe the current financial condition of ERS, analyze changes in the condition of ERS, and provide various summaries of the data.

Plan Provisions

Our actuarial valuation as of August 31, 2016 reflects the benefit and contribution provisions set forth in Chapters 811 through 815 of the Texas Government Code. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. Additionally, this actuarial valuation incorporates the most significant across-the-board pay increases budgeted by the State Legislature for the current biennium. The current actuarial assumptions and methods are outlined in Appendix II of this report.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not

otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. They are all Enrolled Actuaries, Fellows of the Society of Actuaries, and Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned are experienced in performing valuations for large public retirement systems.

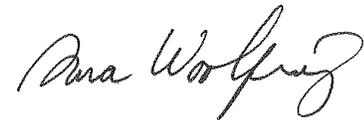
Respectfully submitted,
Gabriel, Roeder, Smith & Company



R. Ryan Falls, FSA, EA, MAAA
Senior Consultant



Joseph P. Newton, FSA, EA, MAAA
Senior Consultant



Dana Woolfrey, FSA, EA, MAAA
Consultant

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SECTION A

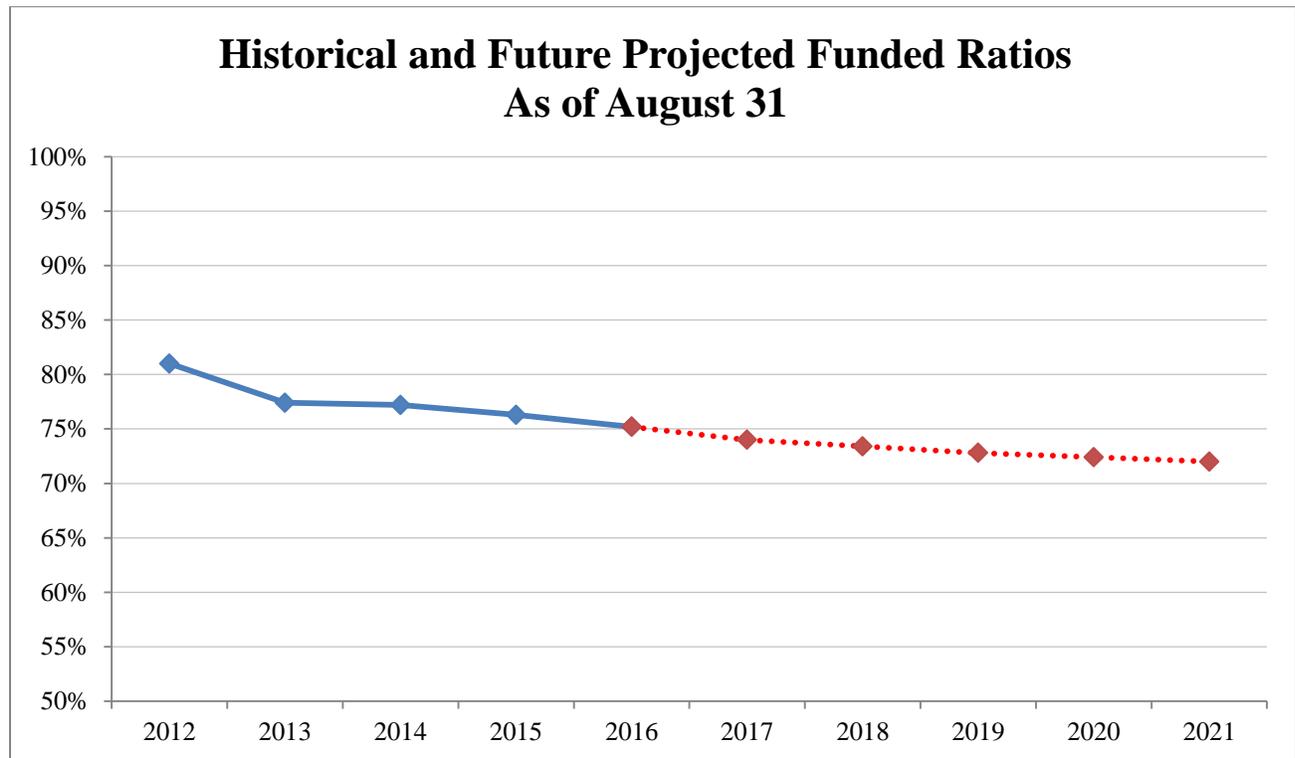
EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Item	2016	2015
Membership <ul style="list-style-type: none"> • Number of <ul style="list-style-type: none"> - Active members* - Retirees and beneficiaries - Inactive, vested - Inactive, nonvested - Total • Valuation Payroll 	<div style="margin-bottom: 10px;"> <ul style="list-style-type: none"> 146,390 103,758 16,597 92,276 <li style="border-top: 1px solid black;">359,021 </div> <ul style="list-style-type: none"> \$ 6,806,457,317 	<div style="margin-bottom: 10px;"> <ul style="list-style-type: none"> 142,409 100,003 16,673 84,449 <li style="border-top: 1px solid black;">343,534 </div> <ul style="list-style-type: none"> \$ 6,659,646,892
Statutory contribution rates <ul style="list-style-type: none"> • Members • Employers • State <p>Actuarially Sound Rate (funds normal cost and amortizes unfunded accrued liability over 31 years, per Section 811.006 of the Texas Government Code)</p>	<div style="margin-bottom: 10px;"> <p style="text-align: center;">FY 2017</p> <ul style="list-style-type: none"> 9.50% 0.50% 9.50% </div> <p style="text-align: center;">19.88%</p>	<div style="margin-bottom: 10px;"> <p style="text-align: center;">FY 2016</p> <ul style="list-style-type: none"> 9.50% 0.50% 9.50% </div> <p style="text-align: center;">19.62%</p>
Assets <ul style="list-style-type: none"> • Market value (MVA) • Actuarial value (AVA) • Return on market value* • Return on actuarial value 	<ul style="list-style-type: none"> \$ 24,465,580,124 \$ 26,557,130,705 5.3% 5.9% 	<ul style="list-style-type: none"> \$ 23,998,481,161 \$ 25,850,542,024 0.5% 6.1%
Actuarial Information on AVA (smoothed) <ul style="list-style-type: none"> • Normal cost % • Total normal cost • Actuarial accrued liability • Unfunded actuarial accrued liability (UAAL) • Funded ratio • Funding period (years) 	<ul style="list-style-type: none"> 12.28% \$ 835,832,959 \$ 35,303,165,362 \$ 8,746,034,657 75.2% 35 	<ul style="list-style-type: none"> 12.27% \$ 817,138,674 \$ 33,868,359,950 \$ 8,017,817,926 76.3% 33
Actuarial Information on MVA <ul style="list-style-type: none"> • Unfunded actuarial accrued liability (UAAL) • Funded ratio • Funding period (years) 	<ul style="list-style-type: none"> \$ 10,837,585,238 69.3% 73 	<ul style="list-style-type: none"> \$ 9,869,878,789 70.9% 59

* Provided by ERS Master Trust Custodian

The following chart illustrates the recent history and outlook of the funded status of ERS over the next five years:



August 31,	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Funded Ratio	81.0%	77.4%	77.2%	76.3%	75.2%	74.0%	73.4%	72.8%	72.4%	71.9%
UAAL (in billions)	\$5.7	\$7.2	\$7.5	\$8.0	\$8.7	\$9.5	\$10.0	\$10.6	\$11.1	\$11.6
ASC	18.25%	18.73%	18.76%	19.62%	19.88%	20.17%	20.35%	20.47%	20.58%	20.64%

The projections beyond 2016 are based on the same assumptions, methods and provisions used for the August 31, 2016 valuation, which include the most significant across-the-board pay increases budgeted by the State Legislature and the assumptions adopted by the Board in February 2013. Additionally, the market value of assets is expected to earn 8% per year.

The funding trajectory of ERS deteriorated slightly based on the actuarial value of assets and on a market basis. This is primarily due to asset losses, both on a market and actuarial basis. Assuming the market value of assets earns 8% per year, ERS is projected to reach full funding in 2089. Assuming the actuarial (smoothed) value of assets earns 8% per year, ERS is projected to reach full funding in 2051.

It is important to note that the short-term projections of funded ratio, UAAL and actuarially sound contribution (ASC) rate show a downward drift. This is caused by the \$2.1 billion of deferred asset losses in the actuarial value of assets that will be systematically recognized over the coming years (20% of the outstanding amount each year).

SECTION B

DISCUSSION

DISCUSSION

Introduction

The results of the August 31, 2016 actuarial valuation of the Employees Retirement System of Texas (ERS) are presented in this report.

The primary purposes of this actuarial valuation report are to determine the adequacy of the current State and employer contribution rates, describe the current financial condition of ERS, analyze the changes in the condition of ERS, and provide various summaries of the data.

The total contribution rate for the current fiscal year exceeds the normal cost by 7.22% of payroll, which, on an actuarial value of assets basis, is sufficient to amortize the unfunded liability over 35 years. On a market value basis, the total contribution rate is sufficient to amortize the unfunded liability over 73 years. This was a step back from the August 31, 2015 valuation, primarily due to asset losses during fiscal year 2016, both on a market and actuarial value basis.

All of the tables referenced in the following discussion appear in Section C of this report.

Plan Provisions

There were no changes to the plan provisions during the past year. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. We did not perform an independent analysis of the actuarial assumptions. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of ERS.

The actuarial valuation as of August 31, 2016 incorporates the most significant across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, all regular class employees were assumed to receive no across-the-board increase on September 1, 2016. CPO/COs covered by State of Texas Salary Schedule C were assumed to receive increases in accordance with the schedule (which generally result in no increase on September 1, 2016). Finally, CPO/COs employed by the Texas Department of Criminal Justice were assumed to receive no across-the-board increase on September 1, 2016.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated

contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of ERS is outside the scope of this actuarial valuation.

The current actuarial assumptions and methods are outlined in Appendix II of this report.

Funding Adequacy

The funding objective of ERS is to fund the sum of the normal cost and the amount necessary to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. Contribution rates should be established which, over time, will remain level as a percent of payroll.

The member contribution rates are established by State statute and the State contribution rate is set by State statute and legislative appropriation. Members contribute 9.50% of payroll and the State is scheduled to contribute 10.00% of payroll (9.50% from statewide appropriations and 0.50% from agency appropriations) for each year in the future based on appropriations for the current biennium and expectations regarding future biennia. The long-term State contribution rates are subject to future legislative appropriations.

The unfunded actuarial accrued liability (UAAL) of ERS increased from \$8.0 billion as of August 31, 2015 to \$8.7 billion as of August 31, 2016. Additionally, the funded ratio of ERS—actuarial value of assets divided by the actuarial accrued liability—decreased from 76.3% to 75.2% as of August 31, 2016. This decrease was primarily due to the losses on the actuarial value of assets during fiscal year 2016. The funded status is one of many metrics used to show trends and develop future expectations about the health of a retirement system. The funded status measure itself is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions since it does not reflect normal cost contributions, the timing of amortization payments, or future experience other than expected.

The valuation shows that the total normal cost for funding purposes is 12.28% of payroll. The total contribution rate is currently 19.50% of payroll. Thus, the total contribution rate for the current fiscal year exceeds the normal cost by 7.22% of payroll, which is sufficient to amortize the unfunded liability over 35 years on an actuarial value of assets basis.

The determination of the funding period anticipates growth in the contributory payroll in accordance the actuarial assumptions. Accordingly, the anticipated contributions that will be used to eliminate the UAAL are expected to increase over time. As a result, the amortization payments will not be sufficient to cover all of the interest charges on the UAAL (i.e., the UAAL is expected to increase each year) until the funding period reaches approximately 20 years, or less.

Section 811.006 of the Texas Government Code limits the modifications to ERS that would, essentially, increase benefits or lower contributions to the trust unless the current level of benefits and contributions are considered actuarially sound. Section 811.006 defines actuarially sound as a

retirement system that is receiving a total contribution rate sufficient to cover the normal cost, administrative expenses, and amortize the UAAL over a period of 31 years, or less. Based on the actuarial valuation as of August 31, 2016, the actuarially sound contribution (ASC) rate for ERS is 19.88% of payroll.

As noted, the ASC is currently calculated based on a 31-year open amortization period. This means that the ASC contribution will always be calculated with the same 31-year period and the UAAL would never completely disappear. Even though the contributions to ERS are not based on this ASC, the Board may want to consider adopting a funding policy that includes an ultimate goal of eliminating the UAAL by a certain date. This type of funding policy will allow the Board to better assess the level of contributions received from the employers and the State.

System Assets

This report contains several tables that summarize key information with respect to the ERS assets.

The total market value of assets increased from \$24.0 billion to \$24.5 billion as of August 31, 2016. Table 5 reconciles the changes in the fund during the year. Total contributions increased from \$963 million to \$1,361 million, due to an increase in active member payroll and an increase in the total contribution rate from 14.90% to 19.50% of pay.

Table 6 shows the development of the actuarial value of assets. Rather than use the ERS' market value of assets, the valuation reflects a smoothed asset value. This actuarial value is calculated by immediately reflecting 20% of the difference between the expected actuarial value and the current market value. The actuarial value is currently 8.5% more than the market value.

The approximate investment return for the fiscal year ending August 31, 2016 was 5.3% when measured on market value and 5.9% when measured on actuarial value. Table 7 shows a history of return rates. The ERS ten-year average market return, net of investment expenses as reported by the ERS Master Trust Custodian, is 5.8%.

Table 8 provides a history of the contributions paid into ERS and the administrative expenses and benefit payments that have been paid out of ERS. This table shows that ERS paid administrative expenses and benefit payments, in excess of contributions received, of \$1,109 million (or 4.6% of assets) in fiscal year 2015 and that amount was \$806 million (or 3.3% of assets) in fiscal year 2016. The scheduled increases in contribution rates should continue to mitigate the growth in this deficit; however, ERS should continue to monitor this deficit as it could impact the future liquidity needs of ERS.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not

otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

The tables in Appendix III show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Development of Employer Cost

	August 31, 2016	August 31, 2015
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	\$ 6,806,457,317	\$ 6,406,986,436
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	6,806,457,317	6,659,646,892
2. Total Normal Cost Rate		
a. Gross normal cost rate	12.03%	12.02%
b. Administrative expenses	0.25%	0.25%
c. Total (Item 2a + Item 2b)	12.28%	12.27%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	\$ 20,307,684,320	\$ 19,516,915,605
b. Less: present value of future normal costs	(5,429,877,061)	(5,077,477,179)
c. Actuarial accrued liability	\$ 14,877,807,259	\$ 14,439,438,426
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	\$ 19,017,977,910	\$ 18,080,000,823
b. Inactive members	1,407,380,193	1,348,920,701
c. Active members (Item 3c)	14,877,807,259	14,439,438,426
d. Total	\$ 35,303,165,362	\$ 33,868,359,950
5. Actuarial Value of Assets	\$ 26,557,130,705	\$ 25,850,542,024
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	\$ 8,746,034,657	\$ 8,017,817,926
7. Amortization of UAAL Over 31 Years as a Level Percentage of Payroll	7.60%	7.35%
8. Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years (Item 2c + Item 7)	19.88%	19.62%
9. Allocation of Contribution Rate		
a. Combined State and employer rates	10.00%	10.00%
b. Member rate	9.50%	9.50%
c. Total contribution rate	19.50%	19.50%
d. Total normal cost rate	12.28%	12.27%
e. Available contribution rate to amortize UAAL	7.22%	7.23%
f. Total contribution rate	19.50%	19.50%
10. Funding period based on statutory contribution rates and Actuarial Value of Assets (years)	35	33

Actuarial Present Value of Future Benefits

	<u>August 31, 2016</u>	<u>August 31, 2015</u>
1. Active Members		
a. Service Retirement	\$ 18,497,623,991	\$ 17,852,126,502
b. Disability Benefits	289,378,636	270,809,826
c. Death Before Retirement	305,729,174	292,430,946
d. Termination	1,214,952,519	1,101,548,331
e. Total	<u>\$ 20,307,684,320</u>	<u>\$ 19,516,915,605</u>
2. Inactive Members	\$ 1,407,380,193	\$ 1,348,920,701
3. Annuitants	\$ 19,017,977,910	\$ 18,080,000,823
4. Total Actuarial Present Value of Future Benefits	\$ 40,733,042,423	\$ 38,945,837,129

Analysis of Normal Cost

	<u>August 31, 2016</u>	<u>August 31, 2015</u>
1. Gross Normal Cost Rate		
a. Service Retirement	8.63%	8.63%
b. Disability Benefits	0.28%	0.28%
c. Death Before Retirement	0.24%	0.24%
d. Termination	<u>2.88%</u>	<u>2.87%</u>
e. Total	12.03%	12.02%
2. Administrative Expenses	<u>0.25%</u>	<u>0.25%</u>
3. Total Normal Cost	12.28%	12.27%
4. Less: Member Rate	<u>9.50%</u>	<u>9.50%</u>
5. Employer Normal Cost Rate	2.78%	2.77%

Historical Summary of Active Member Data

Valuation as of August 31, (1)	Active Members		Covered Payroll		Average Salary		Average Age (8)	Average Service (9)
	Number (2)	Percent Increase (3)	Amount in \$ Millions (4)	Percent Increase (5)	\$ Amount (6)	Percent Increase (7)		
2008	134,626	N/A	5,313	N/A	39,468	N/A	43.7	9.4
2009	141,223	4.9%	5,677	6.8%	40,202	1.9%	43.6	9.2
2010	142,490	0.9%	5,845	3.0%	41,022	2.0%	43.8	9.2
2011	137,293	-3.6%	5,714	-2.2%	41,620	1.5%	44.1	9.5
2012	132,669	-3.4%	5,597	-2.0%	42,188	1.4%	44.3	9.7
2013	133,669	0.8%	5,689	1.7%	42,564	0.9%	44.3	9.6
2014	134,162	0.4%	5,953	4.6%	44,374	4.3%	44.3	9.4
2015	142,409	6.1%	6,407	7.6%	44,990	1.4%	43.6	8.8
2016	146,390	2.8%	6,806	6.2%	46,495	3.3%	43.3	8.5

Reconciliation of Plan Net Assets

	Year Ending	
	August 31, 2016 (1)	August 31, 2015 (2)
1. Market value of assets at beginning of year	\$ 23,998,481,161	\$ 25,050,116,469
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	\$ 686,763,354	\$ 500,394,986
ii. Member (including penalty interest)	674,677,886	462,159,534
iii. Total	\$ 1,361,441,240	\$ 962,554,520
b. Net investment income	\$ 1,273,413,421	\$ 56,940,707
c. Total revenue	\$ 2,634,854,661	\$ 1,019,495,227
3. Disbursements for the year		
a. Benefit payments and refunds	2,215,784,680	\$ 2,114,361,254
b. Net transfers from TRS	(68,477,651)	(65,070,345)
c. Administrative expenses	20,448,669	21,839,626
d. Total expenditures	2,167,755,698	2,071,130,535
4. Increase in net assets (Item 2c - Item 3d)	\$ 467,098,963	\$ (1,051,635,308)
5. Market value of assets at end of year (Item 1 + Item 4)	\$ 24,465,580,124	\$ 23,998,481,161

Development of Actuarial Value of Assets

	<u>Year Ending August 31, 2016</u>
1. Actuarial value of assets at beginning of year	\$ 25,850,542,024
2. Net new investments	
a. Contributions for the year (Table 5)	\$ 1,361,441,240
b. Disbursements for the year (Table 5)	<u>(2,167,755,698)</u>
c. Subtotal	(806,314,458)
3. Assumed investment return rate	8.00%
4. Expected return	\$ 2,035,790,784
5. Expected actuarial value of assets at end of year (Item 1 + Item 2c + Item 4)	\$ 27,080,018,350
6. Market value of assets at end of year	\$ 24,465,580,124
7. Excess earnings/(shortfall) (Item 6 - Item 5)	\$ (2,614,438,226)
8. Excess earnings/(shortfall) recognized (20% x Item 7)	\$ (522,887,645)
9. Actuarial value of assets (Item 5 + Item 8)	\$ 26,557,130,705
10. Estimated rate of return	5.9%
11. Actuarial value as percentage of market value	108.5%

History of Investment Return Rates

Year Ending August 31 of	Market*	Actuarial
(1)	(2)	(3)
2003	9.2%	5.4%
2004	11.7%	6.4%
2005	12.7%	7.5%
2006	8.8%	7.7%
2007	13.9%	8.6%
2008	-4.6%	5.7%
2009	-6.6%	3.2%
2010	6.7%	3.6%
2011	12.6%	5.0%
2012	8.2%	5.4%
2013	10.1%	6.1%
2014	14.7%	7.6%
2015	0.5%	6.1%
2016	5.3%	5.9%
Average Returns		
Last Five Years:	7.7%	6.2%
Last Ten Years:	5.8%	5.7%

* Market Value Rates of Return provided by the ERS Master Trust Custodian.

History of Cash Flow

Year Ending August 31, (1)	Contributions (2)	Distributions and Expenditures			External Cash Flow for the Year (7)	Market Value of Assets (8)	External Cash Flow as Percent of Market Value (9)
		Benefit Payments and Refunds (3)	Administrative Expenses (5)	Total (6)			
2007	\$ 657.7	\$ (1,333.2)	\$ (16.0)	\$ (1,349.2)	\$ (691.5)	\$ 23,480	-2.9%
2008	678.8	(1,383.9)	(16.2)	(1,400.1)	(721.3)	21,464	-3.4%
2009	716.1	(1,449.0)	(17.3)	(1,466.3)	(750.2)	19,098	-3.9%
2010	810.4	(1,512.4)	(19.0)	(1,531.4)	(721.0)	19,581	-3.7%
2011	839.9	(1,612.5)	(18.8)	(1,631.3)	(791.4)	21,204	-3.7%
2012	758.1	(1,733.7)	(17.8)	(1,751.5)	(993.4)	21,826	-4.6%
2013	798.3	(1,834.4)	(18.7)	(1,853.1)	(1,054.8)	22,869	-4.6%
2014	912.8	(1,963.5)	(20.2)	(1,983.7)	(1,070.9)	25,050	-4.3%
2015	962.6	(2,049.3)	(21.8)	(2,071.1)	(1,108.5)	23,998	-4.6%
2016	1,361.4	(2,147.3)	(20.4)	(2,167.7)	(806.3)	24,466	-3.3%

Dollar amounts in millions

Column (7) = Column (2) + Column (6).

Total Experience Gain or Loss

Item	Year Ending August 31, 2016	Year Ending August 31, 2015
(1)	(2)	(3)
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	\$ 8,017,817,926	\$ 7,492,814,715
2. Normal cost for the year (excluding administrative expenses)	800,489,556	699,224,514
3. Actual administrative expenses	20,448,669	21,839,626
4. Contributions for the year (excluding service purchases)	(1,321,742,138)	(917,406,260)
5. Interest at 8%		
a. On UAAL	\$ 641,425,434	\$ 599,425,177
b. On normal cost and administrative expenses	32,837,529	28,842,566
c. On contributions	(52,869,686)	(36,696,250)
d. Total	\$ 621,393,277	\$ 591,571,493
6. Assumption change (Gains)/Losses	\$ 0	\$ 0
7. Legislative changes	0	(384,148,839)
8. Expected UAAL (Sum of Items 1 through 7)	8,138,407,290	7,503,895,249
9. Actual UAAL	8,746,034,657	8,017,817,926
10. Total (gain)/loss for the year (Item 9 - Item 8)	\$ 607,627,367	\$ 513,922,677
B. Source of gains and losses		
	<u>% of AAL</u>	
11. Asset (Gain)/Loss for the year	1.48%	\$ 522,887,645
12. Pay Increases (Less)/Greater than Expected	0.11%	39,084,397
13. Non-Retired Demographic (Gains)/Losses	0.03%	(9,121,228)
14. Post-Retirement Mortality (Gains)/Losses	0.06%	19,613,169
15. Other Demographic (Gains)/Losses	0.10%	35,163,384
16. Total (Sum of Items 11 through 15)	1.72%	\$ 607,627,367

Solvency Test

Actuarial Accrued Liability and Percent of Active Member Payroll for:

August 31,	Accumulated Member Contributions Including Interest		Retirees and Beneficiaries Currently Receiving Benefits		Employer Financed Portion of Vested and Nonvested Benefits		Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Assets		
	(1)	% of Payroll	(2)	% of Payroll	(3)	% of Payroll		(1)	(2)	(3)
2007	\$ 4,059.7	77%	\$11,519.9	219%	\$ 8,407.5	160%	\$ 22,938.9	100%	100%	88%
2008	4,256.2	79%	12,195.8	227%	8,951.2	166%	23,511.9	100%	100%	79%
2009	4,460.6	77%	12,648.2	218%	9,799.0	169%	23,509.6	100%	100%	65%
2010	4,719.7	80%	13,407.8	226%	10,284.3	173%	23,628.6	100%	100%	54%
2011	4,943.7	85%	14,325.2	247%	9,781.3	169%	23,997.4	100%	100%	48%
2012	5,075.2	89%	15,244.0	269%	9,658.0	170%	24,272.5	100%	100%	41%
2013	5,201.0	91%	16,148.2	284%	10,536.8	185%	24,667.6	100%	100%	31%
2014	5,213.6	88%	17,113.9	287%	10,597.2	178%	25,431.9	100%	100%	29%
2015	5,235.1	82%	18,080.0	282%	10,553.3	165%	25,850.5	100%	100%	24%
2016	5,509.4	81%	19,018.0	279%	10,775.8	158%	26,557.1	100%	100%	19%

Note : Dollar amounts in millions

APPENDICES

SUMMARY OF PLAN PROVISIONS FOR EMPLOYEES RETIREMENT SYSTEM OF TEXAS

Classes of Membership

1. Elected Class Membership:
 - a. Membership is optional and limited to:
 - i. Elected State officials not covered by either of the Judicial Retirement Systems
 - ii. Members of the Legislature; and
 - iii. District and Criminal District Attorneys paid by the State general revenue fund.
2. Employee Class Membership:
 - a. Membership is mandatory for all employees and appointed officers of every department, commission, board, agency, or institution of the State except for:
 - i. Independent contractors;
 - ii. Persons covered by the Teacher Retirement System or either of the Judicial Retirement Systems; and
 - iii. Employee Class Members already receiving retirement benefits under the System.
 - b. Includes two types of Employee Class service:
 - i. CPO/CO: Certified Peace Officer / Custodial Officer – in general, service rendered while a law enforcement officer, custodial officer, parole officer or caseworker; and
 - ii. Regular: Non-CPO/CO service.
 - c. Prior to September 1, 2015, membership begins after a 90-day waiting period. Effective September 1, 2015, membership begins immediately.

Member Contributions

1. Elected Class:
 - a. *Legislators*:
 - i. *Fiscal year 2015*: 8.00% of compensation
 - ii. *Fiscal year 2016 and beyond*: 9.50% of compensation
 - b. *Non-legislators*:
 - i. *Fiscal year 2015*: 6.90% of compensation
 - ii. *Fiscal year 2016 and beyond*: 9.50% of compensation. Beginning in fiscal year 2018, the 9.50% will be reduced one-tenth of one percent for each one-tenth of one percent that the State contribution rate for the fiscal year to which the service relates is less than the State contribution rate established for the 2017 fiscal year.

2. Employee Class:
 - a. *Fiscal year 2015:* 6.90% of compensation
 - b. *Fiscal year 2016 and beyond:* 9.50% of compensation. Beginning in fiscal year 2018, the 9.50% will be reduced one-tenth of one percent for each one-tenth of one percent that the State contribution rate for the fiscal year to which the service relates is less than the State contribution rate established for the 2017 fiscal year.
 - c. Additional member contributions may be allowable for service purchases.
3. Member contributions cease when a member’s benefit accrual has reached 100% of Average Monthly Compensation.
4. Member contributions accumulate interest at 5.00% per year through December 31, 2013 and 2.00% interest per year, thereafter.

State of Texas and Employer Contributions

State and employer contributions are set biennially by the legislature. The current projected contribution rates, as a percentage of compensation, are shown below. In addition, the State makes contributions for lump-sum death benefits, establishing service not previously established, and annual membership fees. State payroll contributions cease when a member’s benefit accrual has reached 100% of Average Monthly Compensation.

	FY2015	FY2016	FY2017 and beyond
Employer (agency appropriations)	0.50%	0.50%	0.50%
State (statewide appropriations)	7.50%	9.50%	9.50%

State contributions after the 2017 fiscal year are subject to future legislative appropriations.

Return to Work Surcharge

For members who, on or after September 1, 2009, retire from the employee class and are rehired as a retiree into a position that would otherwise include membership in the employee class, the department or agency that employs the member must remit to the retirement system an amount equal to the amount of the State contribution that the department or agency would remit for an active member employed in the person's position.

Compensation

Compensation includes base salary, longevity and hazardous duty pay and excludes overtime pay. This amount is limited by Section 401(a)(17) of the Internal Revenue Code for members hired after August 31, 1996.

Average Monthly Compensation (AMC)

1. Elected Class Service: The State salary, excluding longevity pay, of a district judge, as adjusted from time to time.
2. Employee Class Service:
 - a. *Members hired prior to September 1, 2009*: Average of the 36 highest months of compensation for service in the employee class of membership
 - b. *Members hired on or after September 1, 2009 and prior to September 1, 2013*: Average of the 48 highest months of compensation for service in the employee class of membership
 - c. *Members hired on or after September 1, 2013*: Average of the 60 highest months of compensation for service in the employee class of membership

Creditable Service

The types of service creditable in ERS are membership service, military service and equivalent membership service. Equivalent membership service includes: previously cancelled service, service not previously established, waiting period service, and Additional Service Credit.

Unused Sick and Annual Leave

In many cases, unused sick and annual leave can be used to establish Creditable Service. Members hired prior to September 1, 2009 can use unused sick and annual leave to satisfy service requirements for Retirement and Death Benefit Plan eligibility as well as to calculate plan benefits. Members hired on or after September 1, 2009 can only use unused sick and annual leave to calculate plan benefits. However, members hired on or after September 1, 2013 cannot use unused annual leave to calculate plan benefits if the member opts to receive the unused annual leave as a lump-sum payment. Elected Class service is not granted for unused sick and annual leave.

Standard Service Retirement Annuity

1. Elected Class:
 - a. *Eligibility*:
 - i. Age 60 and eight years of elected class service; or
 - ii. Age 50 and 12 years of elected class service.
 - b. *Benefits*: 2.3% of AMC times years of Creditable Service, adjusted automatically based on the State salary of a district judge. Alternatively, an elected class member may elect to transfer their elected class service to the employee class in order to have their AMC based on actual compensation. However, if the elected service is transferred to the employee class, the member forfeits increases based on changes in the State salary of a district judge unless the service is transferred back to the elected class.

2. Employee Class:

a. *Eligibility:*

- i. Members hired prior to September 1, 2009: Age 60 with five years of employee class service;
- ii. Members hired on or after September 1, 2009: Age 65 with 10 years of employee class service;
- iii. Five years of service and age plus employee class service is at least 80 (Rule of 80)
- iv. Age 55 with 10 years of CPO/CO service
- v. Any age with 20 years of CPO/CO service

b. *Benefits:* 2.3% of AMC times years of Creditable Service

c. *Applicable Reductions for eligibilities 2.a.iii. and 2.a.iv.:*

- i. For members hired prior to September 1, 2009, none.
- ii. For members hired on or after September 1, 2009, but prior to September 1, 2013, reduced five percent for each year the member retires prior to age 60, with a maximum possible reduction of 25 percent.
- iii. For members hired on or after September 1, 2013, reduced five percent for each year the member retires prior to age 62, with no maximum possible reduction.

d. *Applicable Reductions for eligibility 2.a.v.:*

- i. For members hired prior to September 1, 2009, retiring after attaining age 50 or after attaining Rule of 80, there is no reduction. Otherwise, the member receives the percentage of the benefit stated in the following table:

Attained Age at Retirement	Reduction Percentage	Attained Age at Retirement	Reduction Percentage
36	31.2%	43	55.3%
37	33.9%	44	60.1%
38	36.7%	45	65.3%
39	39.8%	46	71.1%
40	43.2%	47	77.3%
41	46.9%	48	84.2%
42	50.9%	49	91.7%

- ii. For members hired after on or after September 1, 2009, but prior to September 1, 2013, reduced five percent for each year the member retires prior to age 55, with a maximum possible reduction of 25 percent.
- iii. For members hired on or after September 1, 2013, reduced five percent for each year the member retires prior to age 57, with no maximum possible reduction.

3. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Standard Non-Occupational Disability Annuity

1. Elected Class:
 - a. *Eligibility*:
 - i. 8 years of elected class service; or
 - ii. 6 years of elected class service plus 2 years of pre-1978 military service; and
 - iii. Not eligible for a Standard Service Retirement Annuity.
 - b. *Benefits*: 2.3% of AMC times years of Creditable Service, adjusted automatically based on the State salary of a district judge.
2. Employee Class:
 - a. *Eligibility*:
 - i. 10 years of employee class service; and
 - ii. Not eligible for a Standard Service Retirement Annuity on the basis of Rule of 80 or age 55 and 10 years of CPO/CO Service.
 - b. *Benefits*: 2.3% of AMC times years of Creditable Service
 - c. *Applicable Reductions*: Actuarially reduced from the age that the member would have been eligible for Standard Service Retirement Annuity
3. Normal Form of Payment: Annuity payable for life or until member is no longer incapacitated for the performance of duty. Any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Standard Occupational Disability Annuity

1. Elected Class:
 - a. *Eligibility*: Disability as a direct result of some risk or hazard inherent to employment
 - b. *Benefits*: 2.3% of AMC times years of Creditable Service, but not less than 18.4% of AMC, adjusted automatically based on the State salary of a district judge
2. Employee Class (Regular Class Service):
 - a. *Eligibility*: Disability as a direct result of some risk or hazard inherent to employment
 - b. *Benefits*: 2.3% of AMC times years of Creditable Service, but not less than 35% of AMC

3. Employee Class (CPO/CO Members):

- a. *Eligibility:* Disability as a direct result of some risk or hazard inherent to law enforcement or custodial duties
 - i. Total: Incapable of substantial gainful activity and eligible for Social Security disability benefits
 - ii. Non-total: Does not satisfy definition of Total Disability
- b. *Benefits:*
 - i. Non-total with less than 20 years of CPO/CO Service: 2.3% of AMC times years of Creditable Service, but not less than 50% of AMC. 15% of AMC payable from LECOSRF and the remaining 35% of AMC is payable from the ERS trust
 - ii. Non-total with 20 years of CPO/CO Service: 2.3% of AMC times years of Creditable Service
 - iii. Total: 2.3% of AMC times years of Creditable Service, but not less than 35% of AMC

4. Normal Form of Payment: Annuity payable for life or until member is no longer incapacitated for the performance of duty. Any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Occupational Disability Lump-Sum Death Benefit

If a member receiving an occupational disability retirement annuity dies and it is determined that the death was an occupational death, a lump-sum death benefit is payable in an amount equal to one year's salary, computed on the basis of the retiree's rate of compensation at the time of disability retirement, and payable to a surviving spouse or dependent minor child.

Death Benefit Plan (DBP) Annuity

1. Eligibility:
 - a. 10 years of employee class service; or
 - b. Eligible for Standard Service Retirement Annuity at time of death.
2. Benefits: Benefits are calculated as if the member had elected an optional form of payment, received a standard service retirement annuity, and died immediately thereafter. If the member dies before becoming eligible for the Standard Service Retirement Annuity, the benefit is reduced for early retirement as follows:
 - a. With 12 years of elected class service, the benefit is actuarially reduced from the member's age 50,
 - b. With 10 years of CPO/CO service, the benefit is actuarially reduced from the member's age 55,
 - c. With five years of employee class service for members hired before September 1, 2009 or eight years of elected class service, the benefit is actuarially reduced from the member's age 60, and
 - d. With 10 years of employee class service for members hired on or after September 1, 2009, the benefit is actuarially reduced from the member's age 65.

Pre-Retirement Death Refund Alternative

A refund of accumulated contributions is payable in cases of pre-retirement death where the member did not meet the eligibility requirements for a Death Benefit Plan Annuity, or the eligible beneficiary chooses to receive a refund of the member account balance in lieu of an annuity. This amount is increased by 5% of the member's account balance at death, times full years of service credit at death, to a maximum of 100%.

Occupational Death Lump-Sum Benefit

If an active member dies and it is determined that the death was an occupational death, a lump-sum death benefit is payable in an amount equal to one year's salary, computed on the basis of the member's rate of compensation at the time of death and payable to a surviving spouse or dependent minor child in addition to any other death benefits.

Post-Retirement Death General Lump-Sum Benefit

\$5,000 upon the death of a retired member. This amount is funded separately by the State and not reflected in this valuation.

Deferred Service Retirement Annuity

1. Elected Class:
 - a. *Eligibility*: Eight years of elected class service
 - b. *Benefits*: Standard Service Retirement Annuity payable at age 60 (or 50 with 12 years of elected class service)
2. Employee Class:
 - a. *Eligibility*:
 - i. Members hired prior to September 1, 2009: Five years of employee class service
 - ii. Members hired on or after September 1, 2009: 10 years of employee class service
 - b. *Benefits*:
 - i. For members hired prior to September 1, 2009: Standard Service Retirement Annuity payable at age 60
 - ii. For members hired on or after September 1, 2009: Standard Service Retirement Annuity payable at age 65
 - iii. For members with 10 years of CPO/CO service: Standard Service Retirement Annuity payable at age 55
3. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Refund of Accumulated Contributions

A refund of accumulated contributions is payable in cases where a terminated member did not meet the eligibility requirements for an annuity, or a terminated member chooses to receive a refund of his or her account balance in lieu of an annuity.

Maximum Benefits

Annuity benefits are limited to 100% of Average Monthly Compensation. For members with CPO/CO service, this benefit limitation includes benefits from all sources (ERS and the Law Enforcement and Custodial Officer Supplemental Retirement Fund).

Limit on Plan Modifications

According to Section 811.006 of the Texas Government Code – a rate of member or State contributions to or a rate of interest required for the establishment of credit in the retirement system may not be reduced or eliminated, a type of service may not be made creditable in the retirement system, a limit on the maximum permissible amount of a type of creditable service may not be removed or raised, a new monetary benefit payable by the retirement system may not be established, and the determination of the amount of a monetary benefit from the system may not be increased, if, as a result of the particular action, the time, as determined by an actuarial valuation, required to amortize the UAAL of the retirement system would be increased to a period that exceeds 30 years by one or more years.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation that covered the five-year period from September 1, 2006 through August 31, 2011.

I. Valuation Date

The valuation date is August 31 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation is used to determine the adequacy of the State contribution rate (established by Legislative appropriation) and employer contribution rate (established by statute) and to describe the current financial condition of ERS.

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the first step is to determine the contribution rate (level as a percentage of pay) required to provide the benefits to each member, or the normal cost rate. The normal cost rate consists of two pieces: (i) the member's contribution rate, and (ii) the remaining portion of the normal cost rate which is the employer's normal cost rate. The total normal cost rate is based on the benefits payable to a new member and the entry age characteristics of the current active membership.

The Unfunded Actuarial Accrued Liability (UAAL) is the liability for future benefits which is in excess of (i) the actuarial value of assets, and (ii) the present value of future normal costs. The employer contribution provided in excess of the employer normal cost is applied to amortize the UAAL.

The funding period is calculated as the number of years required to fully amortize the UAAL, assuming that: (a) future market earnings, net of investment-related expenses, will equal 8.00% per year, (b) there will be no liability gains/losses or changes in assumptions, (c) the number of active members will remain unchanged, (d) active members who leave employment will be replaced by new entrants each year, and (e) State and employer contributions will remain the same percentage of payroll as described in Appendix I.

The Entry Age actuarial cost method is an "immediate gain" method (i.e., experience gains and losses are separately identified as part of the UAAL). However, they are amortized over the same period applied to all other components of the UAAL.

III. Actuarial Value of Assets

The actuarial value of assets is determined as the expected value of plan assets as of the valuation date plus 20% of the difference between the market-related value and the expected value. The expected value equals the actuarial value of plan assets as of the prior valuation date, plus contributions, less benefit payments and administrative expenses, all accumulated at the assumed rate of interest to the current valuation date.

IV. Actuarial Assumptions

Investment Return: 8.00% per year, net of investment-related expenses (composed of an assumed 3.50% inflation rate and a 4.50% real rate of return)

Administrative Expenses: 0.25% of valuation payroll per year

Salary Increases: Increases are assumed to occur at the beginning of the valuation year and vary by employee group. The components of the annual increases are:

Employee Group	Inflation ***	Real Wage Growth	Merit, Promotion and Longevity
Legislators	0%	0%	0%
Elected Class other than Legislators	3.5%	0%	0%
Employee Class	3.5%	0%	See sample rates
State Salary of a District Judge*	3.5%	0%	0%
Inactive members who transfer to TRS**	3.5%	0%	1.5%

* The State salary of a district judge is the compensation used to determine benefit amounts for Legislators. It is also used for benefits for other Elected Class members if it provides a more valuable benefit amount than actual average compensation.

** Assumed in estimating benefits of former members who transfer to the Teacher Retirement System of Texas (TRS).

*** Total liabilities for this valuation reflect the most significant across-the-board pay increases appropriated by the State legislature for the current biennium.

Sample Rates:

Annual Salary Increases for Merit, Promotion and Longevity Male and Female Regular Employee Class Members							
Age	Years of ERS Decrement Service						
	0	1	2 - 4	5 - 9	10 - 14	15 - 19	20+
20	6.80 %	5.25 %	4.75 %	4.30 %			
25	6.40	5.25	4.75	3.50	2.50 %		
30	5.90	5.25	4.75	3.00	2.50	2.00 %	
35	5.40	4.75	4.00	3.00	2.50	2.00	1.90 %
40	4.90	4.75	4.00	3.00	2.50	1.90	1.80
45	4.40	4.25	3.75	3.00	2.40	1.90	1.70
50	3.90	3.70	3.20	2.70	2.20	1.70	1.60
55	3.40	3.20	2.80	2.40	1.90	1.60	1.50
60+	2.90	2.70	2.30	2.00	1.60	1.40	1.30

Annual Salary Increases for Merit, Promotion and Longevity Male and Female CPO/CO Employee Class Members							
Age	Years of ERS Decrement Service						
	0	1	2	3	4	5 - 9	10+
All	8.00 %	5.00 %	4.50 %	4.00 %	3.50 %	2.00 %	1.50 %

Payroll Growth: 3.50% per year, compounded annually (for projecting valuation payroll).

Post-Retirement Increases for Elected Class Members: If benefits are based on the State salary of a district judge, the benefits are assumed to increase 3.50% per year during retirement (each September 1), compounded annually, consistent with the assumed Salary Increase for a district judge. Increases are assumed to also occur during deferral periods (if any). Otherwise, no increases are assumed.

Age and Service Assumptions and Methods:

Rounding of ages:

Current and projected ages rounded to the nearest year are used for all purposes – determining eligibility for benefits, present value factors, early retirement reductions, option factors, salary increase rates, and decrements.

Benefit Service:

Current Benefit Service in years and months as of the valuation date was provided by ERS. This service plus Future Earned Service, Service Credit at Retirement, and Eligibility Service at Retirement were used to project benefit amounts.

Future Earned Service:

Active members were assumed to earn one additional year of service credit in each future year employed based on their current class of membership (but not beyond the

amount of credit needed to provide a 100% of average monthly compensation standard service retirement annuity).

Service Credit at Retirement:

For members hired before September 1, 2009, service credit when eligible for service retirement is assumed to be increased by:

- 0 years for members retiring from the Elected Class;
- 1.0 years for members retiring from regular employee class service if age plus service, prior to adjustment, is greater than or equal to 78;
- 0.5 years for members retiring from regular employee class service if age plus service, prior to adjustment, is less than 78;
- 1.0 years for members retiring from CPO/CO class if service, prior to adjustment, is at least 18 years; and
- 0.5 years for members retiring from CPO/CO class if service, prior to adjustment, is less than 18 years.

(but not beyond the amount of credit needed to provide a 100% of average monthly compensation standard service retirement annuity).

For members hired on or after September 1, 2009, service credit when eligible for service retirement is assumed to be increased by:

- 0 years for members retiring from the Elected Class;
- 1.0 years for members retiring from regular employee class service if age plus service, prior to adjustment, is greater than or equal to 79;
- 0.5 years for members retiring from regular employee class service if age plus service, prior to adjustment, is less than 79;
- 1.0 years for members retiring from CPO/CO class if service, prior to adjustment, is at least 19 years; and
- 0.5 years for members retiring from CPO/CO class if service, prior to adjustment, is less than 19 years.

(but not beyond the amount of credit needed to provide a 100% of average monthly compensation standard service retirement annuity).

Service for Decrements:

The method of calculating ERS Decrement Service and CPO/CO Decrement Service on the valuation date is shown below. Decrement service is assumed to increase by one year for each future year employed based on their current class of membership.

- Valuation Age: Age rounded to the nearest year on valuation date
- ERS Benefit Service: Years and months of all creditable ERS service on the valuation date
- CPO/CO Benefit Service: Years and months of creditable CPO/CO service on the valuation date
- Date 1: (Valuation Date) minus (ERS Benefit Service)
- ERS Decrement Service: (Valuation Age) minus (age rounded to nearest year on Date 1)
- ERS Funding Entry Age (age at hire for the entry age normal cost method): (Valuation Age) minus (ERS Decrement Service)
- Date 2: (Valuation date) minus (CPO/CO Benefit Service)

- CPO/CO Decrement Service: (Valuation Age) minus (age rounded to nearest year on Date 2)

Eligibility Service at Retirement:

For members hired before September 1, 2009, eligibility service is assumed to be increased by the following to reach eligibility for service retirement:

- 0 years for members retiring from the Elected Class;
- 2.0 years for members retiring from regular employee class service if age plus service, prior to adjustment, is greater than or equal to 78;
- 1.0 years for members retiring from regular employee class service if age plus service, prior to adjustment, is less than 78;
- 2.0 years for members retiring from CPO/CO class if service, prior to adjustment, is at least 18 years; and
- 1.0 years for members retiring from CPO/CO class if service, prior to adjustment, is less than 18 years.

For members hired on or after September 1, 2009, eligibility service is assumed to be increased by the following to reach eligibility for service retirement:

- 0 years for members retiring from the Elected Class;
- 1.0 years for members retiring from regular employee class service ; and
- 1.0 years for members retiring from CPO/CO class service.

Decrement Timing: All decrements – mortality, service retirement, disability retirement, and termination of employment for reasons other than death or retirement – are assumed to occur at the beginning of the valuation year.

Mortality Decrements:

Active Members, Service Retirees, Beneficiaries, and Inactive Members

1994 Group Annuity Mortality with no setback for males and set forward two years for females. Generational mortality improvements in accordance with Scale AA are projected from the year 2000.

Disability Retirees

RP-2000 Disabled Retiree Mortality set forward six years for males and setback one year for females.

Occupational Death

2.0% of male and 0.3% of female active member deaths are assumed to be occupational.

Service Retirement Decrements: Graded tables based on ERS experience.

Active Regular Employee Class Members – hired before September 1, 2009

ERS Decrement Service is used to determine when the rates apply:

- Age 60 with four years of service
- 78 points with five years of service

Sample rates for eligible members:

Annual Service Retirement Rates per 100 Participants Regular Employee Class Members												
Age	Males - Years of ERS Decrement Service						Females - Years of ERS Decrement Service					
	5	10	15	20	25	30	5	10	15	20	25	30
50						35						45
51						25						40
52						25						25
53					35	25					40	25
54					60	25					60	25
55					22.5	25					40	25
56					20	25					25	25
57					20	25					25	25
58				35	20	25				40	25	25
59				60	20	25				60	25	25
60	10	15	17.5	37.5	20	27.5	10	15	15	35	20	20
65	20	45	45	35	35	35	20	45	45	32.5	32.5	32.5
70	20	37.5	27.5	32.5	32.5	32.5	20	37.5	27.5	32.5	32.5	32.5
75	100	100	100	100	100	100	100	100	100	100	100	100

Active Regular Employee Class Members – hired on or after September 1, 2009

ERS Decrement Service is used to determine when the rates apply:

- Age 65 with nine years of service
- 79 points with five years of service

Sample rates for eligible members:

Annual Service Retirement Rates per 100 Participants Regular Employee Class Members													
Age	Males - Years of ERS Decrement Service						Females - Years of ERS Decrement Service						
	5	10	15	20	25	30	5	10	15	20	25	30	
50						15							20
51						15							25
52						7.5							10
53						7.5							10
54					5	7.5					12.5		10
55					25	7.5					30		10
56					12.5	7.5					15		10
57					7.5	7.5					10		10
58					7.5	7.5					10		10
59				5	7.5	7.5				12.5	10		10
60				25	57.5	67.5				25	45		45
65		85	37.5	30	45	40		85	37.5	17.5	35		30
70		80	60	90	35	35		80	60	90	32.5		32.5
75	100	100	100	100	100	100	100	100	100	100	100	100	100

Active Elected Class Members

ERS Decrement Service is used to determine when the rates apply:

- Age 60 with eight years of service
- Age 50 with 12 years of service

Annual Service Retirement Rates per 100 Participants Elected Class Members	
Age	Male and Female
50 - 64	10
65 - 74	20
75+	100

Active CPO/CO Employee Class Members – hired before September 1, 2009

CPO/CO Decrement Service is used to determine when the rates apply:

- Any age with 18 years of CPO/CO service
- Age 55 with nine years of CPO/CO service

Sample rates for eligible members:

Annual Service Retirement Rates per 100 Participants CPO/CO Employee Class Members - Male and Female						
Age	Years of CPO/CO Decrement Service					
	5	10	15	20	25	30
50				45	55	55
51				30	30	30
52				30	30	30
53				30	30	30
54				30	30	30
55		12	12	45	35	35
56		10	10	45	35	35
57		10	10	45	45	45
58		10	10	45	35	35
59		13	13	45	35	35
60	6	16	16	55	35	35
65	15	35	35	50	60	60
70	50	50	50	50	50	50
75	100	100	100	100	100	100

Active CPO/CO Employee Class Members – hired on or after September 1, 2009

CPO/CO Decrement Service is used to determine when the rates apply:

- Any age with 19 years of CPO/CO service
- Age 55 with nine years of CPO/CO service

Sample rates for eligible members:

Annual Service Retirement Rates per 100 Participants CPO/CO Employee Class Members - Male and Female						
Age	Years of CPO/CO Decrement Service					
	5	10	15	20	25	30
50				5	5	5
51				5	5	5
52				5	5	5
53				5	5	5
54				5	5	5
55		12	12	82.5	65	65
56		10	10	37.5	30	30
57		10	10	37.5	37.5	37.5
58		10	10	37.5	30	30
59		13	13	37.5	30	30
60		16	16	55	35	35
65		35	35	50	60	60
70		50	50	50	50	50
75	100	100	100	100	100	100

Disability Retirement Decrements: Graded Tables Based on ERS Experience

Active Regular Employee Class Members

ERS Decrement Service is used to determine when the rates apply:

- The rates do not apply before someone is eligible for the benefit.
- Service greater than zero is required for occupational disability retirement.
- 10 years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the member has attained age 60, if hired before September 1, 2009, or age 65, if hired on or after September 1, 2009.

Active Elected Class Members

ERS Decrement Service is used to determine when the rates apply:

- The rates do not apply before someone is eligible for the benefit.
- No occupational disabilities are assumed for the elected class.
- Eight years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the member has attained age 60, if hired before September 1, 2009, or age 65, if hired on or after September 1, 2009.

Sample rates for eligible regular employee class and elected class members:

Annual Disability Rates per 100 Participants		
Age	Regular Employee Class and Elected Class	
	Males	Females
30	0.0366	0.0180
35	0.0867	0.0589
40	0.0999	0.1195
45	0.1369	0.1940
50	0.1979	0.2762
55	0.3302	0.4651
60	0.4986	0.7444

99% of the disability rates stated above are assumed to be attributable to non-occupational disabilities and 1% are assumed to be attributable to occupational disabilities. No occupational disabilities are assumed for the elected class.

Active CPO/CO Employee Class Members

ERS Decrement Service and CPO/CO Decrement Service are used to determine when the rates apply:

- The rates do not apply before a member is eligible for the benefit.
- Service greater than zero is required for occupational disability retirement.
- 10 years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the member has attained age 60, if hired before September 1, 2009, or age 65, if hired on or after September 1, 2009.

Sample rates for members:

Annual Disability Rates per 100 Participants CPO/CO Employee Class Members	
Age	Males and Females
30	0.0123
35	0.0418
40	0.0781
45	0.1307
50	0.2365
55	0.3280
60	0.4200

95% of the disability rates stated above are assumed to be attributable to non-occupational disabilities, 4% are assumed to be attributable to non-total occupational disabilities, and 1% are assumed to be attributable to total occupational disabilities.

Termination Decrements for Reasons Other Than Death or Retirement: Graded Tables Based on ERS Experience.

Rates of termination are zero for members eligible for service retirement.

Sample rates for members not eligible for service retirement:

Active Regular Employee Class Members – hired before September 1, 2009

Annual Rates of Termination per 100 Participants Regular Employee Class Members									
Age	Male and Female - Years of ERS Decrement Service								
	0	1	2	3	4	5	10	15	20
20	50	40	30	30					
25	35	30	26	22	20	15			
30	28	23	19	15	14	12	6		
35	27	21	16	14	11	10	6	3	
40	25	18	13	11	10	9	6	3	3
45	25	18	13	11	9	8	4	3	1
50	22	17	13	10	9	7	4	2	1
55	21	15	11	9	7	7	4	2	1
60	20	15	10	8					

Active CPO/CO Employee Class Members – hired before September 1, 2009

Annual Rates of Termination per 100 Participants CPO/CO Employee Class Members								
Age	Male and Female - Years of ERS Decrement Service							
	0	1	2	3	4	5	10	15
20	23	19	17	17				
25	20	17	14	14	14	13		
30	16	13	12	11	10	10	8	
35	16	11	9	9	8	7	6	4
40	14	10	8	7	7	7	5	2
45	13	10	7	6	6	6	3	2
50	12	9	7	6	6	6	3	2
55	12	7	5	5	4	4		
60	13	7	5	5				

Active Regular Employee Class Members – hired on or after September 1, 2009

Annual Rates of Termination per 100 Participants Regular Employee Class Members									
Age	Male and Female - Years of ERS Decrement Service								
	0	1	2	3	4	5	10	15	20
20	52	42	32	27					
25	42	32	29	25	22	18			
30	32	27	21	18	15	14	6		
35	31	25	19	16	12	11	6	4	
40	30	21	15	13	11	9	6	2	2
45	27	21	13	12	10	8	4	2	1
50	26	19	13	11	10	7	4	2	1
55	25	17	12	10	7	7	4	2	1
60	24	17	11	9	6	6	4	1	
65	22	16	10	6					

Active CPO/CO Employee Class Members – hired on or after September 1, 2009

Annual Rates of Termination per 100 Participants CPO/CO Employee Class Members								
Age	Male and Female - Years of ERS Decrement Service							
	0	1	2	3	4	5	10	15
20	24	20	17	17				
25	22	19	16	16	16	15		
30	17	15	14	12	12	12	8	
35	18	12	11	11	10	8	6	4
40	15	11	9	8	8	8	5	2
45	14	11	8	7	7	7	3	2
50	13	11	8	7	7	6	3	2
55	13	8	5	5	4	4		
60	15	8	5	5				

Elected Class Members: 4 per 100 participants for members not eligible for service retirement

Withdrawal of Employee Contributions: Members that terminate with a vested benefit are assumed to choose the most valuable option available to them at the time of termination: withdrawal of contributions or deferred annuity.

Percentage of Members Electing Various Benefit Options:

Sex/ Benefit	Standard Life Annuity	Option 1	Option 4
Male Member			
Disability	50%	40%	10%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	75%	25%
Female Member			
Disability	75%	20%	5%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	50%	50%

The value of the Standard Service Retirement Life Annuity reflects the return of excess contributions payable as a lump sum death benefit in cases the annuity benefits paid are less than the member account balance at the time of retirement.

Beneficiary Characteristics: Male member is assumed to be three years older than female beneficiary; and female member is assumed to be the same age as male beneficiary.

Transfers from ERS to TRS:

Contributing ERS members:

It is assumed that 10% of regular and CPO/CO employee class members who cease contributing to ERS and do not withdraw employee contributions will transfer ERS service credit to TRS at retirement.

Noncontributing ERS Members:

Records of ERS and TRS are matched by ERS staff to determine former ERS members who are currently contributing under TRS.

TRS Retirement Age:

Former ERS members who are, or are assumed to become, contributing TRS members are assumed to continue to earn service credit under TRS until first eligible for unreduced service retirement benefits, retire at that time, and transfer ERS service credit to TRS.

Census Data and Assets

- The valuation was based on members of ERS as of August 31, 2016 and does not take into account future members.
- All census data was supplied by ERS and was subject to reasonable consistency checks.
- There were data elements that were modified for some members as part of the valuation in order to make the data complete. However, the number of missing data items was immaterial.
- Asset data was supplied by ERS.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)17.
- Valuation payroll (earnings applied to the current valuation year) is the expected payroll for the fiscal year following the valuation date. It is based on reported payroll determined from August member contributions increased to reflect the across-the-board salary increases appropriated by the State legislature, effective on or after September 1, and projected according to the actuarial assumptions for the upcoming fiscal year.
- No liability was included for benefits which are funded by special State appropriations.
- State appropriations for membership fees have been ignored.

DETAILED SUMMARIES OF MEMBERSHIP DATA

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TABLE A
SUMMARY OF MEMBERSHIP DATA

Active Members

Item	Male	Female	Regular Members	Elected Class	LECOS Members	Total
Number of Members	63,562	82,828	107,002	322	39,066	146,390
Average Annual Salaries	\$ 49,928	\$ 43,861	\$ 47,106	\$ 69,361	\$ 44,634	\$ 46,495
Average Age	43.3	43.4	44.2	52.6	41.0	43.3
Average Service	8.7	8.4	8.8	9.1	8.0	8.5

Annuitants

Item	Number	Annual Annuities	Average Annuities	Average Age
Service Retirees and Beneficiaries	101,362	\$ 2,018,378,484	19,913	68.9
Disability Retirees	2,396	\$ 22,309,296	9,311	66.0
Total	103,758	\$ 2,040,687,780	\$ 19,668	68.8

Inactive Members Assumed Eligible for Deferred Annuities

Item	Number	Annual Annuities	Average Annuities	Average Age
Vested Members who are not Active at TRS	14,252	\$ 149,186,172	\$ 10,468	49.2
Vested Members who are Active at TRS	2,345	\$ 43,968,204	\$ 18,750	51.8
Total	16,597	\$ 193,154,376	\$ 11,638	49.6
Non-vested Members who are Active at TRS	7,197	\$ 23,443,632	\$ 3,257	46.5

Non-vested Inactive Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Members who are not Active at TRS	85,079	\$ 216,884,282	\$ 2,549	40.5
Non-vested Members who are Active at TRS (this group assumed eligible for deferred annuities)	7,197	\$ 27,909,516	\$ 3,878	46.5
Total	92,276	\$ 244,793,798	\$ 2,653	41.0

TABLE B
ACTIVE MEMBERS – ALL MEMBERS
DISTRIBUTION BY AGE AND SERVICE

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25	9,685 \$ 29,664	53 \$ 34,883								9,738 \$ 29,693
25 - 29	13,547 \$ 36,785	1,745 \$ 41,223	41 \$ 39,756							15,333 \$ 37,298
30 - 34	10,971 \$ 39,412	5,149 \$ 48,461	1,255 \$ 49,944	85 \$ 49,411						17,460 \$ 42,886
35 - 39	8,322 \$ 40,347	4,506 \$ 49,491	2,790 \$ 57,359	1,390 \$ 55,437	52 \$ 55,278					17,060 \$ 46,819
40 - 44	7,030 \$ 40,783	3,887 \$ 47,929	2,638 \$ 55,337	3,159 \$ 59,018	1,383 \$ 58,563	59 \$ 60,126				18,156 \$ 49,017
45 - 49	6,203 \$ 40,826	3,845 \$ 47,372	2,609 \$ 53,138	3,313 \$ 56,261	3,417 \$ 62,006	1,471 \$ 64,063	78 \$ 67,553			20,936 \$ 51,194
50 - 54	5,187 \$ 40,444	3,468 \$ 45,859	2,389 \$ 51,338	2,862 \$ 53,978	2,637 \$ 59,414	1,994 \$ 67,387	494 \$ 75,818	32 \$ 68,811		19,063 \$ 51,233
55 - 59	3,996 \$ 41,791	3,187 \$ 46,125	2,238 \$ 50,723	2,478 \$ 52,825	1,880 \$ 58,426	1,095 \$ 67,173	544 \$ 76,927	168 \$ 71,106	2 \$ 116,504	15,588 \$ 51,055
60 - 64	2,107 \$ 42,225	2,340 \$ 47,230	1,484 \$ 49,576	1,641 \$ 52,017	894 \$ 61,140	531 \$ 66,161	270 \$ 68,342	126 \$ 75,138	23 \$ 61,502	9,416 \$ 50,716
Over 64	776 \$ 43,299	1,051 \$ 47,813	598 \$ 49,757	504 \$ 54,780	357 \$ 58,100	196 \$ 64,414	86 \$ 73,153	36 \$ 69,163	36 \$ 75,640	3,640 \$ 51,123
Total	67,824 \$ 38,232	29,231 \$ 47,264	16,042 \$ 52,889	15,432 \$ 55,239	10,620 \$ 60,043	5,346 \$ 66,117	1,472 \$ 74,263	362 \$ 72,113	61 \$ 71,649	146,390 \$ 46,495

TABLE C
ACTIVE MEMBERS – REGULAR CLASS MEMBERS
DISTRIBUTION BY AGE AND SERVICE

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25	5,546 \$ 26,432	30 \$ 30,087								5,576 \$ 26,452
25 - 29	9,540 \$ 36,156	962 \$ 38,473	27 \$ 38,245							10,529 \$ 36,373
30 - 34	8,220 \$ 39,664	3,693 \$ 47,433	738 \$ 50,502	54 \$ 47,268						12,705 \$ 42,584
35 - 39	6,235 \$ 41,119	3,401 \$ 49,624	1,875 \$ 57,032	878 \$ 55,885	33 \$ 54,070					12,422 \$ 46,928
40 - 44	5,276 \$ 41,540	2,931 \$ 48,232	1,783 \$ 55,934	2,196 \$ 59,203	719 \$ 58,707	39 \$ 57,037				12,944 \$ 49,035
45 - 49	4,744 \$ 41,486	2,891 \$ 47,823	1,838 \$ 54,100	2,375 \$ 57,177	2,184 \$ 63,818	1,002 \$ 63,561	65 \$ 65,324			15,099 \$ 51,501
50 - 54	3,960 \$ 41,180	2,552 \$ 46,249	1,726 \$ 52,880	2,129 \$ 55,548	2,183 \$ 59,871	1,713 \$ 66,379	398 \$ 72,041	30 \$ 66,802		14,691 \$ 52,121
55 - 59	3,128 \$ 42,853	2,426 \$ 46,894	1,700 \$ 52,109	1,977 \$ 54,244	1,586 \$ 59,428	1,010 \$ 66,712	486 \$ 74,816	161 \$ 70,085	2 \$ 116,504	12,476 \$ 52,352
60 - 64	1,658 \$ 43,293	1,807 \$ 48,312	1,216 \$ 50,593	1,331 \$ 53,190	755 \$ 63,042	503 \$ 66,650	255 \$ 68,162	124 \$ 74,794	23 \$ 61,502	7,672 \$ 52,214
Over 64	584 \$ 44,539	763 \$ 49,865	481 \$ 51,361	413 \$ 57,509	317 \$ 59,120	178 \$ 65,562	83 \$ 74,344	34 \$ 71,501	35 \$ 77,596	2,888 \$ 53,408
Total	48,891 \$ 38,552	21,456 \$ 47,475	11,384 \$ 53,627	11,353 \$ 56,150	7,777 \$ 61,034	4,445 \$ 65,735	1,287 \$ 72,130	349 \$ 71,614	60 \$ 72,723	107,002 \$ 47,106

TABLE D
ACTIVE MEMBERS – CPO/CO MEMBERS
DISTRIBUTION BY AGE AND SERVICE

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25	4,139 \$ 33,995	23 \$ 41,139								4,162 \$ 34,035
25 - 29	4,007 \$ 38,283	783 \$ 44,602	14 \$ 42,672							4,804 \$ 39,325
30 - 34	2,741 \$ 38,577	1,455 \$ 51,101	517 \$ 49,149	31 \$ 53,146						4,744 \$ 43,666
35 - 39	2,075 \$ 37,964	1,097 \$ 49,025	913 \$ 58,140	512 \$ 54,668	19 \$ 57,377					4,616 \$ 46,516
40 - 44	1,723 \$ 37,911	942 \$ 46,463	852 \$ 53,944	961 \$ 58,702	664 \$ 58,407	20 \$ 66,150				5,162 \$ 48,734
45 - 49	1,435 \$ 38,094	934 \$ 44,986	760 \$ 50,410	933 \$ 54,049	1,232 \$ 58,840	469 \$ 65,136	13 \$ 78,696			5,776 \$ 50,118
50 - 54	1,215 \$ 37,829	894 \$ 43,618	654 \$ 46,273	727 \$ 48,855	452 \$ 57,440	280 \$ 73,769	96 \$ 91,478	2 \$ 98,944		4,320 \$ 47,763
55 - 59	857 \$ 37,586	754 \$ 43,484	527 \$ 45,427	497 \$ 46,804	290 \$ 52,738	84 \$ 71,846	58 \$ 94,612	7 \$ 94,580		3,074 \$ 45,439
60 - 64	440 \$ 37,711	520 \$ 42,937	262 \$ 44,808	302 \$ 46,716	133 \$ 50,776	28 \$ 57,369	12 \$ 87,454	2 \$ 96,483		1,699 \$ 43,773
Over 64	179 \$ 37,422	280 \$ 41,485	110 \$ 43,036	85 \$ 44,880	38 \$ 48,781	14 \$ 66,170	2 \$ 56,699	1 \$ 51,642		709 \$ 42,043
Total	18,811 \$ 37,216	7,682 \$ 46,279	4,609 \$ 50,778	4,048 \$ 52,663	2,828 \$ 57,364	895 \$ 68,262	181 \$ 90,913	12 \$ 92,047		39,066 \$ 44,634

TABLE E
ACTIVE MEMBERS – ELECTED CLASS MEMBERS
DISTRIBUTION BY AGE AND SERVICE

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25										
25 - 29										
30 - 34	10 \$ 60,320	1 \$ 7,200								11 \$ 55,491
35 - 39	12 \$ 51,467	8 \$ 57,000	2 \$ 7,200							22 \$ 49,455
40 - 44	31 \$ 71,568	14 \$ 83,086	3 \$ 95,733	2 \$ 7,200						50 \$ 73,668
45 - 49	24 \$ 73,639	20 \$ 93,520	11 \$ 80,886	5 \$ 33,760	1 \$ 7,200					61 \$ 77,106
50 - 54	12 \$ 62,533	22 \$ 91,709	9 \$ 123,661	6 \$ 117,867	2 \$ 7,200	1 \$ 7,200				52 \$ 88,649
55 - 59	11 \$ 67,564	7 \$ 64,114	11 \$ 90,368	4 \$ 99,800	4 \$ 73,600	1 \$ 140,000				38 \$ 79,464
60 - 64	9 \$ 66,222	13 \$ 68,564	6 \$ 51,623	8 \$ 57,000	6 \$ 51,467		3 \$ 7,200			45 \$ 57,411
Over 64	13 \$ 68,492	8 \$ 73,600	7 \$ 45,143	6 \$ 7,200	2 \$ 73,600	4 \$ 7,200	1 \$ 7,200	1 \$ 7,200	1 \$ 7,200	43 \$ 47,349
Total	122 \$ 67,105	93 \$ 80,036	49 \$ 80,083	31 \$ 57,703	15 \$ 51,467	6 \$ 29,333	4 \$ 7,200	1 \$ 7,200	1 \$ 7,200	322 \$ 69,361

TABLE F

**RETIRED AND BENEFICIARY MEMBERS – EXCLUDING DEFERRED
 LECOSRF AND ERS REIMBURSING TRS ANNUITANTS**

DISTRIBUTION BY AGE AND CATEGORY

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees			
Under 60	14,929	442,538,580	29,643
60 - 64	17,411	399,005,412	22,917
65 - 69	21,754	431,591,796	19,840
70 - 74	14,926	264,946,260	17,751
75 - 79	9,322	154,198,128	16,541
Over 79	10,123	181,124,064	17,892
Total	88,465	1,873,404,240	21,177
Beneficiaries			
Under 60	1,115	13,464,468	12,076
60 - 64	684	10,133,532	14,815
65 - 69	1,044	14,933,568	14,304
70 - 74	1,161	16,654,092	14,345
75 - 79	1,251	19,553,688	15,630
Over 79	2,866	49,646,400	17,323
Total	8,121	124,385,748	15,317
Disabled Retirees			
Under 60	586	4,776,696	8,151
60 - 64	406	4,277,724	10,536
65 - 69	543	5,634,552	10,377
70 - 74	325	3,294,372	10,137
75 - 79	189	1,815,396	9,605
Over 79	196	2,036,376	10,390
Total	2,245	21,835,116	9,726
Grand Total	98,831	2,019,625,104	20,435

TABLE G

**RETIRED AND BENEFICIARY MEMBERS –
 LECOSRF ANNUITANTS DEFERRED IN ERS
 DISTRIBUTION BY AGE AND CATEGORY**

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
All Participants			
Under 45	0	0	0
45 - 49	34	634,956	18,675
Total	34	634,956	18,675
Grand Total	34	634,956	18,675

TABLE H
RETIRED AND BENEFICIARY MEMBERS –
ANNUITANTS WHERE ERS IS REIMBURSING TRS
DISTRIBUTION BY AGE AND CATEGORY

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees and Beneficiaries			
Under 60	455	2,535,420	5,572
60 - 64	1,052	5,380,548	5,115
65 - 69	1,497	6,218,004	4,154
70 - 74	976	3,653,760	3,744
75 - 79	523	1,558,452	2,980
Over 79	239	607,356	2,541
Total	4,742	19,953,540	4,208
Disabled Retirees			
Under 60	57	219,888	3,858
60 - 64	37	117,780	3,183
65 - 69	34	98,568	2,899
70 - 74	20	33,924	1,696
75 - 79	3	4,020	1,340
Over 79	0	0	0
Total	151	474,180	3,140
Grand Total	4,893	20,427,720	4,175

GLOSSARY

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or Funding Method: A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ARC.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

- a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
- b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
- c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those 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. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or Valuation Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ARC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC): A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the calculated contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrement: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period: The term "Funding Period" is used in two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ARC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: 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. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

LAW ENFORCEMENT AND CUSTODIAL OFFICER (LECO) PLAN ACCOUNTING

Executive Summary

Senate Bill 1459 passed by the 83rd Legislature of the State of Texas (SB1459) included a mandate that assets and liabilities attributable to members and retirees of the LECOSRF be measured and accounted for in aggregate and separately from ERS main fund for the subsequent biennium. Even though the mandate has passed, the contents of this Appendix outline the measurement of the potential separate accounting for the stand-alone retirement plan for LECO members. The two populations can either have separate accounting for assets and liabilities or be fully separated.

Summary of the Results

Item	Regular Class	Law Enforcement and Custodial Officers
Membership		
• Number of		
- Active members	107,324	39,066
- Retirees and beneficiaries*	86,180	17,578
- Inactive, vested*	14,169	2,428
- Inactive, nonvested*	71,402	20,874
- Total	279,075	79,946
• Valuation Payroll	\$ 5,062,778,313	\$ 1,743,679,004
Statutory contribution rates		
• Members	9.50%	10.00%
• Employers	0.50%	0.50%
• State	9.50%	10.00%
Total Payroll Contribution Rate	19.50%	20.50%
• Expected contributions from court fees	N/A	\$19.2 million per year
Actuarially Sound Rate (funds normal cost and amortizes unfunded accrued liability over 31 years, per Section 811.006 of the Texas Government Code)		
- Total Contribution Rate	19.47%	24.15%
- In addition to Court Fees	19.47%	23.38%
Contribution Rate Sufficiency (Negative figures indicates contribution shortfall)	0.03%	-2.88%
Assets		
• Market value (MVA)	\$ 19,977,040,613	\$ 5,348,588,734
• Actuarial value (AVA)	\$ 21,684,868,128	\$ 5,805,796,639
Actuarial Information on AVA (smoothed)		
• Normal cost %	12.11%	14.58%
• Total normal cost	\$ 613,102,454	\$ 254,228,399
• Actuarial accrued liability	\$ 27,987,834,309	\$ 8,627,723,554
• Unfunded actuarial accrued liability (UAAL)	\$ 6,302,966,181	\$ 2,821,926,915
• Funded ratio	77.5%	67.3%
• Funding period (years)	31	Never
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	\$ 8,010,793,696	\$ 3,279,134,820
• Funded ratio	71.4%	62.0%
• Funding period (years)	62	Never

* Annuitants with at least 10 years of CPO service are identified as LECO annuitants. Inactive members with at least three-fourths of total service certified as CPO service are identified as LECO inactive members. These headcounts are shown for illustration purposes and do not directly relate to the methods used to allocate individual liabilities to the two resulting plans.

Methodology for the LECO Plan

The goal was to re-assemble these plans for LECO members and regular State (non-LECO) employees as if they had been separate plans from the beginning. In broad terms, the methodology for structuring the proposed stand-alone retirement plan for LECO members can be described as: allocation of ERS liabilities, allocation of ERS assets, and addition of LECOSRF.

Allocation of ERS Liabilities

The first step is to determine the plan liabilities for each resulting plan. ERS plan liabilities for currently contributing LECO members were attributed to the new LECO plan. Liabilities for individual annuitants and non-contributing members were attributed to the new LECO plan based on the proportion of their CPO-service relative to their total ERS plan service. The remaining ERS plan liabilities would remain in the regular State (non-LECO) employees plan.

Adjusted Plan Liability for Purposes of Allocating Assets

LECO members are eligible for enhanced benefits at earlier ages with less reduction for early retirement; therefore, these benefits are more valuable than the benefits available to regular State (non-LECO) employees. Even though LECO members received more valuable benefits from the ERS plan, contributions for these members (State contributions and member contributions) to the ERS plan have historically been the same percentage of payroll as the contributions for regular State (non-LECO) employees.

Solely for the purpose of allocating the plan assets, current ERS plan liabilities for LECO members were re-cast, or adjusted, to approximate the plan liabilities as if LECO members received the same benefits as regular State (non-LECO) employees.

Allocation of Assets

Adjusted ERS plan liabilities of annuitants and non-contributing members in both of the resulting plans were fully funded with ERS assets at market value. There is precedence for first allocating assets to retiree liabilities in corporate plan spinoffs. In a sense, retiree liabilities have the highest “demand” for assets since benefit payments are already being made. The remaining assets were allocated evenly across the adjusted ERS plan liabilities for contributing members in both of the resulting plans.

The ratio of actuarial to market value of assets was applied to the market-value asset allocation to arrive at the final actuarial value asset allocation.

Impact of LECOSRF

The final step in allocating the liabilities and assets for a stand-alone plan for LECO members is to combine the allocated LECO liabilities and assets from the ERS plan with the liabilities and assets of the Law Enforcement and Custodial Officer Supplemental Retirement Fund (LECOSRF).

Financing of Restructured Plans

Based on the results of the August 31, 2016 actuarial valuations of the ERS plan and LECOSRF, neither plan was considered actuarially sound. In this context, an actuarially sound retirement plan receives a total contribution rate sufficient to cover the normal cost, administrative expenses, and amortize the unfunded actuarial accrued liability over a period of 31 years, or less.

Based on the allocation of liabilities and assets outlined in this Appendix, the stand-alone regular State (non-LECO) employees plan would be considered actuarially sound as of August 31, 2016 based on an Actuarial Value of Assets basis since the funding period is 31 years. However, the stand-alone LECO plan would not be considered actuarially sound. Based on a market value of assets basis, neither the stand-alone LECO plan nor the regular State (non-LECO) employees plan would be considered actuarially sound as of August 31, 2016.

Administrative Considerations

The asset allocation outlined in this Appendix is only one of many “reasonable” asset allocations. Actuarial standards of practice give guidance on how to assess the actuarial soundness of a proposed allocation, but they do not prescribe a particular methodology for allocation of the assets in a situation such as this. As previously noted, there are detailed rules regarding the allocation of assets in corporate plan spinoffs, but there is very little precedent for public pension plans. There is supporting rationale for this allocation method, but there are other methods which could also be supported.

**LAW ENFORCEMENT AND CUSTODIAL OFFICER
SUPPLEMENTAL RETIREMENT FUND OF THE
EMPLOYEES RETIREMENT SYSTEM OF TEXAS
ANNUAL ACTUARIAL VALUATION – FUNDING
AS OF AUGUST 31, 2016**

November 17, 2016

Board of Trustees
Employees Retirement System of Texas
200 East 18th Street
Austin, TX 78701

Re: Actuarial Valuation for Funding Purposes as of August 31, 2016

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Law Enforcement and Custodial Officer Supplemental Retirement Fund (LECOSRF) of the Employees Retirement System of Texas as of August 31, 2016. This report was prepared at the request of the Board and is intended for use by ERS staff and those designated or approved by the Board. This report may be provided to parties other than ERS only in its entirety and only with the permission of the Board.

Actuarial Valuation

The primary purposes of the actuarial valuation report are to determine the adequacy of the current State and employer contribution rates, describe the current financial condition of LECOSRF, analyze changes in the condition of LECOSRF, and provide various summaries of the data.

It is important for the Board of Trustees to understand that the currently scheduled member, employer and State contributions are not expected to accumulate sufficient assets in order to pay all of the currently scheduled benefits when due.

Plan Provisions

Our actuarial valuation as of August 31, 2016 reflects the benefit and contribution provisions set forth in Chapters 811 through 815 of the Texas Government Code. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. Additionally, the actuarial valuation incorporates the most significant across-the-board pay increases budgeted by the State Legislature for the current biennium. The current actuarial assumptions and methods are outlined in Appendix II of this report.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. They are all Enrolled Actuaries, Fellows of the Society of Actuaries, and Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned are experienced in performing valuations for large public retirement systems.

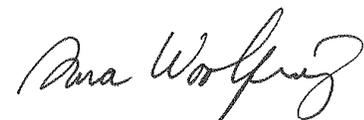
Respectfully submitted,
Gabriel, Roeder, Smith & Company



R. Ryan Falls, FSA, EA, MAAA
Senior Consultant



Joseph P. Newton, FSA, EA, MAAA
Senior Consultant



Dana Woolfrey, FSA, EA, MAAA
Consultant

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SECTION A

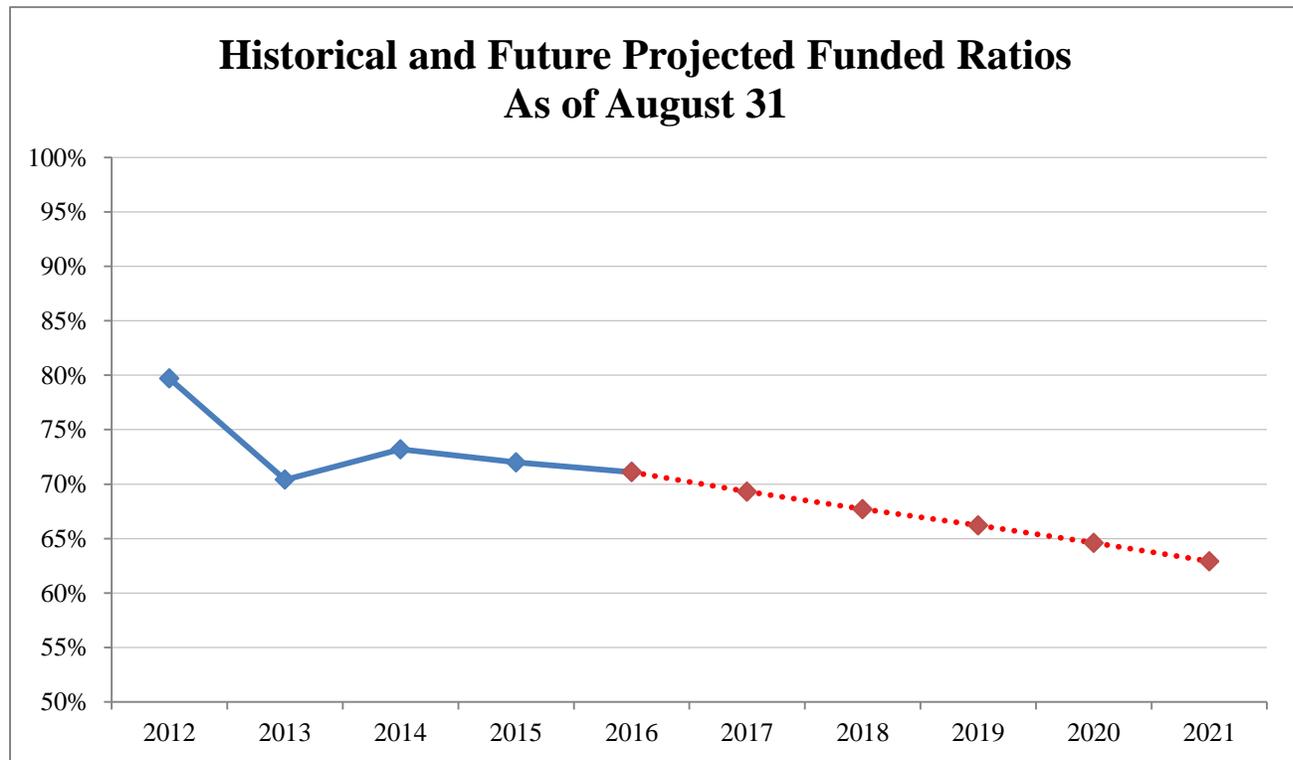
EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Item	2016	2015
Membership		
• Number of		
- Active members	39,066	38,526
- Retirees and beneficiaries	11,515	10,845
- Inactive, vested	95	79
- Inactive, nonvested	15,108	12,883
- Total	65,784	62,333
• Valuation Payroll	\$ 1,743,679,004	\$ 1,750,709,090
Statutory contribution rates	FY 2017	FY 2016
• Members	0.50%	0.50%
• State	0.50%	0.50%
• Expected contributions from court fees	\$19.2 million per year	1.20% of pay
Actuarially Sound Rate (funds normal cost and amortizes unfunded accrued liability over 31 years, per Section 811.006 of the Texas Government Code)		
- Total Contribution Rate	3.10%	3.01%
- In addition to Court Fees	2.33%	1.81%
Assets		
• Market value (MVA)	\$ 860,049,223	\$ 844,145,332
• Actuarial value (AVA)	\$ 933,534,062	\$ 909,249,614
• Return on market value*	5.3%	0.5%
• Return on actuarial value	5.9%	6.1%
Actuarial Information on AVA - smoothed		
• Normal cost %	1.81%	1.77%
• Total normal cost	\$ 31,560,590	\$ 30,987,551
• Actuarial accrued liability	\$ 1,312,392,501	\$ 1,262,311,389
• Unfunded actuarial accrued liability (UAAL)	\$ 378,858,439	\$ 353,061,775
• Funded ratio	71.1%	72.0%
• Funding period (years)	Never	Never
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	\$ 452,343,278	\$ 418,166,057
• Funded ratio	65.5%	66.9%

* Provided by ERS Master Trust Custodian

The following chart illustrates the recent history and outlook of the funded status of LECOSRF over the next five years:



August 31,	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Funded Ratio	79.7%	70.4%	73.2%	72.0%	71.1%	69.3%	67.7%	66.1%	64.5%	62.9%
UAAL (in millions)	\$212	\$354	\$323	\$353	\$379	\$422	\$464	\$509	\$556	\$606
ASC*	2.86%	3.09%	2.96%	3.01%	2.33%	2.44%	2.56%	2.67%	2.78%	2.88%

* For 2016 and thereafter, the stated Actuarially Sound Contribution rate is the contribution necessary to be actuarially sound based on the 31-year standard in addition to expected annual contribution of \$19.2 million from court fees. Prior to 2016, the expected court fees were included in the ASC as 1.20% of pay.

The projections beyond 2016 are based on the same assumptions, methods and provisions used for the August 31, 2016 valuation, which include the most significant across-the-board pay increases budgeted by the State Legislature and the assumptions adopted by the Board in February 2013. Additionally, the market value of assets is expected to earn 8% per year.

It is important for the Board of Trustees to understand that the currently scheduled member, employer and State contributions are not expected to accumulate sufficient assets in order to pay all of the currently scheduled benefits when due. Based on current expectations and assumptions, LECOSRF is projected to remain solvent until the year 2043, after which the funding would revert to a pay-as-you-go status. Therefore, for the current benefit structure to be sustainable, the contribution levels will need to be increased further.

Given this outlook, we recommend the Legislature continue to make further increases in the contribution rates (State, employer, and/or member) to LECOSRF to improve the overall financial health of the retirement system.

SECTION B

DISCUSSION

DISCUSSION

Introduction

The results of the August 31, 2016 actuarial valuation of the Law Enforcement and Custodial Officer Supplemental Retirement Fund (LECOSRF) of the Employees Retirement System of Texas are presented in this report.

The primary purposes of this actuarial valuation report are to determine the adequacy of the current State and employer contribution rates, describe the current financial condition of LECOSRF, analyze the changes in the condition of LECOSRF, and provide various summaries of the data.

The total contribution rate for the current fiscal year exceeds the normal cost by 0.29% of payroll, but it is not sufficient to amortize the unfunded actuarial accrued liability (UAAL) over a finite period of time. As a result, the UAAL is expected to grow indefinitely and the funding objective is not currently being realized. Based on current expectations and assumptions, LECOSRF is projected to remain solvent until the year 2043, after which the funding would revert to a pay-as-you-go status. Therefore, for the current benefit structure to be sustainable, the contribution levels will need to be increased further.

All of the tables referenced in the following discussion appear in Section C of this report.

Plan Provisions

There were no changes to the plan provisions during the past year. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. We did not perform an independent analysis of the actuarial assumptions. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of LECOSRF.

The actuarial valuation as of August 31, 2016 incorporates the most significant across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, CPO/COs that are covered by State of Texas Salary Schedule C were assumed to receive increases in accordance with the schedule (which generally result in no increase on September 1, 2016). Finally, CPO/COs employed by the Texas Department of Criminal Justice were assumed to receive no across-the-board increase on September 1, 2016.

The results of the actuarial valuations are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of LECOSRF is outside the scope of this actuarial valuation.

The current actuarial assumptions are outlined in Appendix II of this report.

Funding Adequacy

The funding objective of LECOSRF is to fund the sum of the normal cost and the amount necessary to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. Contribution rates should be established which, over time, will primarily remain level as a percent of payroll.

The member contribution rates are established by State statute and the State contribution rate is set by State statute and legislative appropriation. For the fiscal year beginning September 1, 2016, members contribute 0.50% of payroll and the State contributes 0.50% of payroll. LECOSRF also receives a portion of the court costs collected under Section 133.102 of the Local Government Code. Based on information provided by ERS, the contribution from this source is expected to be approximately \$19.2 million for fiscal year 2017 and all subsequent years. It should be noted that level dollar court cost contributions in future years will result in total contributions that are not expected to remain level as a percent of payroll over time. For fiscal year 2017, the court fee contribution is approximately 1.10% of payroll.

The UAAL of LECOSRF increased from \$353 million as of August 31, 2015 to \$379 million as of August 31, 2016. Additionally, the funded ratio of LECOSRF decreased from 72.0% to 71.1% as of August 31, 2016. The funded status is one of many metrics used to show trends and develop future expectations about the health of a retirement system. The funded status measure itself is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions since it does not reflect normal cost contributions, the timing of amortization payments, or future experience other than expected.

The valuation shows that the total normal cost for funding purposes is 1.81% of payroll. The approximate total contribution rate is 2.10% of payroll for the current fiscal year. The total contribution rate for the current fiscal year exceeds the normal cost by 0.29% of payroll, but it is not sufficient to amortize the UAAL over a finite period of time. As a result, the UAAL is expected to grow indefinitely and the funding objective is not currently being realized.

Section 811.006 of the Texas Government Code limits the modifications to LECOSRF that would, essentially, increase benefits or lower contributions to the trust unless the current level of benefits and contributions are considered actuarially sound. Section 811.006 defines actuarially sound as a

retirement system that is receiving a total contribution rate sufficient to cover the normal cost, administrative expenses, and amortize the UAAL over a period of 31 years, or less. Based on the actuarial valuation as of August 31, 2016, the actuarially sound contribution (ASC) rate for LECOSRF is 2.33% of payroll in addition to the annual court cost contribution of \$19.2 million.

As noted, the ASC is currently calculated based on a 31-year open amortization period. This means that the ASC contribution will always be calculated with the same 31-year period and the UAAL would never completely disappear. Even though the contributions to LECOSRF are not based on this ASC, the Board may want to consider adopting a funding policy that includes an ultimate goal of eliminating the UAAL by a certain date. This type of funding policy will allow the Board to better assess the level of contributions received from the employers and the State.

System Assets

This report contains several tables that summarize key information with respect to the LECOSRF assets.

The total market value of assets increased from \$844 million to \$860 million as of August 31, 2016. Table 5 reconciles the changes in the fund during the year. Total contributions increased from \$35.1 million to \$37.0 million. Contributions for fiscal year 2017 are anticipated to be approximately 2.10% of pay. Contributions in subsequent years are expected to increase in dollar amount, but at a declining percentage of pay since contributions from court costs are expected to remain level.

Table 6 shows the development of the actuarial value of assets. Rather than use the LECOSRF market value of assets, the valuation reflects a smoothed asset value. This actuarial value is calculated by immediately reflecting 20% of the difference between the expected actuarial value and the current market value. The actuarial value is currently 8.5% more than the market value.

The approximate investment return for the fiscal year ending August 31, 2016 was 5.3% when measured on market value and 5.9% when measured on actuarial value. Table 7 shows a history of return rates. The LECOSRF ten-year average market return, net of investment expenses as reported by the ERS Master Trust Custodian, is 5.8%.

Table 8 provides a history of the contributions paid into LECOSRF and the administrative expenses and benefit payments that have been paid out of LECOSRF. This table shows that LECOSRF paid administrative expenses and benefit payments, in excess of contributions received, of \$27.6 million (or 3.3% of assets) in fiscal year 2015 and that amount was \$28.9 million (or 3.4% of assets) in fiscal year 2016. ERS should continue to monitor this deficit as it could impact the future liquidity needs of LECOSRF.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

The tables in Appendix III show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Development of Employer Cost

	August 31, 2016	August 31, 2015
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	\$ 1,743,679,004	\$ 1,616,433,303
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	1,743,679,004	1,750,709,090
2. Total Normal Cost Rate		
a. Gross normal cost rate	1.71%	1.67%
b. Administrative expenses	0.10%	0.10%
c. Total (Item 2a + Item 2b)	1.81%	1.77%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	\$ 882,442,051	\$ 864,718,270
b. Less: present value of future normal costs	(198,521,400)	(188,751,937)
c. Actuarial accrued liability	\$ 683,920,651	\$ 675,966,333
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	\$ 618,987,770	\$ 578,926,025
b. Inactive members	9,484,080	7,419,031
c. Active members (Item 3c)	683,920,651	675,966,333
d. Total	\$ 1,312,392,501	\$ 1,262,311,389
5. Actuarial Value of Assets	\$ 933,534,062	\$ 909,249,614
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	\$ 378,858,439	\$ 353,061,775
7. Amortization of UAAL Over 31 Years as a Level Percentage of Payroll	1.29%	1.24%
8. Total Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years (Item 2c + Item 7)	3.10%	3.01%
9. Expected Contribution from Court Fees		
a. Expected level of contributions	\$19.2 million per year	1.20% of pay
b. Expected contribution for fiscal year	\$ 19,200,000	\$ 21,008,509
c. Equivalent contribution rate for fiscal year	1.10%	1.20%
10. Contribution Rate <u>In Addition to Expected Court Fees</u> Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	2.33%	1.81%
11. Allocation of Contribution Rate for the Current Fiscal Year		
a. Equivalent employer rate for fiscal year*	1.60%	1.70%
b. Member rate	0.50%	0.50%
c. Total contribution rate for fiscal year*	2.10%	2.20%
d. Total normal cost rate	1.81%	1.77%
e. Available contribution rate to amortize UAAL	0.29%	0.43%
f. Total contribution rate for fiscal year*	2.10%	2.20%
12. Funding period based on statutory contribution rates, expected court fees, and Actuarial Value of Assets (years)	Never	Never

* The annual court fees contributed to LECOSRF are expected to remain level in the future. As a result, the equivalent contribution rate is expected to decrease over time as the payroll increases.

Actuarial Present Value of Future Benefits

	<u>August 31, 2016</u>	<u>August 31, 2015</u>
1. Active Members		
a. Service Retirement	\$ 853,320,981	\$ 837,392,693
b. Disability Benefits	9,032,240	8,820,668
c. Death Before Retirement	7,297,649	7,209,091
d. Termination	12,791,181	11,295,818
e. Total	<u>\$ 882,442,051</u>	<u>\$ 864,718,270</u>
2. Inactive Members	\$ 9,484,080	\$ 7,419,031
3. Annuitants	\$ 618,987,770	\$ 578,926,025
4. Total Actuarial Present Value of Future Benefits	\$ 1,510,913,901	\$ 1,451,063,326

Analysis of Normal Cost

	<u>August 31, 2016</u>	<u>August 31, 2015</u>
1. Gross Normal Cost Rate		
a. Service Retirement	1.53%	1.49%
b. Disability Benefits	0.03%	0.03%
c. Death Before Retirement	0.02%	0.02%
d. Termination	<u>0.13%</u>	<u>0.13%</u>
e. Total	1.71%	1.67%
2. Administrative Expenses	<u>0.10%</u>	<u>0.10%</u>
3. Total Normal Cost	1.81%	1.77%
4. Less: Member Rate	<u>0.50%</u>	<u>0.50%</u>
5. Employer Normal Cost Rate	1.31%	1.27%

Historical Summary of Active Member Data

Valuation as of August 31,	Active Members		Covered Payroll		Average Salary		Average Age	Average Service
	Number	Percent Increase	Amount in \$ Millions	Percent Increase	\$ Amount	Percent Increase		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2008	33,642	N/A	1,245	N/A	37,021	N/A	42.7	9.6
2009	37,819	12.4%	1,387	11.4%	36,687	-0.9%	42.0	8.6
2010	39,052	3.3%	1,483	6.9%	37,979	3.5%	41.9	8.5
2011	36,806	-5.8%	1,452	-2.1%	39,454	3.9%	42.2	8.9
2012	37,404	1.6%	1,475	1.6%	39,444	0.0%	42.5	9.1
2013	37,415	0.0%	1,477	0.1%	39,469	0.1%	42.4	9.1
2014	37,084	-0.9%	1,542	4.4%	41,584	5.4%	42.3	8.9
2015	38,526	3.9%	1,616	4.8%	41,957	0.9%	41.7	8.4
2016	39,066	1.4%	1,744	7.9%	44,634	6.4%	41.0	8.0

Reconciliation of Plan Net Assets

	Year Ending	
	August 31, 2016 (1)	August 31, 2015 (2)
1. Market value of assets at beginning of year	\$ 844,145,332	\$ 869,877,651
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	\$ 27,497,297	\$ 26,728,318
ii. Member (including penalty interest)	9,538,658	8,376,472
iii. Total	\$ 37,035,955	\$ 35,104,790
b. Net investment income	\$ 44,831,113	\$ 1,918,490
c. Total revenue	\$ 81,867,068	\$ 37,023,280
3. Disbursements for the year		
a. Benefit payments and refunds	64,541,719	\$ 61,344,037
b. Net transfers from TRS	0	0
c. Administrative expenses	1,421,458	1,411,562
d. Total expenditures	65,963,177	62,755,599
4. Increase in net assets (Item 2c - Item 3d)	\$ 15,903,891	\$ (25,732,319)
5. Market value of assets at end of year (Item 1 + Item 4)	\$ 860,049,223	\$ 844,145,332

Development of Actuarial Value of Assets

	<u>Year Ending August 31, 2016</u>
1. Actuarial value of assets at beginning of year	\$ 909,249,614
2. Net new investments	
a. Contributions for the year (Table 5)	\$ 37,035,955
b. Disbursements for the year (Table 5)	<u>(65,963,177)</u>
c. Subtotal	(28,927,222)
3. Assumed investment return rate	8.00%
4. Expected return	\$ 71,582,880
5. Expected actuarial value of assets at end of year (Item 1 + Item 2c + Item 4)	\$ 951,905,272
6. Market value of assets at end of year	\$ 860,049,223
7. Excess earnings/(shortfall) (Item 6 - Item 5)	\$ (91,856,049)
8. Excess earnings/(shortfall) recognized (20% x Item 7)	\$ (18,371,210)
9. Actuarial value of assets (Item 5 + Item 8)	\$ 933,534,062
10. Estimated rate of return	5.9%
11. Actuarial value as percentage of market value	108.5%

History of Investment Return Rates

Year Ending August 31 of	Market*	Actuarial
(1)	(2)	(3)
2003	9.2%	5.2%
2004	11.7%	6.3%
2005	12.7%	7.4%
2006	8.8%	7.6%
2007	13.9%	8.5%
2008	-4.6%	5.7%
2009	-6.6%	3.2%
2010	6.7%	3.7%
2011	12.6%	5.1%
2012	8.2%	5.4%
2013	10.1%	6.1%
2014	14.7%	7.6%
2015	0.5%	6.1%
2016	5.3%	5.9%
Average Returns		
Last Five Years:	7.7%	6.2%
Last Ten Years:	5.8%	5.7%

* Market Value Rates of Return provided by the ERS Master Trust Custodian.

History of Cash Flow

Year Ending August 31, (1)	Contributions (2)	Distributions and Expenditures			External Cash Flow for the Year (7)	Market Value of Assets (8)	External Cash Flow as Percent of Market Value (9)
		Benefit Payments and Refunds (3)	Administrative Expenses (5)	Total (6)			
2007	\$ 0.0	\$ (32.1)	\$ (0.5)	\$ (32.6)	\$ (32.6)	\$ 762.9	-4.3%
2008	20.2	(34.9)	(0.4)	(35.3)	(15.1)	704.9	-2.1%
2009	20.7	(38.7)	(0.4)	(39.1)	(18.4)	634.8	-2.9%
2010	35.3	(41.2)	(0.6)	(41.8)	(6.5)	668.4	-1.0%
2011	31.8	(43.7)	(0.9)	(44.6)	(12.8)	737.4	-1.7%
2012	7.3	(48.1)	(0.8)	(48.9)	(41.6)	747.7	-5.6%
2013	14.3	(52.4)	(0.8)	(53.2)	(38.9)	780.7	-5.0%
2014	35.9	(57.1)	(1.3)	(58.4)	(22.5)	869.9	-2.6%
2015	35.1	(61.3)	(1.4)	(62.7)	(27.6)	844.1	-3.3%
2016	37.0	(64.5)	(1.4)	(65.9)	(28.9)	860.0	-3.4%

Dollar amounts in millions

Column (7) = Column (2) + Column (6).

Total Experience Gain or Loss

Item	Year Ending August 31, 2016	Year Ending August 31, 2015
(1)	(2)	(3)
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	\$ 353,061,775	\$ 323,174,989
2. Normal cost for the year (excluding administrative expenses)	29,236,842	26,878,492
3. Actual administrative expenses	1,421,458	1,411,562
4. Contributions for the year (excluding service purchases)	(36,180,288)	(34,305,834)
5. Interest at 8%		
a. On UAAL	\$ 28,244,942	\$ 25,853,999
b. On normal cost and administrative expenses	1,226,332	1,131,602
c. On contributions	(1,447,212)	(1,372,233)
d. Total	\$ 28,024,062	\$ 25,613,368
6. Assumption change (Gains)/Losses	\$ 0	\$ 0
7. Legislative changes	0	3,971,918
8. Expected UAAL (Sum of Items 1 through 7)	375,563,849	346,744,495
9. Actual UAAL	378,858,439	353,061,775
10. Total (gain)/loss for the year (Item 9 - Item 8)	\$ 3,294,590	\$ 6,317,280
B. Source of gains and losses		
	<u>% of AAL</u>	
11. Asset (gain)/loss for the year	1.40%	\$ 18,371,210
12. Pay Increases (Less)/Greater than Expected	0.31%	(4,012,226)
13. Non-Retired Demographic (Gains)/Losses	0.95%	(12,523,340)
14. Post-Retirement Mortality (Gains)/Losses	0.02%	214,071
15. Other Demographic (Gains)/Losses	0.09%	1,244,875
16. Total (Sum of Items 11 through 15)	0.25%	\$ 3,294,590

Solvency Test

Actuarial Accrued Liability and Percent of Active Member Payroll for:

August 31,	Accumulated Member Contributions Including Interest		Retirees and Beneficiaries Currently Receiving Benefits		Employer Financed Portion of Vested and Nonvested Benefits		Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Assets		
	(1)	% of Payroll	(2)	% of Payroll	(3)	% of Payroll		(1)	(2)	(3)
2007	\$ 0.0	0%	\$ 278.1	22%	\$ 484.6	9%	\$ 747.8	100%	100%	97%
2008	0.0	0%	314.6	25%	527.5	42%	774.5	100%	100%	87%
2009	0.0	0%	334.6	24%	572.5	41%	780.8	100%	100%	78%
2010	7.3	0%	368.0	25%	591.3	40%	802.9	100%	100%	72%
2011	13.9	1%	400.9	28%	578.0	40%	830.5	100%	100%	72%
2012	19.5	1%	447.5	30%	577.3	39%	832.5	100%	100%	63%
2013	24.4	2%	482.7	33%	690.0	47%	843.0	100%	100%	49%
2014	29.5	2%	533.3	35%	644.0	42%	883.6	100%	100%	50%
2015	34.5	2%	578.9	36%	648.9	40%	909.2	100%	100%	46%
2016	41.5	2%	619.0	35%	651.9	37%	933.5	100%	100%	42%

Note: Dollar amounts in millions

APPENDICES

**SUMMARY OF PLAN PROVISIONS FOR
LAW ENFORCEMENT AND CUSTODIAL OFFICER SUPPLEMENTAL RETIREMENT FUND
OF THE EMPLOYEES RETIREMENT SYSTEM OF TEXAS**

Classes of Membership

1. Elected Class Membership:
 - a. Membership is optional and limited to:
 - i. Elected state officials not covered by either of the Judicial Retirement Systems
 - ii. Members of the Legislature; and
 - iii. District and Criminal District Attorneys paid by the state general revenue fund.
2. Employee Class Membership:
 - a. Membership is mandatory for all employees and appointed officers of every department, commission, board, agency, or institution of the state except for:
 - i. Independent contractors;
 - ii. Persons covered by the Teacher Retirement System or either of the Judicial Retirement System; and
 - iii. Employee Class Members already receiving retirement benefits under the System.
 - b. Includes two types of Employee Class service
 - i. CPO/CO: Certified Peace Officer / Custodial Officer – in general, service rendered while a law enforcement officer, custodial officer, parole officer or caseworker
 - ii. Regular: Non-CPO/CO service.
 - c. Prior to September 1, 2015, membership begins after a 90-day waiting period. Effective September 1, 2015, membership begins immediately.
 - d. CPO/CO Service is required in order to have a benefit payable from this fund.

The benefits payable by the Law Enforcement and Custodial Officer Supplemental Retirement Fund (LECOSRF) only apply to members that have accrued CPO/CO service.

Member Contributions

1. 0.5% of compensation to LECOSRF in addition to contributions payable to ERS. Additional member contributions may be allowable for service purchases.
2. Member contributions cease when a member's benefit accrual has reached 100% of Average Monthly Compensation.
3. Member contributions accumulate interest at 2.00% per year.

State of Texas Contributions

State contributions are set biennially by the legislature. The current sources of contributions are shown below.

1. *Payroll Contributions*: The current projected contribution rate for the State is 0.50% of compensation for the 2014 and 2015 fiscal years. State payroll contributions cease when a member's benefit accrual has reached 100% of Average Monthly Compensation.
2. *Court Fees*: LECOSRF also receives a portion of the court costs collected under Section 133.102 of the Local Government Code. Based on historical information, the contribution from this source is expected to be approximately \$19.2 million for fiscal year 2017.

State contributions after the 2015 fiscal year are subject to future legislative appropriations.

Compensation

Compensation includes base salary, longevity and hazardous duty pay and excludes overtime pay. This amount is limited by Section 401(a)(17) of the Internal Revenue Code for members hired after August 31, 1996.

Average Monthly Compensation (AMC)

1. *Members hired prior to September 1, 2009*: Average of the 36 highest months of compensation for service in the employee class of membership
2. *Members hired on or after September 1, 2009 and prior to September 1, 2013*: Average of the 48 highest months of compensation for service in the employee class of membership
3. *Members hired on or after September 1, 2013*: Average of the 60 highest months of compensation for service in the employee class of membership.

Creditable Service

The types of service creditable in LECOSRF are membership service, military service and equivalent membership service. Equivalent membership service includes: previously cancelled service, service not previously established, waiting period service, and Additional Service Credit.

Unused Sick and Annual Leave

In many cases, unused sick and annual leave can be used to establish Creditable Service. Members hired prior to September 1, 2009 can use unused sick and annual leave to satisfy service requirements for Retirement and Death Benefit Plan eligibility as well as to calculate plan benefits. Members hired on or after September 1, 2009 can only use unused sick and annual leave to calculate plan benefits. However, members hired on or after September 1, 2013 cannot use unused annual leave to calculate plan benefits if the member opts to receive the unused annual leave as a lump-sum payment.

Service Retirement Supplement

1. Employee Class:

a. *Eligibility:*

i. Any age with 20 years of CPO/CO Service

b. *Benefits:* 0.5% of AMC times years of CPO/CO Service

c. *Applicable Reductions*

i. For members hired prior to September 1, 2009, retiring after attaining age 50 or after attaining Rule of 80, there is no reduction. Otherwise, the member receives the percentage of the benefit stated in the following table:

Attained Age at Retirement	Reduction Percentage	Attained Age at Retirement	Reduction Percentage
36	31.2%	43	55.3%
37	33.9%	44	60.1%
38	36.7%	45	65.3%
39	39.8%	46	71.1%
40	43.2%	47	77.3%
41	46.9%	48	84.2%
42	50.9%	49	91.7%

ii. For members hired after on or after September 1, 2009, but prior to September 1, 2013, reduced five percent for each year the member retires prior to age 55, with a maximum possible reduction of 25 percent.

iii. For members hired on or after September 1, 2013, reduced five percent for each year the member retires prior to age 57, with no maximum possible reduction.

2. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Standard Non-Occupational Disability Annuity: None.

Standard Occupational Disability Annuity:

1. Employee Class (CPO/CO Members):

- a. *Eligibility:* Disability as a direct result of some risk or hazard inherent to law enforcement or custodial duties
 - i. Total: Incapable of substantial gainful activity and eligible for Social Security disability benefits
 - ii. Non-total: Does not satisfy definition of Total Disability
 - b. *Benefits:*
 - i. Non-total with less than 20 years of CPO/CO Service: 15% of AMC payable from LECOSRF
 - ii. Non-total with 20 years of CPO/CO Service: Benefit defined in the Service Retirement Supplement Section
 - iii. Total: 100% of AMC offset by the amount paid by ERS (ERS pays 2.3% of AMC times years of Creditable Service, but not less than 35% of AMC)
2. Normal Form of Payment: Annuity payable for life or until member is no longer incapacitated for the performance of duty. Any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Death Benefit Plan (DBP) Annuity Supplement

1. Eligibility:

- a. 20 years of CPO/CO Service; and
 - i. Death occurs while an active member; or
 - ii. Death occurs while an inactive member, and the member either:
 1. Filed a DBP prior to September 1, 2006; or
 2. Was eligible for service retirement when the member became inactive.
2. Benefits: Benefits are calculated as if the member had elected to receive a Service Retirement Supplement under an optional form of payment, received a Service Retirement Supplement, and died immediately thereafter.

Deferred Service Retirement Annuity

1. Employee Class:

a. *Eligibility:*

- i. 20 years of CPO/CO service at termination of CPO/CO employment, and either;
 1. The member transfers to and retires from active regular class service; or
 2. The member terminates all employee class service, and the regular employee class account balance is not withdrawn from the ERS trust

b. *Benefits:*

- i. Service Retirement Supplement, based on the member's age at benefit commencement. AMC used in calculating the benefit payable from the ERS trust and the LECOSRF will both be based on all employee class service.
- ii. Payments may commence at any age, provided that the member has terminated all employee class service. The member must retire simultaneously from the regular employee class and the CPO/CO employee class.

2. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Refund of Accumulated Contributions

A refund of accumulated contributions is payable in cases where a terminated member did not meet the eligibility requirements for an annuity, or a terminated member chooses to receive a refund of his or her account balance in lieu of an annuity.

Maximum Benefits

Annuity benefits are limited to 100% of Average Monthly Compensation. For members with CPO/CO service, this benefit limitation includes benefits from all sources (ERS and LECOSRF).

Limit on Plan Modifications

According to Section 811.006 of the Texas Government Code – a rate of member or State contributions to or a rate of interest required for the establishment of credit in the retirement system may not be reduced or eliminated, a type of service may not be made creditable in the retirement system, a limit on the maximum permissible amount of a type of creditable service may not be removed or raised, a new monetary benefit payable by the retirement system may not be established, and the determination of the amount of a monetary benefit from the system may not be increased, if, as a result of the particular action, the time, as determined by an actuarial valuation, required to amortize the UAAL of the retirement system would be increased to a period that exceeds 30 years by one or more years.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation that covered the five-year period from September 1, 2006 through August 31, 2011.

I. Valuation Date

The valuation date is August 31 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

Because the employer contribution rate is set by statute, the actuarial valuation is used to determine the adequacy of the current State and employer contribution rates and describe the current financial condition of LECOSRF.

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the first step is to determine the contribution rate (level as a percentage of pay) required to provide the benefits to each member, or the normal cost rate. The normal cost rate consists of two pieces: (i) the member's contribution rate, and (ii) the remaining portion of the normal cost rate which is the employer's normal cost rate. The total normal cost rate is based on the benefits payable to a new member and the entry age characteristics of the current active membership.

The Unfunded Actuarial Accrued Liability (UAAL) is the liability for future benefits which is in excess of (i) the actuarial value of assets, and (ii) the present value of future normal costs. The employer contribution provided in excess of the employer normal cost is applied to amortize the UAAL.

The funding period is calculated as the number of years required to fully amortize the UAAL, assuming that: (a) future market earnings, net of investment-related expenses, will equal 8.00% per year, (b) there will be no liability gains/losses or changes in assumptions, (c) the number of active members will remain unchanged, (d) active members who leave employment will be replaced by new entrants each year, and (e) State contributions will remain the same percentage of payroll as the current fiscal year.

The Entry Age actuarial cost method is an "immediate gain" method (i.e., experience gains and losses are separately identified as part of the UAAL). However, they are amortized over the same period applied to all other components of the UAAL.

III. Actuarial Value of Assets

The actuarial value of assets is determined as the expected value of plan assets as of the valuation date plus 20% of the difference between the market-related value and the expected value. The expected value equals the actuarial value of plan assets as of the prior valuation date, plus contributions, less benefit payments and administrative expenses, all accumulated at the assumed rate of interest to the current valuation date.

IV. Actuarial Assumptions

Investment Return: 8.00% per year, net of investment-related expenses (composed of an assumed 3.50% inflation rate and a 4.50% real rate of return)

Administrative Expenses: 0.10% of valuation payroll per year

Salary Increases: Increases are assumed to occur at the beginning of the valuation year and vary by employee group. The components of the annual increases are:

Employee Group	Inflation *	Real Wage Growth	Merit, Promotion and Longevity
Employee Class	3.5%	0%	See sample rates

* Total liabilities for this valuation reflect all known pay increases appropriated by the State legislature for the biennium.

Sample Rates:

Annual Salary Increases for Merit, Promotion and Longevity Male and Female CPO/CO Employee Class Members							
Age	Years of ERS Decrement Service						
	0	1	2	3	4	5 - 9	10+
All	8.00 %	5.00 %	4.50 %	4.00 %	3.50 %	2.00 %	1.50 %

Payroll Growth: 3.50% per year, compounded annually (for projecting valuation payroll).

Age and Service Assumptions and Methods:

Rounding of ages:

Current and projected ages rounded to the nearest year are used for all purposes – determining eligibility for benefits, present value factors, early retirement reductions, option factors, salary increase rates, and decrements.

Benefit Service:

Current Benefit Service in years and months as of the valuation date was provided by ERS. This service plus Future Earned Service, Service Credit at Retirement, and Eligibility Service at Retirement were used to project benefit amounts.

Future Earned Service:

Active members were assumed to earn one additional year of service credit in each future year employed based on their current class of membership (but not beyond the amount of credit needed to provide a 100% of average monthly compensation standard service retirement annuity).

Service Credit at Retirement:

For members hired before September 1, 2009, service credit when eligible for service retirement is assumed to be increased by:

- 1.0 years for members retiring from CPO/CO class if service, prior to adjustment, is at least 18 years; and
- 0.5 years for members retiring from CPO/CO class if service, prior to adjustment, is less than 18 years.

(but not beyond the amount of credit needed to provide a 100% of average monthly compensation standard service retirement annuity).

For members hired on or after September 1, 2009, service credit when eligible for service retirement is assumed to be increased by:

- 1.0 years for members retiring from CPO/CO class if service, prior to adjustment, is at least 19 years; and
- 0.5 years for members retiring from CPO/CO class if service, prior to adjustment, is less than 19 years.

(but not beyond the amount of credit needed to provide a 100% of average monthly compensation standard service retirement annuity).

Service for Decrements:

The method of calculating ERS Decrement Service and CPO/CO Decrement Service on the valuation date is shown below. Decrement service is assumed to increase by one year for each future year employed based on their current class of membership.

- Valuation Age: Age rounded to the nearest year on valuation date
- ERS Benefit Service: Years and months of all creditable ERS service on the valuation date
- CPO/CO Benefit Service: Years and months of creditable CPO/CO service on the valuation date
- Date 1: (Valuation Date) minus (ERS Benefit Service)
- ERS Decrement Service: (Valuation Age) minus (age rounded to nearest year on Date 1)
- ERS Funding Entry Age (age at hire for the entry age normal cost method): (Valuation Age) minus (ERS Decrement Service)
- Date 2: (Valuation date) minus (CPO/CO Benefit Service)
- CPO/CO Decrement Service: (Valuation Age) minus (age rounded to nearest year on Date 2)

Eligibility Service at Retirement:

For members hired before September 1, 2009, eligibility service is assumed to be increased by the following to reach eligibility for service retirement:

- 2.0 years for members retiring from regular employee class service if age plus service, prior to adjustment, is greater than or equal to 78;
- 1.0 years for members retiring from regular employee class service if age plus service, prior to adjustment, is less than 78;
- 2.0 years for members retiring from CPO/CO class if service, prior to adjustment, is at least 18 years; and
- 1.0 years for members retiring from CPO/CO class if service, prior to adjustment, is less than 18 years.

For members hired on or after September 1, 2009, eligibility service is assumed to be increased by the following to reach eligibility for service retirement:

- 1.0 years for members retiring from regular employee class service ; and
- 1.0 years for members retiring from CPO/CO class service.

Decrement Timing: All decrements – mortality, service retirement, disability retirement, and termination of employment for reasons other than death or retirement – are assumed to occur at the beginning of the valuation year.

Mortality Decrements:

Active Members, Service Retirees, Beneficiaries, and Inactive Members

1994 Group Annuity Mortality with no setback for males and set forward two years for females. Generational mortality improvements in accordance with Scale AA are projected from the year 2000.

Disability Retirees

RP-2000 Disabled Retiree Mortality set forward six years for males and setback one year for females.

Occupational Death

2.0% of male and 0.3% of female active member deaths are assumed to be occupational.

Service Retirement Decrements: Graded tables based on ERS experience.

Active CPO/CO Employee Class Members – hired before September 1, 2009

CPO/CO Decrement Service is used to determine when the rates apply:

- Any age with 18 years of CPO/CO service
- Age 55 with nine years of CPO/CO service

Sample rates for eligible members:

Annual Service Retirement Rates per 100 Participants CPO/CO Employee Class Members - Male and Female						
Age	Years of CPO/CO Decrement Service					
	5	10	15	20	25	30
50				45	55	55
51				30	30	30
52				30	30	30
53				30	30	30
54				30	30	30
55		12	12	45	35	35
56		10	10	45	35	35
57		10	10	45	45	45
58		10	10	45	35	35
59		13	13	45	35	35
60	6	16	16	55	35	35
65	15	35	35	50	60	60
70	50	50	50	50	50	50
75	100	100	100	100	100	100

Active CPO/CO Employee Class Members – hired on or after September 1, 2009

CPO/CO Decrement Service is used to determine when the rates apply:

- Any age with 19 years of CPO/CO service
- Age 55 with nine years of CPO/CO service

Sample rates for eligible members:

Annual Service Retirement Rates per 100 Participants CPO/CO Employee Class Members - Male and Female						
Age	Years of CPO/CO Decrement Service					
	5	10	15	20	25	30
50				5	5	5
51				5	5	5
52				5	5	5
53				5	5	5
54				5	5	5
55		12	12	82.5	65	65
56		10	10	37.5	30	30
57		10	10	37.5	37.5	37.5
58		10	10	37.5	30	30
59		13	13	37.5	30	30
60		16	16	55	35	35
65		35	35	50	60	60
70		50	50	50	50	50
75	100	100	100	100	100	100

Disability Retirement Decrements: Graded Tables Based on ERS Experience

Active CPO/CO Employee Class Members

ERS Decrement Service and CPO/CO Decrement Service are used to determine when the rates apply:

- The rates do not apply before a member is eligible for the benefit.
- Service greater than zero is required for occupational disability retirement.
- 10 years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the member has attained age 60, if hired before September 1, 2009, or age 65, if hired on or after September 1, 2009.

Sample rates for members:

Annual Disability Rates per 100 Participants CPO/CO Employee Class Members	
Age	Males and Females
30	0.0123
35	0.0418
40	0.0781
45	0.1307
50	0.2365
55	0.3280
60	0.4200

95% of the disability rates stated above are assumed to be attributable to non-occupational disabilities, 4% are assumed to be attributable to non-total occupational disabilities, and 1% are assumed to be attributable to total occupational disabilities.

Termination Decrements for Reasons Other Than Death or Retirement: Graded Tables Based on ERS Experience.

Rates of termination are zero for members eligible for service retirement.

Sample rates for members not eligible for service retirement:

Active CPO/CO Employee Class Members – hired before September 1, 2009

Annual Rates of Termination per 100 Participants CPO/CO Employee Class Members								
Age	Male and Female - Years of ERS Decrement Service							
	0	1	2	3	4	5	10	15
20	23	19	17	17				
25	20	17	14	14	14	13		
30	16	13	12	11	10	10	8	
35	16	11	9	9	8	7	6	4
40	14	10	8	7	7	7	5	2
45	13	10	7	6	6	6	3	2
50	12	9	7	6	6	6	3	2
55	12	7	5	5	4	4		
60	13	7	5	5				

Active CPO/CO Employee Class Members – hired on or after September 1, 2009

Annual Rates of Termination per 100 Participants CPO/CO Employee Class Members								
Age	Male and Female - Years of ERS Decrement Service							
	0	1	2	3	4	5	10	15
20	24	20	17	17				
25	22	19	16	16	16	15		
30	17	15	14	12	12	12	8	
35	18	12	11	11	10	8	6	4
40	15	11	9	8	8	8	5	2
45	14	11	8	7	7	7	3	2
50	13	11	8	7	7	6	3	2
55	13	8	5	5	4	4		
60	15	8	5	5				

Rates of Withdrawal of Employee Contributions

Every member that terminates employment and does not have a benefit payable from this plan is assumed to withdraw their employee contributions.

Percentage of Members Electing Various Benefit Options:

Sex/ Benefit	Standard Life Annuity	Option 1	Option 4
Male Member			
Disability	50%	40%	10%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	75%	25%
Female Member			
Disability	75%	20%	5%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	50%	50%

Beneficiary Characteristics: Male member is assumed to be three years older than female beneficiary; and female member is assumed to be the same age as male beneficiary.

Census Data and Assets

- The valuation was based on members of LECOSRF as of August 31, 2016 and does not take into account future members.
- All census data was supplied by ERS and was subject to reasonable consistency checks.
- There were data elements that were modified for some members as part of the valuation in order to make the data complete. However, the number of missing data items was immaterial.
- Asset data was supplied by ERS.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)(17).
- Valuation payroll (earnings applied to the current valuation year) is the expected payroll for the fiscal year following the valuation date. It is based on reported payroll determined from August member contributions increased to reflect the across-the-board salary increases appropriated by the State legislature, effective on or after September 1, and projected according to the actuarial assumptions for the upcoming fiscal year.
- No liability was included for benefits which are funded by special State appropriations.
- State appropriations for membership fees have been ignored.

DETAILED SUMMARIES OF MEMBERSHIP DATA

<u>TABLE NUMBER</u>	<u>PAGE</u>	
A	36	SUMMARY OF MEMBERSHIP DATA
B	37	ACTIVE MEMBERS: DISTRIBUTION BY AGE AND SERVICE
C	38	RETIRED AND BENEFICIARY MEMBERS: DISTRIBUTION BY AGE AND CATEGORY

TABLE A
SUMMARY OF MEMBERSHIP DATA

Active Members

Item	Male	Female	Total
Number of Members	24,303	14,763	39,066
Average Annual Salaries	\$ 47,155	\$ 40,485	\$ 44,634
Average Age	40.9	41.3	41.0
Average Service	8.2	7.5	8.0

Annuitants

Item	Number	Annual Annuities	Average Annuities	Average Age
Service Retirees and Beneficiaries	11,413	\$ 60,122,640	5,268	62.8
Disability Retirees	102	\$ 958,224	9,394	67.6
Total	11,515	\$ 61,080,864	\$ 5,304	62.8

Inactive Members Assumed Eligible for Deferred Annuities

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	95	\$ 671,388	\$ 7,067	48.8

Non-vested Inactive Members

Item	Number	Account Balances	Average Account Balances	Average Age
Non-vested Members	15,108	\$ 3,559,523	\$ 236	35.5

TABLE B
ACTIVE MEMBERS
DISTRIBUTION BY AGE AND SERVICE

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25	4,139 \$ 33,995	23 \$ 41,139								4,162 \$ 34,035
25 - 29	4,007 \$ 38,283	783 \$ 44,602	14 \$ 42,672							4,804 \$ 39,325
30 - 34	2,741 \$ 38,577	1,455 \$ 51,101	517 \$ 49,149	31 \$ 53,146						4,744 \$ 43,666
35 - 39	2,075 \$ 37,964	1,097 \$ 49,025	913 \$ 58,140	512 \$ 54,668	19 \$ 57,377					4,616 \$ 46,516
40 - 44	1,723 \$ 37,911	942 \$ 46,463	852 \$ 53,944	961 \$ 58,702	664 \$ 58,407	20 \$ 66,150				5,162 \$ 48,734
45 - 49	1,435 \$ 38,094	934 \$ 44,986	760 \$ 50,410	933 \$ 54,049	1,232 \$ 58,840	469 \$ 65,136	13 \$ 78,696			5,776 \$ 50,118
50 - 54	1,215 \$ 37,829	894 \$ 43,618	654 \$ 46,273	727 \$ 48,855	452 \$ 57,440	280 \$ 73,769	96 \$ 91,478	2 \$ 98,944		4,320 \$ 47,763
55 - 59	857 \$ 37,586	754 \$ 43,484	527 \$ 45,427	497 \$ 46,804	290 \$ 52,738	84 \$ 71,846	58 \$ 94,612	7 \$ 94,580		3,074 \$ 45,439
60 - 64	440 \$ 37,711	520 \$ 42,937	262 \$ 44,808	302 \$ 46,716	133 \$ 50,776	28 \$ 57,369	12 \$ 87,454	2 \$ 96,483		1,699 \$ 43,773
Over 64	179 \$ 37,422	280 \$ 41,485	110 \$ 43,036	85 \$ 44,880	38 \$ 48,781	14 \$ 66,170	2 \$ 56,699	1 \$ 51,642		709 \$ 42,043
Total	18,811 \$ 37,216	7,682 \$ 46,279	4,609 \$ 50,778	4,048 \$ 52,663	2,828 \$ 57,364	895 \$ 68,262	181 \$ 90,913	12 \$ 92,047		39,066 \$ 44,634

TABLE C
RETIRED AND BENEFICIARY MEMBERS
DISTRIBUTION BY AGE AND CATEGORY

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees			
Under 60	4,789	26,663,244	5,568
60 - 64	2,349	11,937,708	5,082
65 - 69	1,874	9,572,340	5,108
70 - 74	920	4,686,588	5,094
75 - 79	461	2,533,080	5,495
Over 79	355	2,124,756	5,985
Total	10,748	57,517,716	5,351
Beneficiaries			
Under 60	93	385,128	4,141
60 - 64	84	328,548	3,911
65 - 69	102	355,548	3,486
70 - 74	84	307,008	3,655
75 - 79	112	468,636	4,184
Over 79	190	760,056	4,000
Total	665	2,604,924	3,917
Disabled Retirees			
Under 60	29	237,528	8,191
60 - 64	11	70,008	6,364
65 - 69	19	206,796	10,884
70 - 74	18	181,908	10,106
75 - 79	7	56,364	8,052
Over 79	18	205,620	11,423
Total	102	958,224	9,394
Grand Total	11,515	61,080,864	5,304

GLOSSARY

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or Funding Method: A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ARC.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

- a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
- b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
- c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those 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. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or Valuation Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ARC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC): A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period: The term "Funding Period" is used in two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ARC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: 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. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

JUDICIAL RETIREMENT SYSTEM OF TEXAS, PLAN 2
ANNUAL ACTUARIAL VALUATION – FUNDING
AS OF AUGUST 31, 2016

November 17, 2016

Board of Trustees
Employees Retirement System of Texas
200 East 18th Street
Austin, TX 78701

Re: Actuarial Valuation for Funding Purposes as of August 31, 2016

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Judicial Retirement System of Texas, Plan 2 (JRS-2) as of August 31, 2016. This report was prepared at the request of the Board and is intended for use by ERS staff and those designated or approved by the Board. This report may be provided to parties other than ERS only in its entirety and only with the permission of the Board.

Actuarial Valuation

The primary purposes of the actuarial valuation report are to determine the adequacy of the current State contribution rate, describe the current financial condition of JRS-2, analyze changes in the condition of JRS-2, and provide various summaries of the data.

Plan Provisions

Our actuarial valuation as of August 31, 2016 reflects the benefit and contribution provisions set forth in Chapters 836 through 840 of the Texas Government Code. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. Additionally, the actuarial valuation incorporates all known across-the-board pay increases budgeted by the State Legislature for the current biennium. The current actuarial assumptions and methods are outlined in Appendix II of this report.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not

otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. They are all Enrolled Actuaries, Fellows of the Society of Actuaries, and Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned are experienced in performing valuations for large public retirement systems.

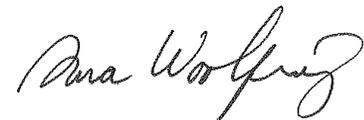
Respectfully submitted,
Gabriel, Roeder, Smith & Company



R. Ryan Falls, FSA, EA, MAAA
Senior Consultant



Joseph P. Newton, FSA, EA, MAAA
Senior Consultant



Dana Woolfrey, FSA, EA, MAAA
Consultant

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SECTION A

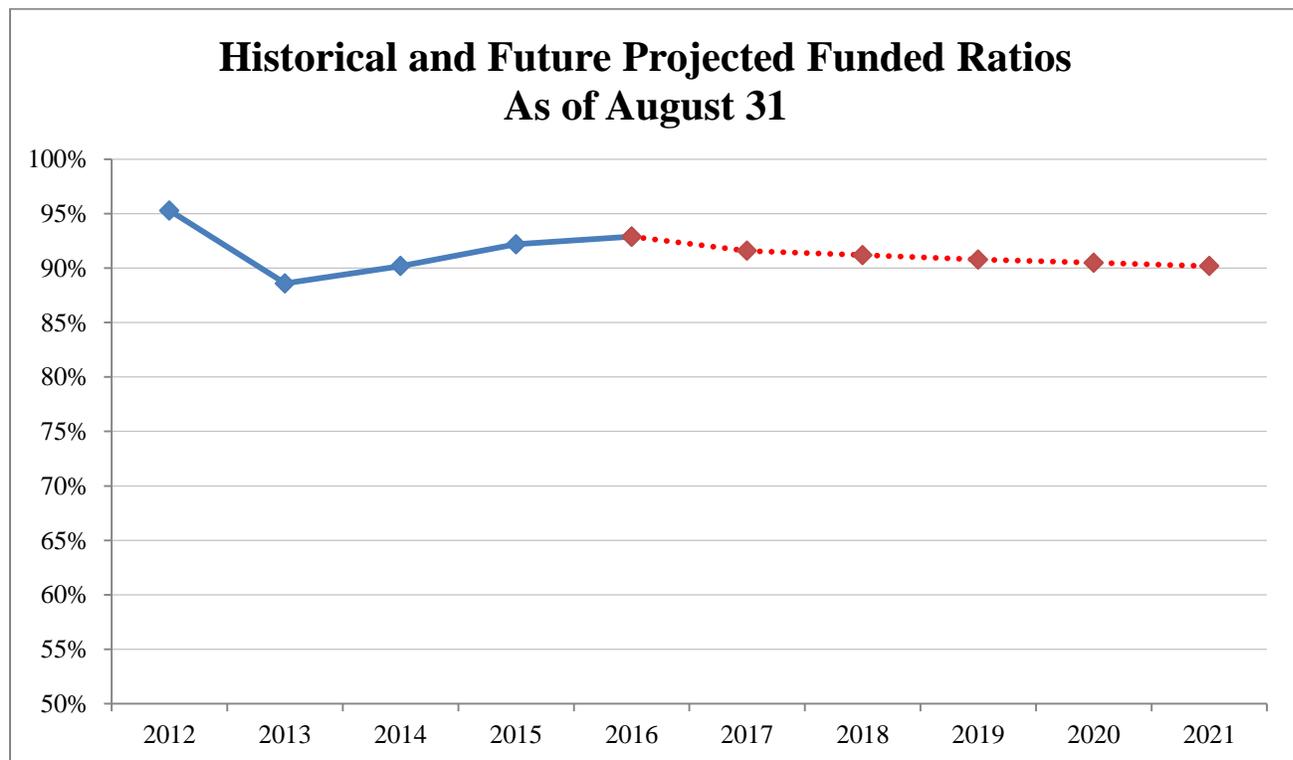
EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Item	2016	2015
Membership		
<ul style="list-style-type: none"> • Number of <ul style="list-style-type: none"> - Active members - Retirees and beneficiaries - Inactive, vested - Inactive, nonvested - Total • Valuation Payroll 	548 331 16 150 <hr/> 1,045 \$ 78,238,000	563 322 14 134 <hr/> 1,033 \$ 80,352,000
Statutory contribution rates	FY 2017	FY 2016
<ul style="list-style-type: none"> • Members • State 	7.44% 15.663%	7.16% 15.663%
Actuarially Sound Rate (funds normal cost and amortizes unfunded accrued liability over 31 years, per Section 840.106 of the Texas Government Code)	23.48%	23.79%
Assets		
<ul style="list-style-type: none"> • Market value (MVA) • Actuarial value (AVA) • Return on market value* • Return on actuarial value 	\$ 381,119,508 \$ 395,457,335 5.3% 7.0%	\$ 364,510,248 \$ 372,615,005 0.5% 7.4%
Actuarial Information on AVA (smoothed)		
<ul style="list-style-type: none"> • Normal cost % • Total normal cost • Actuarial accrued liability • Unfunded actuarial accrued liability (UAAL) • Funded ratio • Funding period (years) 	21.18% \$ 16,570,808 \$ 425,865,307 \$ 30,407,972 92.9% 49	21.40% \$ 17,195,328 \$ 404,010,572 \$ 31,395,567 92.2% Never
Actuarial Information on MVA		
<ul style="list-style-type: none"> • Unfunded actuarial accrued liability (UAAL) • Funded ratio 	\$ 44,745,799 89.5%	\$ 39,500,324 90.2%

* Provided by ERS Master Trust Custodian

The following chart illustrates the recent history and outlook of the funded status of JRS-2 over the next five years:



August 31,	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Funded Ratio	95.3%	88.6%	90.2%	92.2%	92.9%	91.6%	91.2%	90.8%	90.5%	90.2%
UAAL (in millions)	\$14.8	\$41.0	\$37.9	\$31.4	\$30.4	\$37.4	\$41.3	\$45.0	\$48.7	\$52.3
ASC	21.52%	24.08%	23.86%	23.79%	23.48%	23.77%	23.84%	23.90%	23.97%	24.00%

The projections beyond 2016 are based on the same assumptions, methods and provisions used for the August 31, 2016 valuation, which include known across-the-board pay increases budgeted by the State Legislature and the assumptions adopted by the Board in February 2013. Additionally, the market value of assets is expected to earn 8% per year.

Assuming the market value of assets earns 8% per year, JRS-2 is projected to become insolvent in approximately 90 years. However, assuming the actuarial (smoothed) value of assets earns 8% per year, JRS-2 is projected to reach full funding in 2065. This discrepancy is primarily due to the \$14.3 million in deferred assets losses yet to be recognized in the actuarial value of assets. It is important for the Board of Trustees to understand that the vast majority of the total contribution for JRS-2 goes towards the normal cost for current members and only a small portion of the total contribution goes towards eliminating the UAAL. As a result, small deviations from both demographic and economic assumptions can have a notable impact on the projected solvency of JRS-2.

SECTION B

DISCUSSION

DISCUSSION

Introduction

The results of the August 31, 2016 actuarial valuation of the Judicial Retirement System of Texas, Plan 2 (JRS-2) are presented in this report.

The primary purposes of this actuarial valuation report are to determine the adequacy of the current State contribution rate, describe the current financial condition of JRS-2, analyze the changes in the condition of JRS-2, and provide various summaries of the data.

The total contribution rate for the current fiscal year exceeds the normal cost by 1.923% of payroll, which, on an actuarial value of assets basis, is sufficient to amortize the unfunded actuarial accrued liability (UAAL) over 49 years. However, on a market value of assets basis, the total contribution rate is not sufficient to amortize the UAAL over a finite basis.

All of the tables referenced in the following discussion appear in Section C of this report.

Plan Provisions

There were no changes to the plan provisions during the past year. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. We did not perform an independent analysis of the actuarial assumptions. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of JRS-2.

The actuarial valuation as of August 31, 2016 incorporates all known across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, judges are not scheduled to receive an increase on September 1, 2015 nor on September 1, 2016.

The results of the actuarial valuations are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of JRS-2 is outside the scope of this actuarial valuation.

The current actuarial assumptions are outlined in Appendix II of this report.

Funding Adequacy

The funding objective of JRS-2 is to fund the sum of the normal cost and the amount necessary to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. Contribution rates should be established which, over time, will remain level as a percent of payroll.

The member contribution rates are established by State statute and the State contribution rate is set by State statute and legislative appropriation. For the fiscal year beginning September 1, 2016, members accruing benefits contribute 7.50% of payroll and the State contributes 15.663% of payroll. Since some active JRS-2 members have elected to cease contributing to the plan as well as cease accruing additional benefits, the effective member contribution rate for the fiscal year beginning September 1, 2016 is 7.44% of payroll. This rate is subject to future legislative appropriations.

The unfunded actuarial accrued liability (UAAL) of JRS-2 decreased from \$31.4 million as of August 31, 2015 to \$30.4 million as of August 31, 2016. Additionally, the funded ratio of JRS-2 increased from 92.2% to 92.9% as of August 31, 2016. The funded status is one of many metrics used to show trends and develop future expectations about the health of a retirement system. The funded status measure itself is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions since it does not reflect normal cost contributions, the timing of amortization payments, or future experience other than expected.

The valuation shows that the total normal cost for funding purposes is 21.18% of payroll. The total contribution rate is 23.103% of payroll for the current fiscal year. The total contribution rate for the current fiscal year exceeds the normal cost by 1.923% of payroll, which is sufficient to amortize the UAAL over 49 years on an actuarial value of assets basis. As a result, the current contribution rates are expected to eliminate the UAAL for JRS2 in 49 years based on the current benefit provisions and actuarial assumptions. However, it is important to note that assuming the market value of assets earns 8% per year, JRS-2 is projected to become insolvent in approximately 90 years.

Section 840.106 of the Texas Government Code limits the modifications to JRS-2 that would, essentially, increase benefits or lower contributions to the trust unless the current level of benefits and contributions are considered actuarially sound. Section 840.106 defines actuarially sound as a retirement system that is receiving a total contribution rate sufficient to cover the normal cost, administrative expenses, and amortize the UAAL over a period of 31 years, or less. Based on the actuarial valuation as of August 31, 2016, the actuarially sound contribution (ASC) rate for JRS-2 is 23.48% of payroll.

As noted, the ASC is currently calculated based on a 31-year open amortization period. This means that the ASC contribution will always be calculated with the same 31-year period and the UAAL would never completely disappear. Even though the contributions to JRS-2 are not based on this ASC, the Board may want to consider adopting a funding policy that includes an ultimate goal of

eliminating the UAAL by a certain date. This type of funding policy will allow the Board to better assess the level of contributions received from the employers and the State.

System Assets

This report contains several tables that summarize key information with respect to the JRS-2 assets.

The total market value of assets increased from \$364.5 million to \$381.1 million as of August 31, 2016. Table 5 reconciles the changes in the fund during the year. Total contributions increased slightly from \$17.9 million to \$18.1 million, due primarily to the scheduled increase in the member contribution rate from 6.90% to 7.20% (effectively, 6.87% to 7.16% for JRS-2 due to members that elected to cease contributing). Contributions for fiscal year 2016 are expected to increase again primarily due to further scheduled increases in the member contribution rate to 7.50% (effectively, 7.44% due to members that elected to cease contributing).

Table 6 shows the development of the actuarial value of assets. Rather than use the JRS-2 market value of assets, the valuation reflects a smoothed asset value. This actuarial value is calculated by immediately reflecting 20% of the difference between the expected actuarial value and the current market value. The actuarial value is currently 3.8% more than the market value.

The approximate investment return for the fiscal year ending August 31, 2016 was 5.3% when measured on market value and 7.0% when measured on actuarial value. Table 7 shows a history of return rates for the past ten years. The JRS-2 ten-year average market return, net of investment expenses as reported by the ERS Master Trust Custodian, is 5.8%.

Table 8 provides a history of the contributions paid into JRS-2 and the administrative expenses and benefit payments that have been paid out of JRS-2. This table shows that administrative expenses and benefits paid exceeded contributions received by \$1.6 million (or 0.4% of assets) in fiscal year 2015 and that amount was \$3.3 million (or 0.9% of assets) in fiscal year 2016. ERS should monitor this deficit as it could impact the future liquidity needs of JRS-2.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

The tables in Appendix III show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Development of Employer Cost

	August 31, 2016	August 31, 2015
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	\$ 78,238,000	\$ 80,352,000
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	78,238,000	80,352,000
2. Total Normal Cost Rate		
a. Gross normal cost rate	20.68%	20.90%
b. Administrative expenses	0.50%	0.50%
c. Total (Item 2a + Item 2b)	21.18%	21.40%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	\$ 300,182,639	\$ 286,075,055
b. Less: present value of future normal costs	(82,520,893)	(87,218,042)
c. Actuarial accrued liability	\$ 217,661,746	\$ 198,857,013
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	\$ 196,779,287	\$ 194,524,402
b. Inactive members	11,424,274	10,629,157
c. Active members (Item 3c)	217,661,746	198,857,013
d. Total	\$ 425,865,307	\$ 404,010,572
5. Actuarial Value of Assets	\$ 395,457,335	\$ 372,615,005
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	\$ 30,407,972	\$ 31,395,567
7. Amortization of UAAL Over 31 Years as a Level Percentage of Payroll	2.30%	2.39%
8. Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years (Item 2c + Item 7)	23.48%	23.79%
9. Allocation of Contribution Rate		
a. Employer rate	15.663%	15.663%
b. Member rate	7.44%	7.16%
c. Total contribution rate	23.103%	22.823%
d. Total normal cost rate	21.18%	21.40%
e. Available contribution rate to amortize UAAL	1.923%	1.423%
f. Total contribution rate	23.103%	22.823%
10. Funding period based on statutory contribution rates and Actuarial Value of Assets (years)	49	Never

Actuarial Present Value of Future Benefits

	August 31, 2016	August 31, 2015
1. Active Members		
a. Service Retirement	\$ 273,908,650	\$ 259,495,191
b. Disability Benefits	3,610,321	3,705,899
c. Death Before Retirement	10,766,912	10,607,029
d. Termination	11,896,756	12,266,936
e. Total	<u>\$ 300,182,639</u>	<u>\$ 286,075,055</u>
2. Inactive Members	\$ 11,424,274	\$ 10,629,157
3. Annuitants	\$ 196,779,287	\$ 194,524,402
4. Total Actuarial Present Value of Future Benefits	\$ 508,386,200	\$ 491,228,614

Analysis of Normal Cost

	<u>August 31, 2016</u>	<u>August 31, 2015</u>
1. Gross Normal Cost Rate		
a. Service Retirement	17.28%	17.44%
b. Disability Benefits	0.55%	0.55%
c. Death Before Retirement	0.77%	0.82%
d. Termination	<u>2.08%</u>	<u>2.09%</u>
e. Total	20.68%	20.90%
2. Administrative Expenses	<u>0.50%</u>	<u>0.50%</u>
3. Total Normal Cost	21.18%	21.40%
4. Less: Member Rate	<u>7.44%</u>	<u>7.16%</u>
5. Employer Normal Cost Rate	13.74%	14.24%

Historical Summary of Active Member Data

Valuation as of August 31, (1)	Active Members		Covered Payroll		Average Salary		Average Age (8)	Average Service (9)
	Number (2)	Percent Increase (3)	Annual Payroll (\$) (4)	Percent Increase (5)	\$ Amount (6)	Percent Increase (7)		
2008	518	0.6%	66,110,000	2.3%	127,625	1.7%	54.9	9.4
2009	533	2.9%	67,967,500	2.8%	127,519	-0.1%	55.2	9.0
2010	539	1.1%	68,755,000	1.2%	127,560	0.0%	55.8	9.5
2011	546	1.3%	69,655,000	1.3%	127,573	0.0%	55.7	9.2
2012	541	-0.9%	68,777,500	-1.3%	127,130	-0.3%	56.5	10.0
2013	545	0.7%	69,515,000	1.1%	127,550	0.3%	56.5	9.6
2014	554	1.7%	79,122,500	13.8%	142,820	12.0%	57.3	10.2
2015	563	1.6%	80,352,000	1.6%	142,721	-0.1%	56.9	9.3
2016	548	-2.7%	78,238,000	-2.6%	142,770	0.0%	57.4	10.1

Reconciliation of Plan Net Assets

	Year Ending	
	August 31, 2016 (1)	August 31, 2015 (2)
1. Market value of assets at beginning of year	\$ 364,510,248	\$ 365,290,077
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	\$ 12,374,200	\$ 12,457,095
ii. Member (including penalty interest)	5,754,349	5,464,997
iii. Total	\$ 18,128,549	\$ 17,922,092
b. Net investment income	\$ 19,861,581	\$ 820,005
c. Total revenue	\$ 37,990,130	\$ 18,742,097
3. Disbursements for the year		
a. Benefit payments and refunds	21,154,764	\$ 19,238,317
b. Administrative expenses	226,106	283,609
c. Total expenditures	21,380,870	19,521,926
4. Increase in net assets (Item 2c - Item 3c)	\$ 16,609,260	\$ (779,829)
5. Market value of assets at end of year (Item 1 + Item 4)	\$ 381,119,508	\$ 364,510,248

Development of Actuarial Value of Assets

	<u>Year Ending August 31, 2016</u>
1. Actuarial value of assets at beginning of year	\$ 372,615,005
2. Net new investments	
a. Contributions for the year (Table 5)	\$ 18,128,549
b. Disbursements for the year (Table 5)	<u>(21,380,870)</u>
c. Subtotal	(3,252,321)
3. Assumed investment return rate	8.00%
4. Expected return	\$ 29,679,108
5. Expected actuarial value of assets at end of year (Item 1 + Item 2c + Item 4)	\$ 399,041,792
6. Market value of assets at end of year	\$ 381,119,508
7. Excess earnings/(shortfall) (Item 6 - Item 5)	\$ (17,922,284)
8. Excess earnings/(shortfall) recognized (20% x Item 7)	\$ (3,584,457)
9. Actuarial value of assets (Item 5 + Item 8)	\$ 395,457,335
10. Estimated rate of return	7.0%
11. Actuarial value as percentage of market value	103.8%

History of Investment Return Rates

Year Ending August 31 of	Market*	Actuarial
(1)	(2)	(3)
2003	9.2%	5.2%
2004	11.7%	6.2%
2005	12.7%	7.5%
2006	8.8%	7.7%
2007	13.9%	8.8%
2008	-4.6%	5.9%
2009	-6.6%	3.5%
2010	6.7%	4.1%
2011	12.6%	5.7%
2012	8.2%	7.6%
2013	10.1%	8.0%
2014	14.7%	9.3%
2015	0.5%	7.4%
2016	5.3%	7.0%
Average Returns		
Last Five Years:	7.7%	7.9%
Last Ten Years:	5.8%	6.7%

* Market Value Rates of Return provided by the ERS Master Trust Custodian.

History of Cash Flow

Year Ending August 31,	Contributions	Distributions and Expenditures			External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
		Benefit Payments and Refunds	Administrative Expenses	Total			
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
2007	15,034	(5,805)	(395)	(6,200)	8,834	217,665	4.1%
2008	15,102	(6,717)	(244)	(6,962)	8,141	215,041	3.8%
2009	15,579	(8,229)	(240)	(8,469)	7,110	205,730	3.5%
2010	15,632	(9,407)	(277)	(9,684)	5,948	225,265	2.6%
2011	16,224	(11,768)	(286)	(12,054)	4,170	259,624	1.6%
2012	8,321	(12,982)	(230)	(13,212)	(4,891)	295,913	-1.7%
2013	8,817	(14,869)	(228)	(15,098)	(6,281)	318,385	-2.0%
2014	17,406	(16,420)	(267)	(16,687)	719	365,290	0.2%
2015	17,922	(19,238)	(284)	(19,522)	(1,600)	364,510	-0.4%
2016	18,129	(21,155)	(226)	(21,381)	(3,252)	381,120	-0.9%

Dollar amounts in thousands

Column (7) = Column (2) + Column (6).

Total Experience Gain or Loss

Item (1)	Year Ending August 31, 2016 (2)	Year Ending August 31, 2015 (3)
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	\$ 31,395,567	\$ 37,855,797
2. Normal cost for the year (excluding administrative expenses)	16,793,568	16,243,849
3. Actual Administrative expenses	226,106	283,609
4. Contributions for the year (excluding service purchases)	(18,113,430)	(17,820,849)
5. Interest at 8%		
a. On UAAL	\$ 2,511,645	\$ 3,028,464
b. On normal cost	680,787	661,098
c. On contributions	(724,537)	(712,834)
d. Total	\$ 2,467,895	\$ 2,976,728
6. Assumption Change (Gains)/Losses	\$ 0	\$ 0
7. Legislative Changes	0	(13,986,651)
8. Expected UAAL (Sum of Items 1 through 7)	32,769,706	25,552,483
9. Actual UAAL	30,407,972	31,395,567
10. Total (gain)/loss for the year (Item 9 - Item 8)	\$ (2,361,734)	\$ 5,843,084
B. Source of gains and losses		
	<u>% of AAL</u>	
11. Asset (gain)/loss for the year	0.84%	\$ 3,584,457
12. Pay Increases (Less)/Greater than Expected	0.00%	0
13. Non-Retired Demographic (Gains)/Losses	1.83%	(7,807,497)
14. Post-Retirement Mortality (Gains)/Losses	0.21%	885,212
15. Other Demographic (Gains)/Losses	<u>0.23%</u>	<u>976,094</u>
16. Total (Sum of Items 11 through 15)	0.55%	\$ (2,361,734)

Solvency Test

Actuarial Accrued Liability and Percent of Active Member Payroll for:

August 31,	Accumulated Member Contributions Including Interest		Retirees and Beneficiaries Currently Receiving Benefits		Employer Financed Portion of Vested and Nonvested Benefits		Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Assets		
	(1)	% of Payroll	(2)	% of Payroll	(3)	% of Payroll		(1)	(2)	(3)
2007	\$ 44,615	69%	\$ 62,008	96%	\$ 114,261	177%	\$ 211,933	100%	100%	92%
2008	50,408	76%	63,792	96%	124,898	189%	232,891	100%	100%	95%
2009	51,733	76%	85,845	126%	117,991	174%	248,279	100%	100%	94%
2010	57,347	83%	92,253	134%	132,160	192%	264,515	100%	100%	87%
2011	57,769	83%	120,798	173%	121,596	175%	283,935	100%	100%	87%
2012	63,678	93%	122,571	178%	128,950	187%	300,433	100%	100%	89%
2013	64,435	93%	147,052	212%	147,571	212%	318,026	100%	100%	72%
2014	69,364	88%	153,383	194%	163,539	207%	348,431	100%	100%	77%
2015	67,428	84%	194,524	242%	142,059	177%	372,615	100%	100%	78%
2016	73,450	94%	196,779	252%	155,636	199%	395,457	100%	100%	80%

Note : Dollar amounts in thousands

APPENDICES

SUMMARY OF PLAN PROVISIONS FOR JUDICIAL RETIREMENT SYSTEM, PLAN 2

Membership

Membership is mandatory at the first day of employment for eligible persons who, after August 31, 1985, became a judge, justice, or commissioner of:

- (1) The Supreme Court;
- (2) The Court of Criminal Appeals;
- (3) Courts of Appeals;
- (4) District Courts; or
- (5) Specified commissioners to a court.

Member Contributions

Judicial officers contribute a percentage of their compensation based on the following schedule:

- a. Fiscal year 2014: 6.60%
- b. Fiscal year 2015: 6.90%
- c. Fiscal year 2016: 7.20%
- d. Fiscal year 2017 and beyond: 7.50%

Beginning in fiscal year 2018, the 7.50% will be reduced one-tenth of one percent for each one-tenth of one percent that the State contribution rate for the fiscal year to which the service relates is less than the State contribution rate established for the 2015 fiscal year.

Contributions cease after member has accrued 20 years of service credit or has served 12 years on an appellate court and attained the Rule of 70. However, these members may elect to make contributions for each subsequent year of service credit and receive the additional benefit accruals.

Member contributions accumulate interest at 5.00% per year through December 31, 2013 and 2.00% interest per year, thereafter.

State of Texas Contributions

State contributions are set biennially by the legislature. For fiscal years 2016 and 2017, the State will contribute 15.663% of payroll.

Final Compensation

The State salary being paid at the time the member retires to a judge of a court of the same classification as the last court to which the member was elected or appointed.

Creditable Service

The types of service creditable in JRS-2 are membership service, military service and equivalent membership service. Equivalent membership service includes: previously cancelled service, service not previously established, waiting period service, and additional purchased service.

Standard Service Retirement Annuity

1. Eligibility:
 - a. Age 65 and ten years of service if currently holding judicial office; or
 - b. Age 65 and twelve years of service; or
 - c. Twenty years of service, regardless of age; or
 - d. Member's age plus service credited in the retirement system equals 70 (Rule of 70), if the member has served at least twelve years on an appellate court.
2. Benefits: Monthly annuity payable for life, equal to 50% of Final Compensation at retirement, increased by 10% of Final Compensation at retirement if the member has not been out of judicial office for one year or the member has served as a visiting judge within one year of benefit commencement.

Members who elect to continue their contributions after 20 years of service credit, or after serving 12 years on an appellate court and attaining the Rule of 70, can earn up to a maximum total benefit of 90% of Final Compensation. For each such year, the service retirement annuity would be increased by 2.3% of the Final Compensation at retirement.

3. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Early Commencement of the Standard Service Retirement Annuity

1. Eligibility:
 - a. Age 60 and ten years of service if currently holding judicial office; or
 - b. Age 60 and twelve years of service.
2. Benefits: Standard Service Retirement Annuity with the 50% replaced by the following percentages based on age at retirement:

<u>Attained Age</u>	<u>Percent of Final Compensation</u>
60	40.0%
61	41.7
62	43.6
63	45.6
64	47.7

3. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Standard Non-Occupational Disability Annuity

1. **Eligibility**: Seven years of service and Chief Justice of the Supreme Court and the medical board must certify that the member is mentally or physically incapacitated for the further performance of regular judicial duties.
2. **Benefits**: Unreduced Standard Service Retirement Annuity.
3. **Normal Form of Payment**: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Death Benefit Plan (DBP) Annuity

1. **Eligibility**: Death of an active member with 10 years of service.
2. **Benefits**: Benefits are calculated as if the member had elected an optional form of payment, received a Standard Service Retirement Annuity, and died immediately thereafter. If the member dies before becoming eligible for a Standard Service Retirement Annuity, the benefit is reduced for early retirement from age 65.

Pre-Retirement Death Refund Alternative

A refund of accumulated contributions is payable in cases of pre-retirement death where the member did not meet the eligibility requirements for a Death Benefit Plan Annuity, or the eligible beneficiary chooses to receive a refund of the member account balance in lieu of an annuity. This amount is increased by 5% of the member's account balance at death, times full years of service credit at death, to a maximum of 100%.

Deferred Service Retirement Annuity

1. **Eligibility**: Twelve or more years of service and Member Contributions have not been refunded.
2. **Benefits**: The Standard Service Retirement Annuity earned as of the date of termination; provided that the annuity may be increased under the provisions of the proportionate retirement program if the member becomes a contributing member of another system that participates in the program.
3. **Payments may commence at**: Age 65; or a reduced amount as early as age 60.
4. **Normal Form of Payment**: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Refund of Accumulated Contributions

A refund of accumulated contributions is payable in cases where a terminated member did not meet the eligibility requirements for an annuity, or a terminated member chooses to receive a refund of his or her account balance in lieu of an annuity.

Limit on Plan Modifications

According to Section 840.106 of the Texas Government Code – a rate of member or State contributions to or a rate of interest required for the establishment of credit in the retirement system may not be reduced or eliminated, a type of service may not be made creditable in the retirement system, a limit on the maximum permissible amount of a type of creditable service may not be removed or raised, a new monetary benefit payable by the retirement system may not be established, and the determination of the amount of a monetary benefit from the system may not be increased, if, as a result of the particular action, the time, as determined by an actuarial valuation, required to amortize the UAAL of the retirement system would be increased to a period that exceeds 30 years by one or more years.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation that covered the five-year period from September 1, 2006 through August 31, 2011.

I. Valuation Date

The valuation date is August 31 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

Because the employer contribution rate is set by statute, the actuarial valuation is used to determine the adequacy of the current State contribution rate and describe the current financial condition of JRS-2.

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the first step is to determine the contribution rate (level as a percentage of pay) required to provide the benefits to each member, or the normal cost rate. The normal cost rate consists of two pieces: (i) the member's contribution rate, and (ii) the remaining portion of the normal cost rate which is the employer's normal cost rate.

The Unfunded Actuarial Accrued Liability (UAAL) is the liability for future benefits which is in excess of (i) the actuarial value of assets, and (ii) the present value of future normal costs. The employer contribution provided in excess of the employer normal cost is applied to amortize the UAAL.

The funding period is calculated as the number of years required to fully amortize the UAAL, assuming that: (a) future market earnings, net of investment-related expenses, will equal 8.00% per year, (b) there will be no liability gains/losses or changes in assumptions, (c) the number of active members will remain unchanged, (d) active members who leave employment will be replaced by new entrants each year, and (e) State contributions will remain the same percentage of payroll as the current fiscal year.

The Entry Age actuarial cost method is an "immediate gain" method (i.e., experience gains and losses are separately identified as part of the UAAL). However, they are amortized over the same period applied to all other components of the UAAL.

III. Actuarial Value of Assets

The actuarial value of assets is determined as the expected value of plan assets as of the valuation date plus 20% of the difference between the market-related value and the expected value. The expected value equals the actuarial value of plan assets as of the prior valuation date, plus contributions, less benefit payments and administrative expenses, all accumulated at the assumed rate of interest to the current valuation date.

IV. Actuarial Assumptions

Investment Return: 8.00% per year, net of investment-related expenses (composed of an assumed 3.50% inflation rate and a 4.50% real rate of return)

Administrative Expenses: 0.50% of valuation payroll per year

Salary Increases: 3.50% per year; total liabilities for this valuation reflect all known legislative salary increases for the biennium.

Payroll Growth: 3.50% per year, compounded annually (for projecting valuation payroll).

Post-Retirement Benefit Increases: None

Age and Service Assumptions and Methods:

Rounding of ages:

Current and projected ages rounded to the nearest year are used for all purposes – determining eligibility for benefits, present value factors, early retirement reductions, option factors, salary increase rates, and decrements.

Benefit Service:

Current Benefit Service in years and months as of the valuation date was provided by ERS. This service plus Future Earned Service, and Eligibility Service at Retirement were used to project benefit amounts.

Future Earned Service:

Active members were assumed to earn one additional year of service credit in each future year they are assumed to make contributions.

Service for Decrements:

The method of calculating JRS Decrement Service on the valuation date is shown below. Decrement service is assumed to increase by one year for each future year employed.

- Valuation Age: Age rounded to the nearest year on valuation date
- JRS Service: Years and months of all JRS service on the valuation date
- Date 1: (Valuation Date) minus (JRS Service)
- JRS Decrement Service: (Valuation Age) minus (age rounded to nearest year on Date 1)
- JRS Funding Entry Age (age at hire for the entry age normal cost method): (Valuation Age) minus (JRS Decrement Service)

Decrement Timing: All decrements – mortality, service retirement, disability retirement, and termination of employment for reasons other than death or retirement – are assumed to occur at the beginning of the valuation year.

Mortality Decrements:

Active Members, Service Retirees, Beneficiaries, and Inactive Members

1994 Group Annuity Mortality with no setback for males and set forward two years for females. Generational mortality improvements in accordance with Scale AA are projected from the year 2000.

Disability Retirees

RP-2000 Disabled Retiree Mortality set forward six years for males and setback one year for females.

Service Retirement Decrements: Graded tables based on JRS-1 and JRS-2 experience.

JRS Decrement Service is used to determine when the rates apply:

- Age 65 with ten years of service, if member currently holding judicial office
- Age 65 with twelve years of service
- Twenty years of service
- Age plus service equal to or greater than 70, if member has at least twelve years of service on an appellate court

Annual Service Retirement Rates per 100 Participants	
Age	
50 - 69	20
70 - 74	25
75+	100

Members are assumed to retire when they are projected to have accrued the maximum benefit of 90% of applicable salary, regardless of whether the member elects to continue contributing.

Disability Retirement Decrements: Graded Tables Based on ERS Experience

JRS Decrement Service is used to determine when the rates apply:

- The rates do not apply before someone is eligible for the benefit.
- Service greater than zero is required for occupational disability retirement.
- Seven years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the member has attained age 60.

Sample rates for eligible members:

Annual Disability Rates per 100 Participants		
Age	Males	Females
30	0.0366	0.0180
35	0.0867	0.0589
40	0.0999	0.1195
45	0.1369	0.1940
50	0.1979	0.2762
55	0.3302	0.4651

99% of the disability rates stated above are assumed to be attributable to non-occupational disabilities and 1% are assumed to be attributable to occupational disabilities. No occupational disabilities are assumed for judges.

Termination Decrements for Reasons Other Than Death or Retirement: Based on JRS-1 and JRS-2 Experience

Four per 100 participants for members not eligible for service retirement.

Rates of Withdrawal of Employee Contributions

Members eligible to receive a deferred annuity are assumed not to withdraw their contributions. Members not eligible to receive a deferred annuity are assumed to withdraw their contributions.

Percentage of Members Electing Various Benefit Options:

Sex/ Benefit	Standard Life Annuity	Option 1	Option 4
Male Member			
Disability	50%	40%	10%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	75%	25%
Female Member			
Disability	75%	20%	5%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	50%	50%

Beneficiary Characteristics: Male member is assumed to be three years older than female beneficiary; and female member is assumed to be the same age as male beneficiary.

Census Data and Assets

- The valuation was based on members of JRS-2 as of August 31, 2015 and does not take into account future members.
- All census data was supplied by ERS and was subject to reasonable consistency checks.
- There were data elements that were modified for some members as part of the valuation in order to make the data complete. However, the number of missing data items was immaterial.
- Asset data was supplied by ERS.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)(17).
- Valuation payroll (earnings applied to the current valuation year) is the expected payroll for the fiscal year following the valuation date. It is based on reported payroll determined from August member contributions increased to reflect the across-the-board salary increases appropriated by the State legislature, effective on or after September 1, and projected according to the actuarial assumptions for the upcoming fiscal year.
- No liability was included for benefits which are funded by special State appropriations.

DETAILED SUMMARIES OF MEMBERSHIP DATA

<u>TABLE NUMBER</u>	<u>PAGE</u>	
A	31	SUMMARY OF MEMBERSHIP DATA
B	32	ACTIVE MEMBERS: DISTRIBUTION BY AGE AND SERVICE
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TABLE A
SUMMARY OF MEMBERSHIP DATA

Active Members

Item	Male	Female	Total
Number of Members	356	192	548
Average Annual Salaries	\$ 142,402	\$ 143,453	\$ 142,770
Average Age	58.5	55.4	57.4
Average Service	10.2	10.0	10.1

Inactive Members

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	16	\$ 1,177,200	73,575	57.5
Service Retirees and Beneficiaries	329	\$ 20,844,540	63,357	69.3
Disability Retirees	2	\$ 159,000	79,500	64.2
Total	347	\$ 22,180,740	\$ 63,921	68.7

Non-vested Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Participants	150	\$ 4,936,491	\$ 32,910	61.3

TABLE B
ACTIVE MEMBERS
DISTRIBUTION BY AGE AND SERVICE

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25										
25 - 29										
30 - 34										
35 - 39	10 \$ 140,000	1 \$ 140,000								11 \$ 140,000
40 - 44	23 \$ 141,826	13 \$ 142,154								36 \$ 141,944
45 - 49	41 \$ 143,415	27 \$ 140,519	11 \$ 146,364							79 \$ 142,835
50 - 54	26 \$ 142,692	39 \$ 141,436	12 \$ 143,500	15 \$ 142,800	2 \$ 140,000					94 \$ 142,234
55 - 59	29 \$ 142,897	17 \$ 140,824	19 \$ 142,947	24 \$ 145,250	9 \$ 141,556					98 \$ 143,000
60 - 64	15 \$ 141,867	37 \$ 140,757	20 \$ 142,925	21 \$ 144,905	18 \$ 148,833	6 \$ 147,417				117 \$ 143,598
Over 64	11 \$ 140,000	28 \$ 141,000	24 \$ 143,021	22 \$ 144,568	17 \$ 142,471	10 \$ 145,600	1 \$ 140,000			113 \$ 142,646
Total	155 \$ 142,348	162 \$ 141,037	86 \$ 143,477	82 \$ 144,530	46 \$ 144,674	16 \$ 146,281	1 \$ 140,000			548 \$ 142,770

TABLE C

**RETIRED AND BENEFICIARY MEMBERSHIP DATA
 DISTRIBUTION BY AGE AND CATEGORY**

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees			
Under 60	20	1,212,000	60,600
60 - 64	66	4,294,404	65,067
65 - 69	85	5,734,512	67,465
70 - 74	71	4,474,956	63,028
75 - 79	36	2,240,808	62,245
Over 79	16	912,720	57,045
Total	294	18,869,400	64,182
Beneficiaries			
Under 60	4	205,344	51,336
60 - 64	7	465,348	66,478
65 - 69	5	266,736	53,347
70 - 74	7	399,132	57,019
75 - 79	3	175,824	58,608
Over 79	9	462,756	51,417
Total	35	1,975,140	56,433
Disabled Retirees			
Under 60	0	0	0
60 - 64	1	75,000	75,000
65 - 69	1	84,000	84,000
70 - 74	0	0	0
75 - 79	0	0	0
Over 79	0	0	0
Total	2	159,000	79,500
Grand Total	331	21,003,540	63,455

GLOSSARY

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or Funding Method: A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ARC.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

- a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
- b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
- c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those 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. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or Valuation Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ARC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC): A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decremets: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period: The term "Funding Period" is used in two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ARC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: 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. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

JUDICIAL RETIREMENT SYSTEM OF TEXAS, PLAN 1
ANNUAL ACTUARIAL VALUATION
AS OF AUGUST 31, 2016

November 17, 2016

Board of Trustees
Employees Retirement System of Texas
200 East 18th Street
Austin, TX 78701

Re: Actuarial Valuation as of August 31, 2016

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Judicial Retirement System of Texas, Plan 1 (JRS-1) as of August 31, 2016. This report was prepared at the request of the Board and is intended for use by ERS staff and those designated or approved by the Board. This report may be provided to parties other than ERS only in its entirety and only with the permission of the Board.

Actuarial Valuation

JRS-1 is not advanced funded as the actual benefit payments are funded through legislative appropriations. As a result, the primary purpose for the annual actuarial valuation of JRS-1 is to determine the financial statement disclosure and reporting information as provided by the Governmental Accounting Standards Board. The applicable disclosure and reporting information for JRS-1 can be found in ERS' Comprehensive Annual Financial Report for the fiscal year ending August 31, 2016.

The purpose of this report is also to document the plan's Actuarial Accrued Liability and membership demographics as well as provide a projection of the appropriations needed to cover the actual plan benefit payments.

Plan Provisions

There were other changes to the plan provisions during the past year. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in these actuarial valuations were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation completed by Buck Consultants that covered the five-year period from September 1, 2006 through August 31, 2011. We did not perform an independent analysis of the actuarial assumptions. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of JRS-1.

The actuarial valuation as of August 31, 2016 incorporates all known across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, judges are not scheduled to receive an increase on September 1, 2016.

The interest rate used in this valuation reflects a composite expected rate of return based on all pension plans of the Employees Retirement System of Texas. As this pension plan has no assets, if an expected rate of return was separately determined for the JRS-1, the interest rate used would be significantly less than 8% per year.

The results of the actuarial valuations are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the liabilities of JRS-1 is outside the scope of this actuarial valuation.

The current actuarial assumptions are outlined in Appendix II of this report.

Data

The valuation was based upon information as of August 31, 2016, furnished by ERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Appendix III shows key census statistics for the various groups included in the valuation.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. They are all Enrolled Actuaries, Fellows of the Society of Actuaries, and Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned are experienced in performing valuations for large public retirement systems.

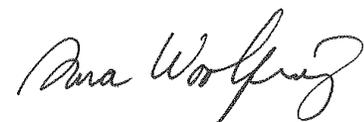
Respectfully submitted,
Gabriel, Roeder, Smith & Company



R. Ryan Falls, FSA, EA, MAAA
Senior Consultant



Joseph P. Newton, FSA, EA, MAAA
Senior Consultant



Dana Woolfrey, FSA, EA, MAAA
Consultant

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SUMMARY OF PLAN OBLIGATIONS

	August 31, 2016	August 30, 2015
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	\$ 1,470,000	\$ 1,470,000
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	1,470,000	1,470,000
2. Total Normal Cost Rate		
a. Gross normal cost rate	26.35%	25.22%
b. Administrative expenses	0.00%	0.00%
c. Total (Item 2a + Item 2b)	26.35%	25.22%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	\$ 11,130,751	\$ 10,605,239
b. Less: present value of future normal costs	(297,307)	(361,109)
c. Actuarial accrued liability	\$ 10,833,444	\$ 10,244,130
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	\$ 207,524,126	\$ 212,882,207
b. Inactive members	112	44,319
c. Active members (Item 3c)	10,833,444	10,244,130
d. Total	\$ 218,357,682	\$ 223,170,656
5. Actuarial Value of Assets	\$ 0	\$ 0
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	\$ 218,357,682	\$ 223,170,656

SUMMARY OF PROJECTED PAYMENTS

The following chart illustrates the outlook of the benefit payments and contributions of JRS-1 over the next 10 years:

Fiscal Year	Projected Benefit Payments	Projected Member Contributions	Net Projected Appropriation
2017	\$ 25,074,643	\$ 20,855	\$ 25,053,788
2018	24,720,741	16,362	24,704,379
2019	24,283,519	12,831	24,270,688
2020	23,671,262	9,702	23,661,560
2021	23,017,447	7,320	23,010,127
2022	22,330,313	5,511	22,324,802
2023	21,631,499	2,240	21,629,259
2024	20,890,846	1,683	20,889,163
2025	20,050,986	0	20,050,986
2026	19,267,271	0	19,267,271

The projections are based on the same assumptions, methods and provisions used for the August 31, 2016 valuation, which include known across-the-board pay increases budgeted by the State Legislature and the assumptions adopted by the Board in February 2013.

The projected benefit payments for JRS-1 are expected to slowly decline over time because the reduction in benefits due to the mortality of current retirees will exceed the expected benefit increases and the new benefits payable to current active members. Note that the projected benefit payments assume an across-the-board pay increase of 0% as of September 1, 2016, and 3.5% per year beginning September 1, 2017 in accordance with the valuation assumptions.

LIABILITY BASED ON MUNICIPAL BOND RATE

Since there are no assets held in trust to pay the benefits of JRS-1, another reasonable measure of the plan’s obligation would be to calculate the liability based on an investment return assumption, or discount rate, that reflects the expected return on the assets that will be used to pay benefits. In this case, the assets that will be used to pay benefits are the general funds of the State of Texas.

As of August 31, 2016, the Actuarial Accrued Liability of JRS-1 is \$328,044,409 based on a municipal bond rate of 2.84%.

The source of the municipal bond rate is the “20-Bond GO Index”, which is the Bond Buyer Index, general obligation, 20 years to maturity, mixed quality. In describing this index, the Bond Buyer notes that the bonds’ average credit quality is roughly equivalent to Moody’s Investors Service’s Aa2 rating and Standard & Poor’s Corp.’s AA. The rate shown is as of the most recent date available on or before the measurement date.

SUMMARY OF PLAN PROVISIONS FOR JUDICIAL RETIREMENT SYSTEM, PLAN 1

Membership

Membership is mandatory at the first day of employment for eligible persons who, before August 31, 1985, became a judge, justice, or commissioner of:

- (1) The Supreme Court;
- (2) The Court of Criminal Appeals;
- (3) Courts of Appeals;
- (4) District Courts; or
- (5) Specified commissioners to a court.

Member Contributions

Section 835.101 of the Texas Government Code requires members of JRS-1 to contribute the same amount as a member of the employee class of the Employees Retirement System of Texas. As a result, judicial officers contribute 9.50% of their compensation beginning in fiscal year 2016.

The ultimate member contribution rate may be subject to the State maintaining a certain level of contributions to the Employees Retirement System of Texas relative to the State's contribution for fiscal year 2017.

Contributions cease after member has accrued 20 years of service credit. However, these members may elect to make contributions for each subsequent year of service credit and receive the additional benefit accruals.

Member contributions accumulate interest at 5.00% per year through December 31, 2013 and 2.00% per year, thereafter.

State of Texas Contributions

Appropriations as needed to cover actual benefit payments.

Creditable Service

The types of service creditable in JRS-1 are membership service, military service and equivalent membership service. Equivalent membership service includes: previously cancelled service, service not previously established, waiting period service, and additional purchased service.

Standard Service Retirement Annuity

1. Eligibility:
 - a. Age 65 and ten years of service if currently holding judicial office; or
 - b. Age 65 and twelve years of service; or
 - c. Twenty years of service, regardless of age; or
 - d. Member's age plus service credited in the retirement system equals 70 (Rule of 70), if the member has served at least twelve years on an appellate court.
2. Benefits: Monthly annuity payable for life, equal to 50% of the State salary, as adjusted from time to time, being paid to a judge of a court of the same classification as the last court on which the member served before retirement. The 50% is increased to 60% if the member has not been out of judicial office for one year or the member has served as a visiting judge within one year of benefit commencement.

Members who elect to continue their contributions after 20 years of service credit could do so for up to an additional 13 years of service. For each such year, the Standard Service Retirement Annuity would be increased by 2.3% of the applicable State salary.

3. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Early Commencement of the Standard Service Retirement Annuity

1. Eligibility:
 - a. Age 60 and ten years of service if currently holding judicial office; or
 - b. Age 60 and twelve years of service.
2. Benefits: Standard Service Retirement Annuity with the 50% replaced by the following percentages based on age at retirement:

<u>Attained Age</u>	<u>Percent of Applicable State Salary</u>
60	40.0%
61	41.7
62	43.6
63	45.6
64	47.7

3. Normal Form of Payment: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Standard Non-Occupational Disability Annuity

1. **Eligibility**: Seven years of service and Chief Justice of the Supreme Court and the medical board must certify that the member is mentally or physically incapacitated for the further performance of regular judicial duties.
2. **Benefits**: Unreduced Standard Service Retirement Annuity.
3. **Normal Form of Payment**: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Death Benefit Plan (DBP) Annuity

1. **Eligibility**: Death of an active member with 10 years of service.
2. **Benefits**: Benefits are calculated as if the member had elected an optional form of payment, received a Standard Service Retirement Annuity, and died immediately thereafter. If the member dies before becoming eligible for a Standard Service Retirement Annuity, the benefit is reduced for early retirement from age 65.

Pre-Retirement Death Refund Alternative

A refund of accumulated contributions is payable in cases of pre-retirement death where the member did not meet the eligibility requirements for a Death Benefit Plan Annuity, or the eligible beneficiary chooses to receive a refund of the member account balance in lieu of an annuity.

Deferred Service Retirement Annuity

1. **Eligibility**: Twelve or more years of service and Member Contributions have not been refunded.
2. **Benefits**: The Standard Service Retirement Annuity earned as of the date of termination; provided that the annuity may be increased under the provisions of the proportionate retirement program if the member becomes a contributing member of another system that participates in the program.
3. **Payments may commence at**: Age 65; or a reduced amount as early as age 60.
4. **Normal Form of Payment**: Payable for the life of the member with any remaining member account balance paid at time of death. Survivorship options and partial lump-sum option are available on an actuarially equivalent basis.

Refund of Accumulated Contributions

A refund of accumulated contributions is payable in cases where a terminated member did not meet the eligibility requirements for an annuity, or a terminated member chooses to receive a refund of his or her account balance in lieu of an annuity.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on February 26, 2013 based on the experience investigation that covered the five-year period from September 1, 2006 through August 31, 2011.

I. Valuation Date

The valuation date is August 31 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the first step is to determine the contribution rate (level as a percentage of pay) required to provide the benefits to each member, or the normal cost rate. The normal cost rate consists of two pieces: (i) the member's contribution rate, and (ii) the remaining portion of the normal cost rate which is the employer's normal cost rate.

The Unfunded Actuarial Accrued Liability (UAAL) is the liability for future benefits which is in excess of (i) the actuarial value of assets, and (ii) the present value of future normal costs. The employer contribution provided in excess of the employer normal cost is applied to amortize the UAAL.

The Entry Age actuarial cost method is an "immediate gain" method (i.e., experience gains and losses are separately identified as part of the UAAL). However, they are amortized over the same period applied to all other components of the UAAL.

III. Actuarial Value of Assets

JRS-1 is not an advance funded plan. No asset smoothing method is applicable.

IV. Actuarial Assumptions

Investment Return: 8.00% per year, net of investment-related expenses (composed of an assumed 3.50% inflation rate and a 4.50% real rate of return)

Administrative Expenses: None assumed.

Salary Increases: 3.50% per year; total liabilities for this valuation reflect all known legislative salary increases for the biennium.

Payroll Growth: Not applicable.

Post-Retirement Benefit Increases: Benefits are assumed to increase 3.50% per year during retirement (each September 1), compounded annually, consistent with the assumed Salary Increases for a judge of a court of the same classification as the last court on which the member served before retirement. Increases are assumed to also occur during deferral periods (if any).

Age and Service Assumptions and Methods:

Rounding of ages:

Current and projected ages rounded to the nearest year are used for all purposes – determining eligibility for benefits, present value factors, early retirement reductions, option factors, salary increase rates, and decrements.

Benefit Service:

Current Benefit Service in years and months as of the valuation date was provided by ERS. This service plus Future Earned Service, and Eligibility Service at Retirement were used to project benefit amounts.

Future Earned Service:

Active members were assumed to earn one additional year of service credit in each future year they are assumed to make contributions.

Service for Decrements:

The method of calculating JRS Decrement Service on the valuation date is shown below. Decrement service is assumed to increase by one year for each future year employed.

- Valuation Age: Age rounded to the nearest year on valuation date
- JRS Service: Years and months of all JRS service on the valuation date
- Date 1: (Valuation Date) minus (JRS Service)
- JRS Decrement Service: (Valuation Age) minus (age rounded to nearest year on Date 1)
- JRS Funding Entry Age (age at hire for the entry age normal cost method): (Valuation Age) minus (JRS Decrement Service)

Decrement Timing: All decrements – mortality, service retirement, disability retirement, and termination of employment for reasons other than death or retirement – are assumed to occur at the beginning of the valuation year.

Mortality Decrements:

Active Members, Service Retirees, Beneficiaries, and Inactive Members

1994 Group Annuity Mortality with no setback for males and set forward two years for females. Generational mortality improvements in accordance with Scale AA are projected from the year 2000.

Disability Retirees

RP-2000 Disabled Retiree Mortality set forward six years for males and setback one year for females.

Service Retirement Decrements: Graded tables based on JRS-1 and JRS-2 experience.

JRS Decrement Service is used to determine when the rates apply:

- Age 65 with ten years of service, if member currently holding judicial office
- Age 65 with twelve years of service
- Twenty years of service
- Age plus service equal to or greater than 70, if member has at least twelve years of service on an appellate court

Annual Service Retirement Rates per 100 Participants	
Age	
50 - 69	20
70 - 74	25
75+	100

Members are assumed to retire when they are projected to have accrued the maximum benefit of 90% of applicable salary, regardless of whether the member elects to continue contributing.

Disability Retirement Decrements: Graded Tables Based on ERS Experience

JRS Decrement Service is used to determine when the rates apply:

- The rates do not apply before someone is eligible for the benefit.
- Service greater than zero is required for occupational disability retirement.
- Seven years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the member has attained age 60.

Sample rates for eligible members:

Annual Disability Rates per 100 Participants		
Age	Males	Females
30	0.0366	0.0180
35	0.0867	0.0589
40	0.0999	0.1195
45	0.1369	0.1940
50	0.1979	0.2762
55	0.3302	0.4651

99% of the disability rates stated above are assumed to be attributable to non-occupational disabilities and 1% are assumed to be attributable to occupational disabilities. No occupational disabilities are assumed for judges.

Termination Decrements for Reasons Other Than Death or Retirement: Based on JRS-1 and JRS-2 Experience

Four per 100 participants for members not eligible for service retirement.

Rates of Withdrawal of Employee Contributions

Members eligible to receive a deferred annuity are assumed not to withdraw their contributions. Members not eligible to receive a deferred annuity are assumed to withdraw their contributions.

Percentage of Members Electing Various Benefit Options:

Sex/ Benefit	Standard Life Annuity	Option 1	Option 4
Male Member			
Disability	50%	40%	10%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	75%	25%
Female Member			
Disability	75%	20%	5%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	50%	50%

Beneficiary Characteristics: Male member is assumed to be three years older than female beneficiary; and female member is assumed to be the same age as male beneficiary.

Census Data and Assets

- The valuation was based on members of JRS-1 as of August 31, 2016 and does not take into account future members.
- All census data was supplied by ERS and was subject to reasonable consistency checks.
- There were data elements that were modified for some members as part of the valuation in order to make the data complete. However, the number of missing data items was immaterial.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)(17).
- Valuation payroll (earnings applied to the current valuation year) is the expected payroll for the fiscal year following the valuation date. It is based on reported payroll determined from August member contributions increased to reflect the across-the-board salary increases appropriated by the State legislature, effective on or after September 1, and projected according to the actuarial assumptions for the upcoming fiscal year.
- No liability was included for benefits which are funded by special State appropriations.

SUMMARY OF MEMBERSHIP DATA

Active Members

Item	Male	Female	Total
Number of Members	10	0	10
Average Annual Salaries	\$ 147,000	N/A	\$ 147,000
Average Age	69.8	N/A	69.8
Average Service	30.0	N/A	30.0

Inactive Members

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	0	\$ 0	N/A	N/A
Service Retirees and Beneficiaries	374	\$ 25,063,884	67,016	80.2
Disability Retirees	0	\$ 0	N/A	N/A
Total	374	\$ 25,063,884	\$ 67,016	80.2

Non-vested Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Participants	2	\$ 112	\$ 56	71.8

GLOSSARY

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or Funding Method: A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ARC.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

- a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
- b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
- c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those 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. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or Valuation Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ARC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC): A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decremments: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period: The term "Funding Period" is used in two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ARC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: 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. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.