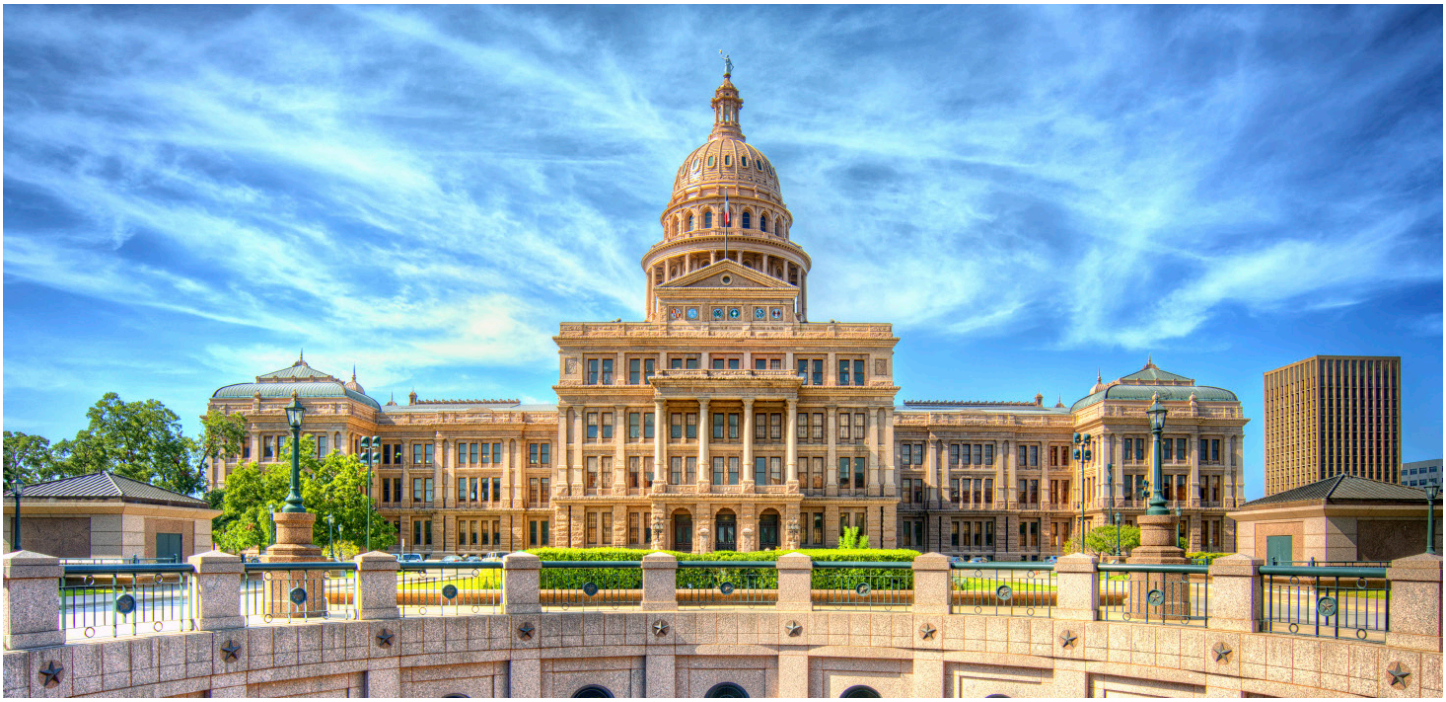


ACTUARIAL VALUATION REPORTS

For Pension Plans Administered by ERS

As of August 31, 2017 | Prepared by Gabriel Roeder Smith & Company

ERS
EMPLOYEES RETIREMENT SYSTEM OF TEXAS

Actuarial Valuations of the ERS Retirement Funds as of August 31, 2017
December 12, 2017

Ryan Falls, FSA, EA, MAAA

Joe Newton, FSA, EA, MAAA

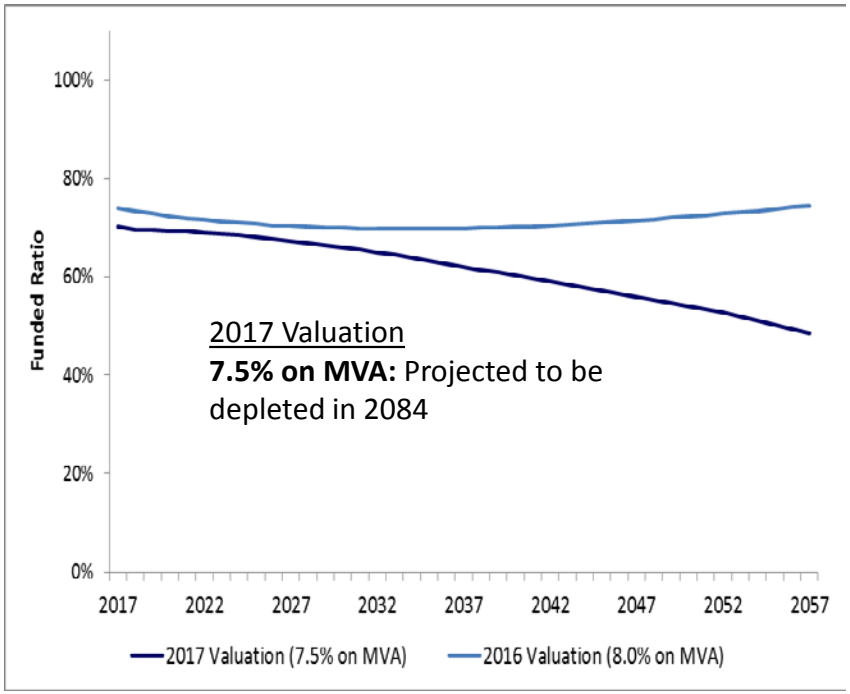
Agenda

- Purpose of Actuarial Valuation
- Summary of Changes in Actuarial Assumptions and Methods
- Impact of Asset Returns
- ERS Funding Valuation Results
- LECOSRF and JRS2 Funding Valuation Results
- Accounting Results at August 31, 2017

GRS Retirement Consulting

Where are we headed now?

- Recently revised expectations about important factors, such as future investment returns and life expectancy, altered the trajectory of the ERS Plan
- Additional contributions or benefit reductions are needed to improve the projected funded status based on the current benefits



2016 Valuation
8.0% on MVA: Projected to eliminate UAAL in 2089

Projections assume that all assumptions are met, including an 7.5% return (8.0% for 2016) on the market value of assets (unless otherwise noted), and future contributions continue at current levels.

Projections on market value and AVA are the same due to resetting the AVA to market as of August 31, 2017.

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Purpose of Actuarial Valuation

Purpose of Actuarial Valuation

- Prepared as of August 31, 2017 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

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Summary of Changes in Actuarial Assumptions and Methods

Summary of Assumption/Method Changes

- Major Changes
  - Reduced the nominal investment return assumption to 7.50%
  - Decreased core inflation assumption from 3.50% to 2.50%
  - Set the general wage inflation (GWI) assumption to 0.50% above inflation
    - Nominal GWI becomes 3.00% (Inflation + 0.50%)
  - For regular State employees, decreased individual salary increase assumption schedules by the same 1.00% as the change in core inflation
    - Nominal annual increase for long service employees decreased from 5.00% to 4.00%
  - For LECOs, decreased individual salary increase assumption schedules by 0.50%
    - 1.00% decrease due to change in core inflation but 0.5% increase in the individual merit and promotion component
    - Nominal annual increase for long service employees decreases from 5.00% to 4.50%
  - Updated mortality tables, including assumption for continued future mortality improvement
    - New assumption based on actual experience of ERS annuitants

Summary of Assumption/Method Changes

- Minor Changes
  - Changed the asset smoothing method to a traditional individual year deferral method, but allow direct offsetting of gains and losses
    - Reset the actuarial (smoothed) value market value as of August 31, 2017
    - New method to apply prospectively
  - Changed actuarial cost method to Individual EAN (from Ultimate EAN)
  - Reduced rates of disability and retirement
  - Slightly increased rates of termination
  - Increased administrative expense load from 0.25% of payroll to 0.33% for ERS
    - Lowered LECOSRF from 0.10% to 0.08% and lowered JRS2 from 0.50% to 0.33%

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Impact of Asset Returns

Asset Experience

- Asset returns
  - Market Value (gross): 12.15%
  - Market Value (net): 12.11%
  - Actuarial (or smoothed) Value: 2.8%
    - Primarily due to recognizing $2 billion in unrecognized losses from the prior asset smoothing method
    - Less than expected, thus creates a loss on the unfunded liability
- Gains on the market value
  - Helps offset a portion of liability losses due to assumption/ method changes

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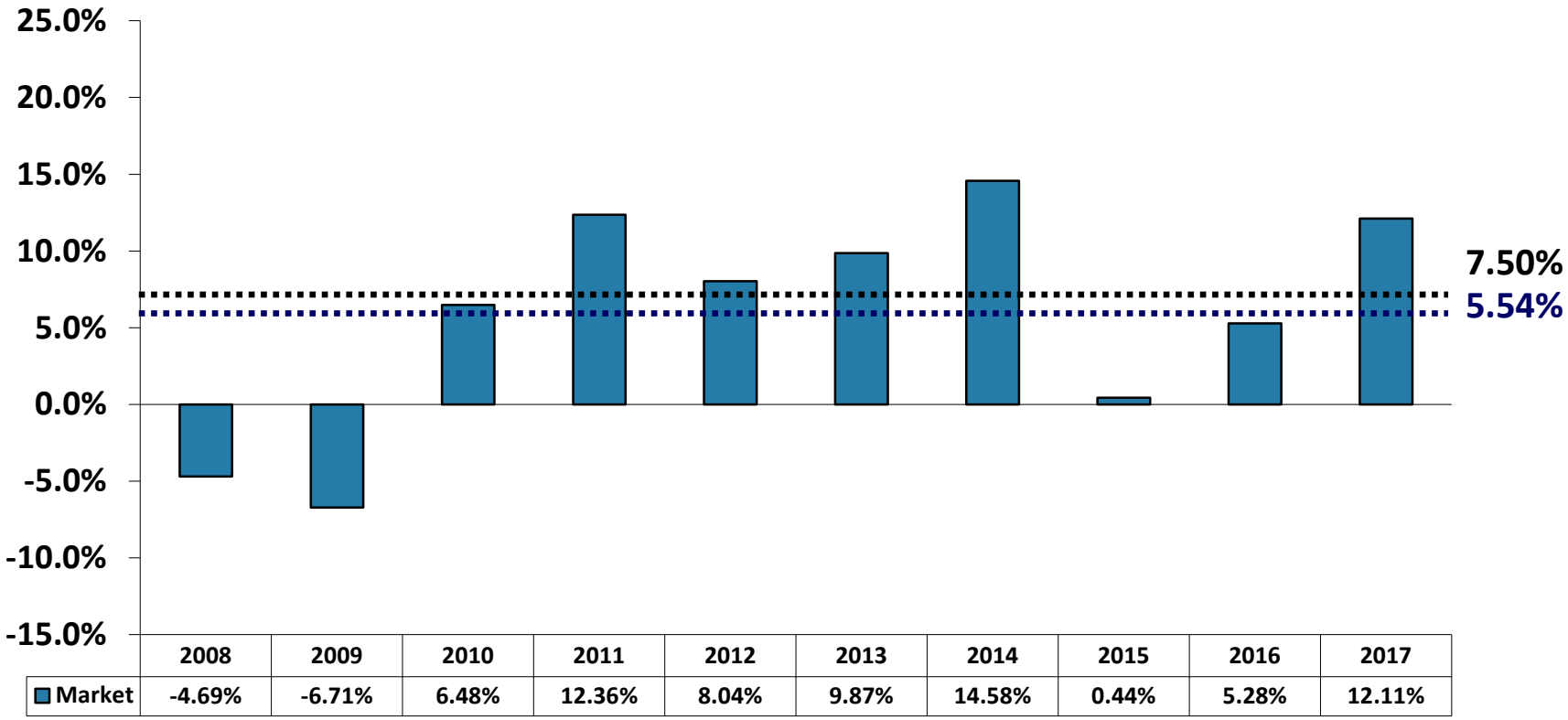
Estimated Yields Based on Market Value of Assets



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Market	-4.69%	-6.71%	6.48%	12.36%	8.04%	9.87%	14.58%	0.44%	5.28%	12.11%

8.34% average compound net return (on market value) over last 5 years.

5.54% average compound net return (on market value) over last 10 years.

6.41% average compound net return (on market value) over last 20 years.

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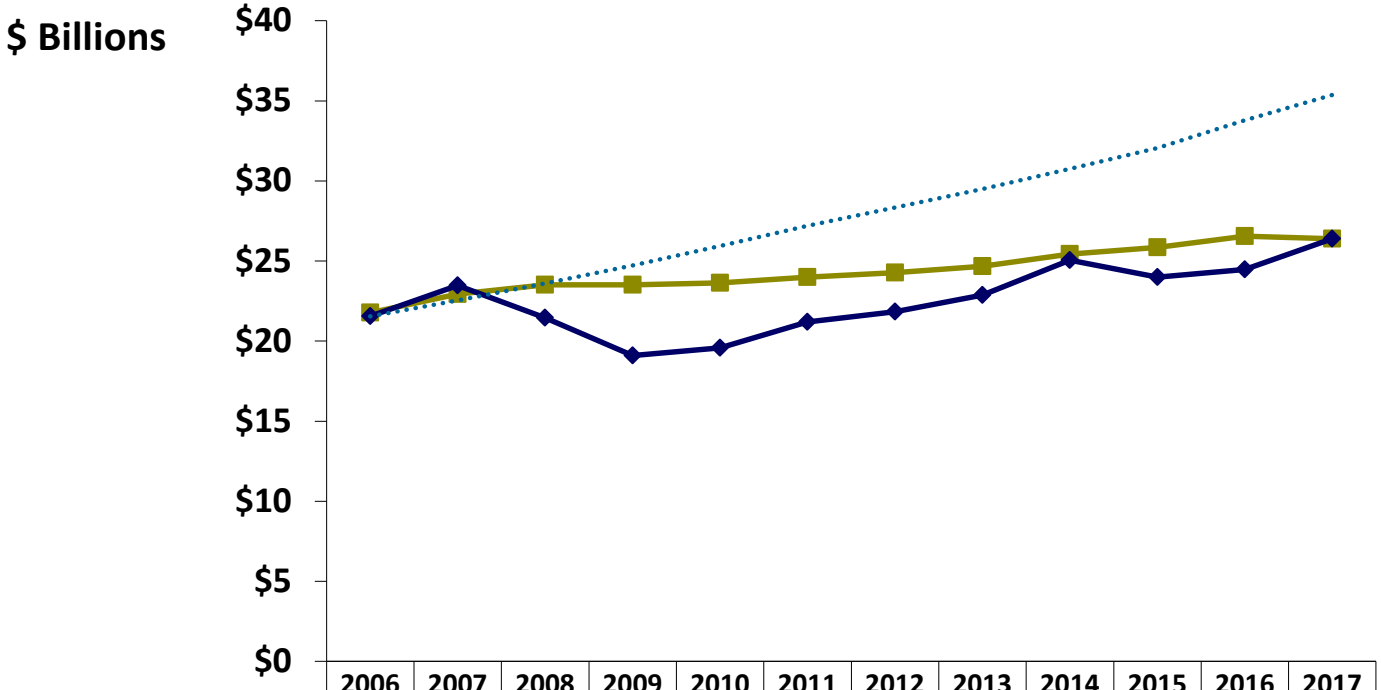
Actuarial, Market and Hypothetical* Values of Assets for ERS



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Actuarial	$21.8	$22.9	$23.5	$23.5	$23.6	$24.0	$24.3	$24.7	$25.4	$25.9	$26.6	$26.4
Market	$21.5	$23.5	$21.5	$19.1	$19.6	$21.2	$21.8	$22.9	$25.1	$24.0	$24.5	$26.4
Hypothetical*	$21.5	$22.6	$23.6	$24.7	$25.9	$27.2	$28.3	$29.5	$30.8	$32.1	$33.8	$35.4

* Hypothetical uses 2006 market value and projects forward using actual cash flows and investment returns consistent with actuarial assumptions in effect.

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ERS
Funding Valuation Results
at August 31, 2017

GRS Retirement Consulting

Funded Status (ERS)

($ in millions)

Actuarial Valuation as of August 31, 2017		
	AVA	**MVA**
Actuarial Accrued Liability	$37,630	$37,630
AVA / MVA	26,372	26,372
Unfunded Accrued Liability	$11,258	$11,258
Funded Ratio	70.1%	70.1%
Funding Period	Never	Never

Actuarial Valuation as of August 31, 2016		
	AVA	**MVA**
Actuarial Accrued Liability	$35,303	$35,303
AVA / MVA	26,557	24,465
Unfunded Accrued Liability	$8,746	$10,838
Funded Ratio	75.2%	69.3%
Funding Period	35	73

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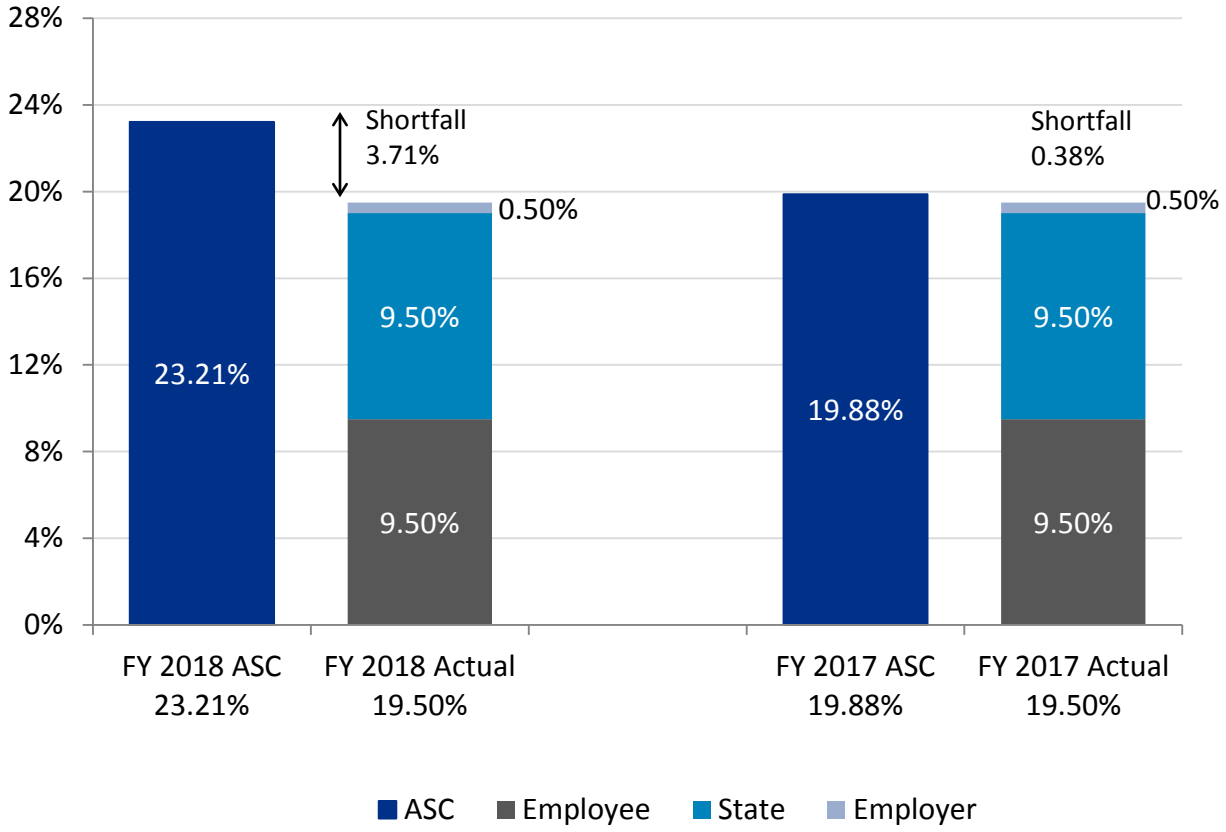
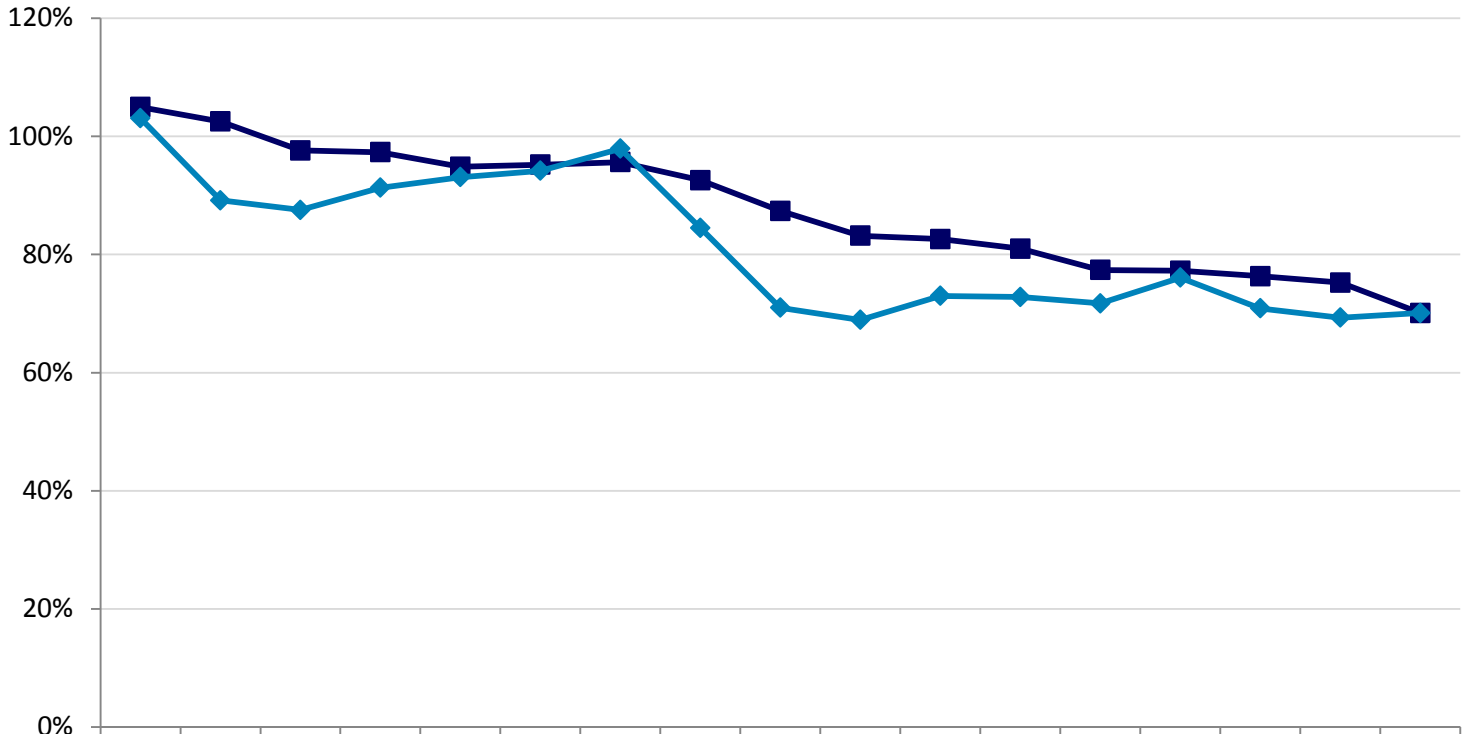
Actuarially Sound Contribution (ERS)



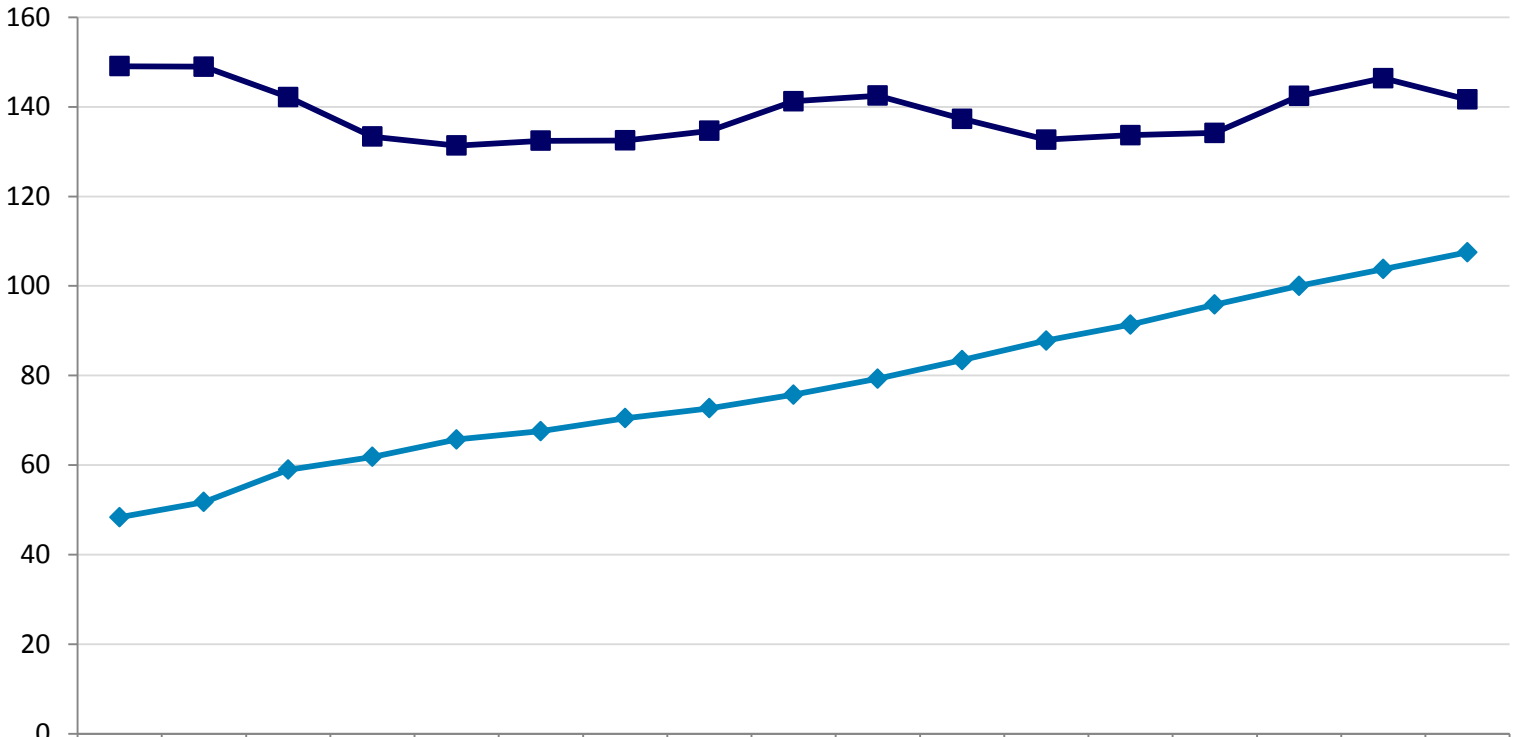
Funded Ratio History (ERS)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Funded Ratio on AVA	104.9	102.5	97.6%	97.3%	94.8%	95.2%	95.6%	92.6%	87.4%	83.2%	82.6%	81.0%	77.4%	77.2%	76.3%	75.2%	70.1%
Funded Ratio on MVA	103.0	89.1%	87.5%	91.3%	93.1%	94.2%	97.9%	84.5%	71.0%	68.9%	73.0%	72.8%	71.7%	76.1%	70.9%	69.3%	70.1%

Membership (ERS)

(counts in 1000's)

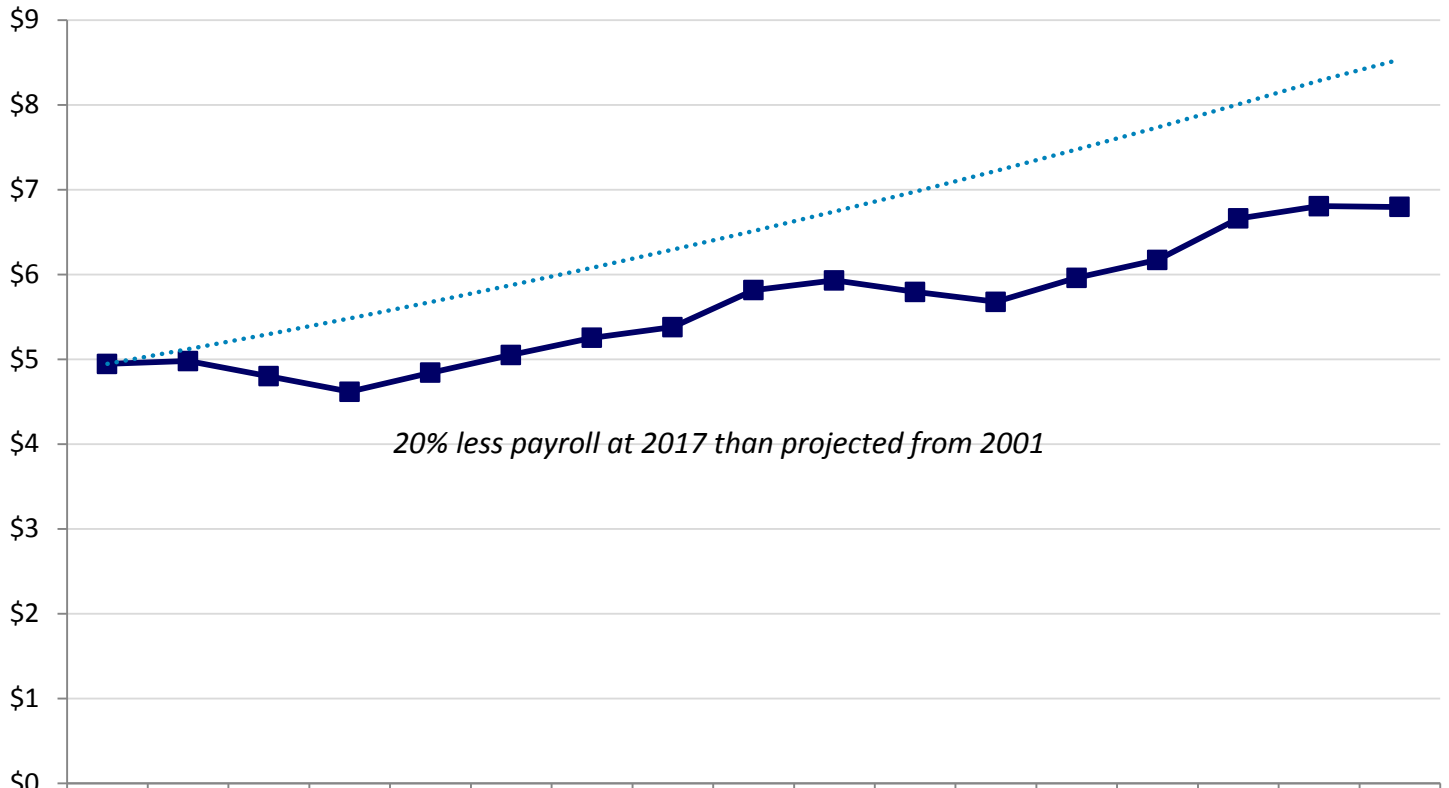


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Actives	149	149	142	133	131	132	132	135	141	142	137	133	134	134	142	146	142
Payees	48	52	59	62	66	68	70	73	76	79	83	88	91	96	100	104	108

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* (ERS)

($ in billions)

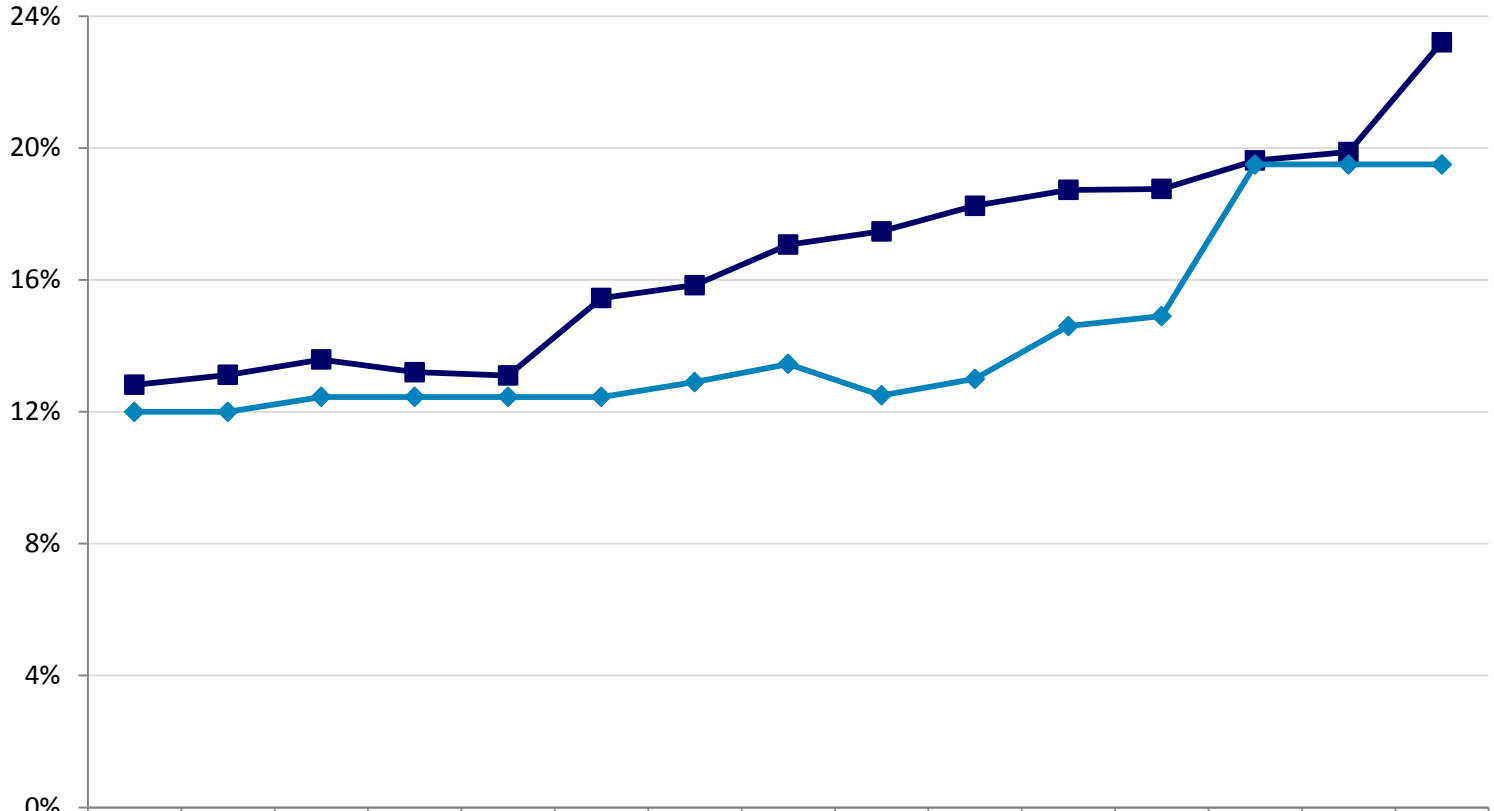


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Actual Payroll	$4.9	$5.0	$4.8	$4.6	$4.8	$5.1	$5.3	$5.4	$5.8	$5.9	$5.8	$5.7	$6.0	$6.2	$6.7	$6.8	$6.8
Projected Payroll	$4.9	$5.1	$5.3	$5.5	$5.7	$5.9	$6.1	$6.3	$6.5	$6.7	$7.0	$7.2	$7.5	$7.7	$8.0	$8.3	$8.5

**Projected from 2001 using payroll growth assumption in effect*

Actual vs. Actuarial Contributions* (ERS)

(% of Payroll, by Fiscal Year)



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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%	23.21%
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%	19.50%

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

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

	August 31, 2017	Market Return for 12 month period ending August 31, 2018				
	Results	-7.5%	0.0%	7.5%	15.0%	22.5%
UAAL ($ in billions)	$11.3	$12.6	$12.2	**$11.8**	$11.4	$11.0
Funded Ratio on AVA	70.1%	67.6%	68.6%	**69.6%**	70.6%	71.6%
ASC	23.21%	23.93%	23.60%	**23.27%**	22.94%	22.62%
Funding Period on AVA	Never	Never	Never	**Never**	Never	Never
Funded Ratio on MVA	70.1%	59.7%	64.6%	**69.6%**	74.6%	79.6%
Funding Period on MVA	Never	Never	Never	**Never**	88	37

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

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5-Year Funded Ratio and ASC Projections (ERS)

Projection Assuming 7.5% Investment Returns			
Actuarial Valuation as of August 31,	Funded Ratio on AVA	ASC	Funding Period on AVA
2017	70.1%	23.21%	Never
2018	69.6%	23.27%	Never
2019	69.6%	23.33%	Never
2020	69.4%	23.40%	Never
2021	69.2%	23.47%	Never

Projections assume that all assumptions are met, including an 7.5% return on the market value of assets, and future contributions continue at current levels.

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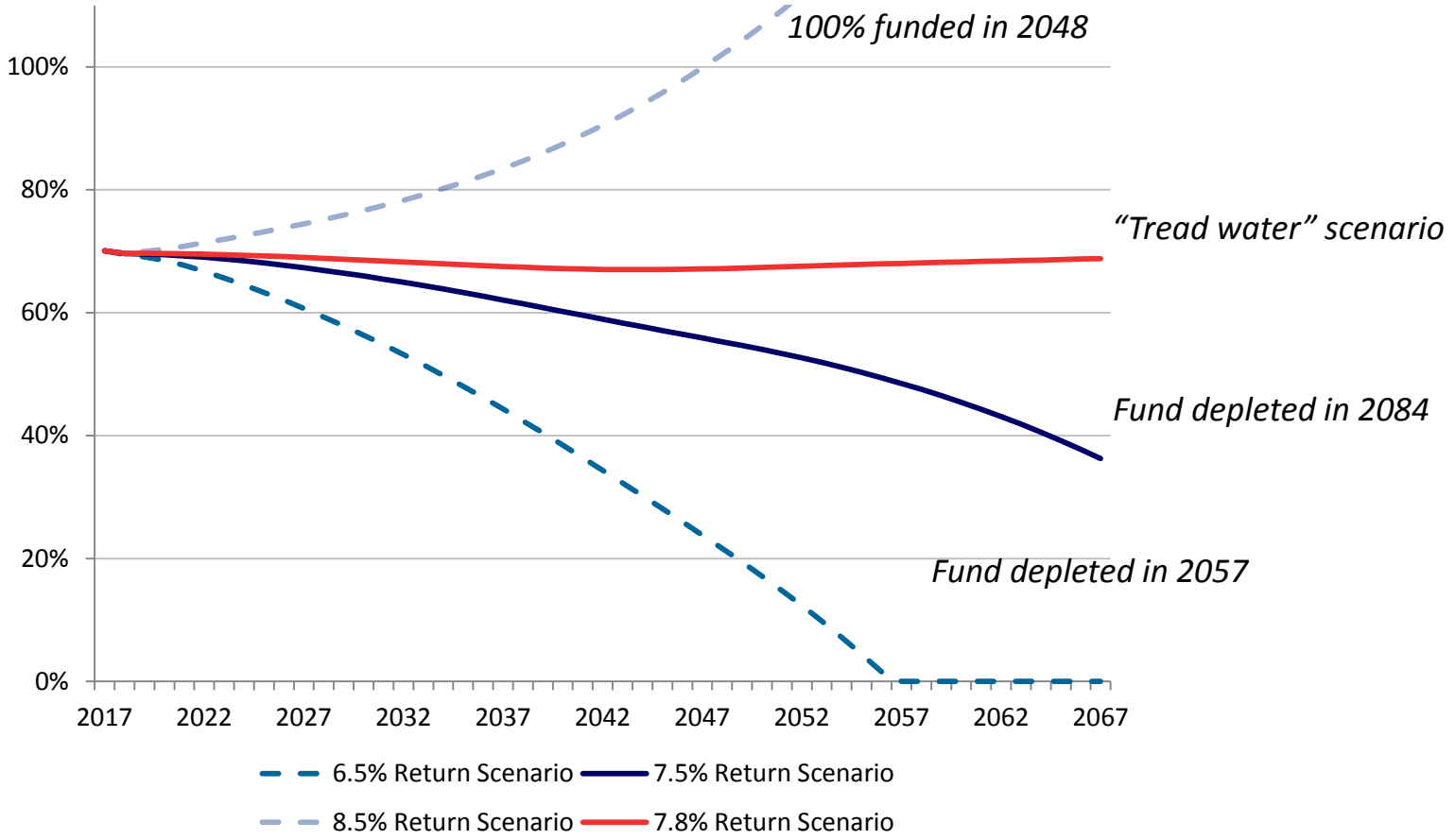
Funded Ratio Projections (ERS)



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.

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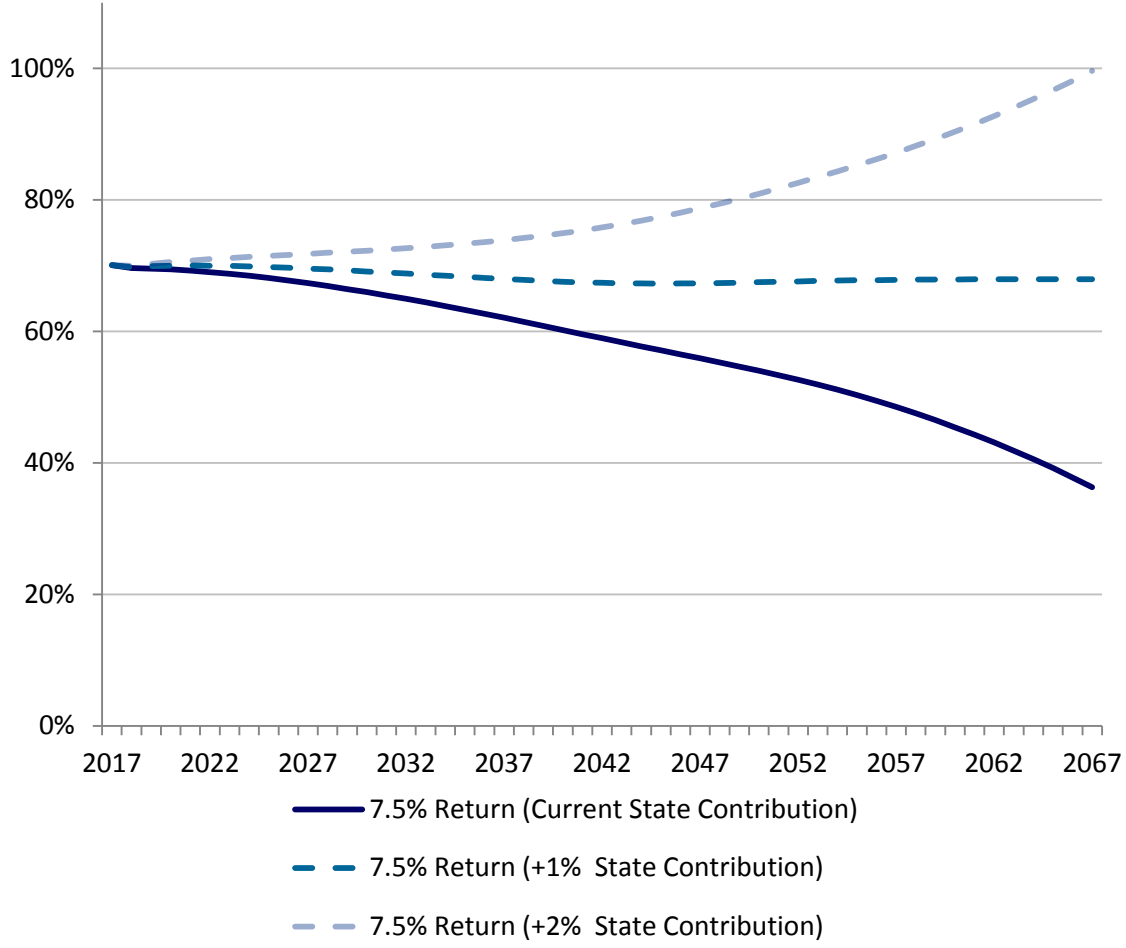
Funded Ratio Projections (ERS)



100% funded in 2068

68% funded after 100 years

Fund depleted in 2084

Projections assume no changes to current assumptions and except State Contribution rates, as noted, all other assumptions are met.

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LECOSRF and JRS2
Funding Valuation Results
at August 31, 2017

LECOSRF and JRS2 Results

- LECOSRF had a reduction in funded status
  - Contributions are not sufficient to sustain the plan
  - Projected depletion date in 2044
- JRS2 had a reduction in funded status
  - However, current statutory rates sufficient to sustain the plan

Funded Status

($ in millions)

Actuarial Valuation as of August 31, 2017		
	LECOSRF	**JRS2**
Actuarial Accrued Liability	$1,400	$464
Actuarial Value of Assets	924	421
Unfunded Accrued Liability	$476	$43
Funded Ratio	66.0%	90.8%
Funding Period	Never	63

Actuarial Valuation as of August 31, 2016		
	LECOSRF	**JRS2**
Actuarial Accrued Liability	$1,312	$426
Actuarial Value of Assets	933	396
Unfunded Accrued Liability	$379	$30
Funded Ratio	71.1%	92.9%
Funding Period	Never	49

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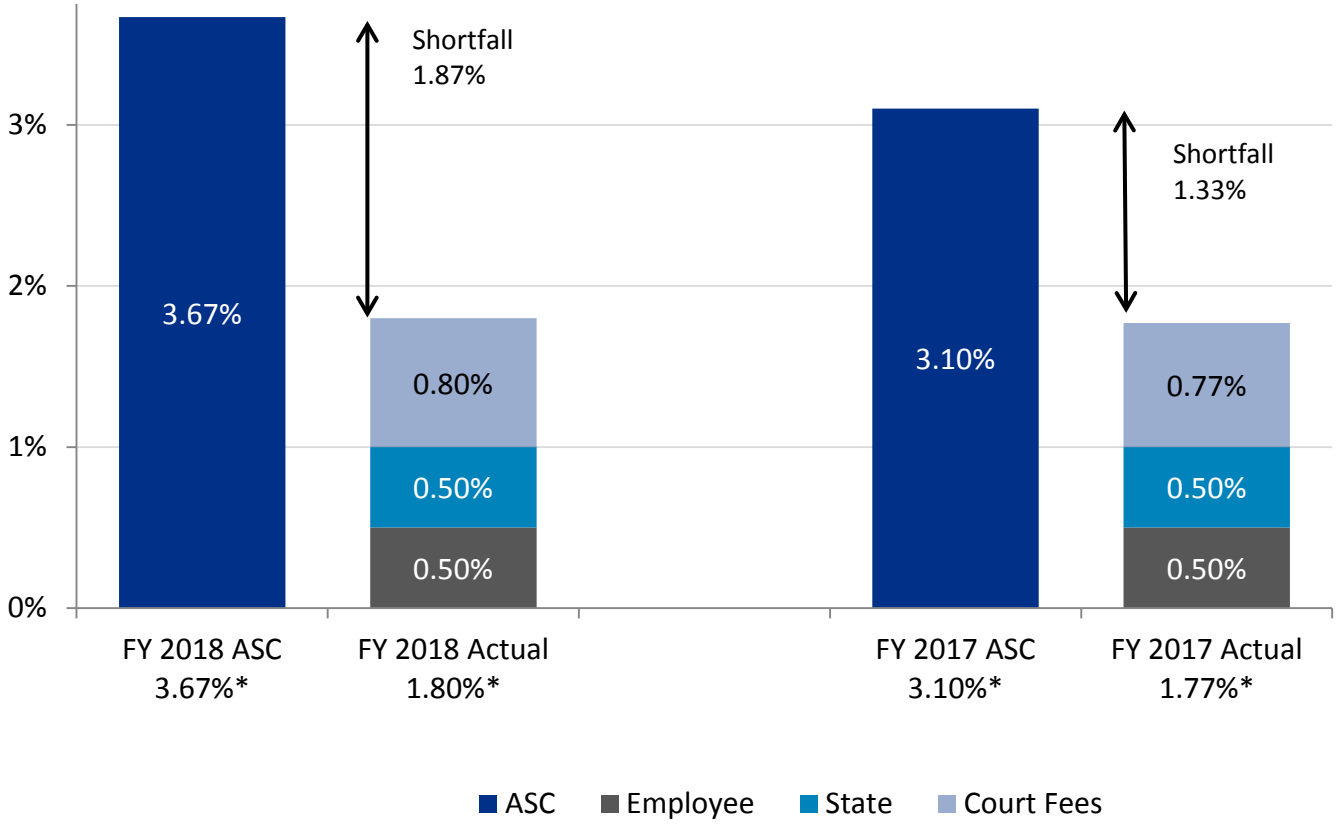
Actuarially Sound Contribution (LECOSRF)



**The 0.80% amount for LECOSRF is projected to be about $18.8 million for FY18, based on a 4-year average of actual revenues. The amount of court fees received by LECOSRF is not based on a percent of payroll and is expected to decline as a percent of payroll going forward.*

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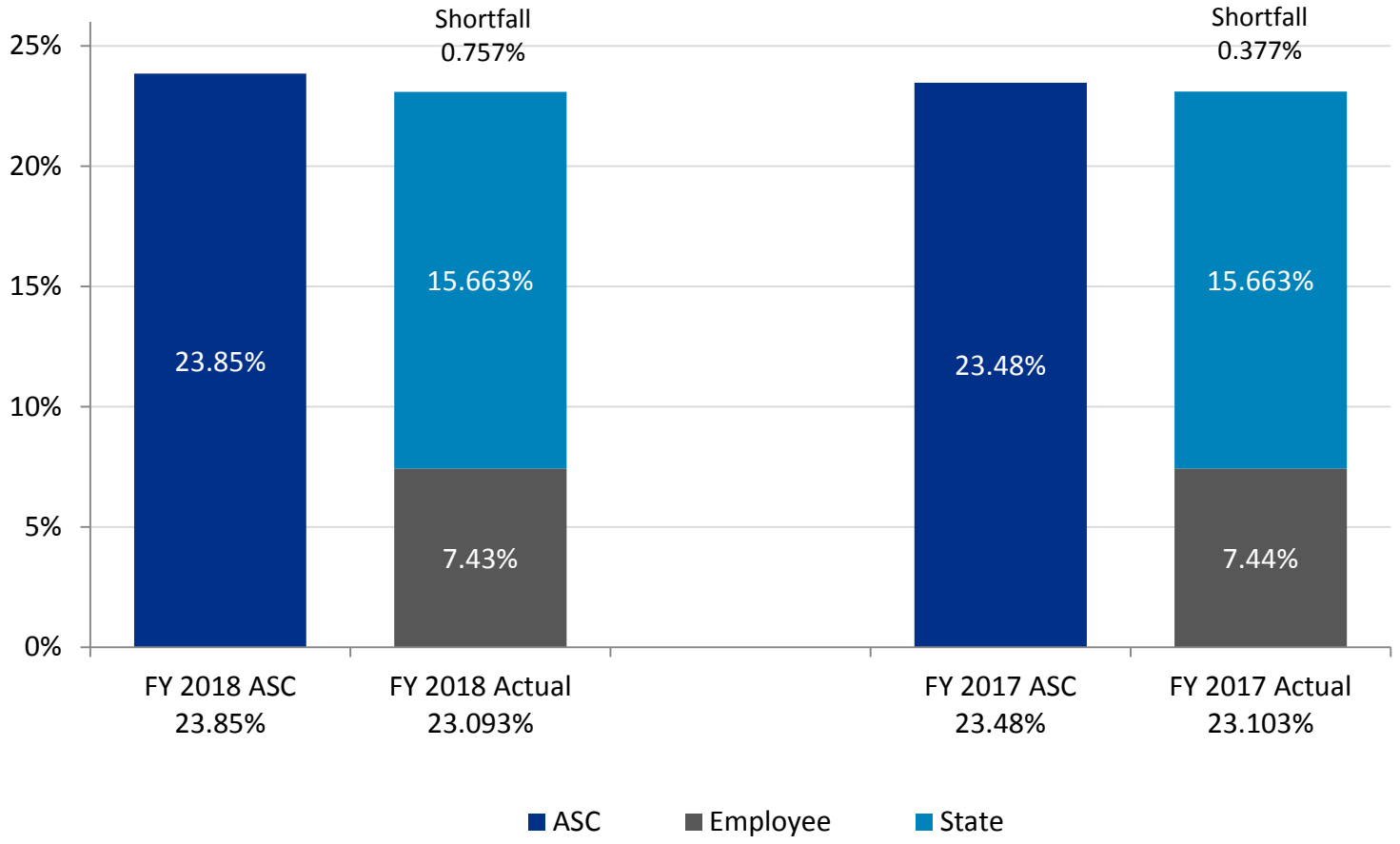
Actuarially Sound Contribution (JRS2)



Accounting Results as of August 31, 2017

Accounting Valuation Results

- ERS adopted GASB 67 for plan year ending August 31, 2014
- GASB 68 measures were included in Texas state reporting starting in fiscal year ending August 31, 2016
  - State has elected to utilize one year reporting lag
    - GASB 67/68 valuation as of August 31, 2016 used for August 31, 2017 reporting
- GASB 73 outlines new reporting for JRS1

Determining 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 (7.50% 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 (3.42% as of August 31, 2017)
    - Used to discount plan obligations after the projected assets have been extinguished
  - JRS1 uses municipal bond rate since there are no trust assets

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Accounting Valuation Results

- ($ in millions)

August 31, 2017	ERS	LECOSRF	JRS2	JRS1
Single Discount Rate (SDR)	5.36%	4.21%	7.50%	3.42%
Total Pension Liability	$48,237	$2,164	$464	$277
Plan Fiduciary Net Position	26,372	924	421	0
Net Pension Liability (NPL)	**21,865**	**1,240**	**43**	**277**
August 31, 2016				
Single Discount Rate (SDR)	5.73%	3.69%	6.53%	2.84%
Total Pension Liability	$44,223	$2,214	$486	$328
Plan Fiduciary Net Position	24,466	860	381	0
Net Pension Liability (NPL)	**19,757**	**1,354**	**105**	**328**

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Summary

Summary

- Changes in future expectations had a large impact on the projected funded status of the plans
- Asset experience exceeded expectations on a market basis
- For ERS and 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
- Contribution rates and current level of plan benefits are sufficient to sustain JRS2
  - However, there is no margin for adverse deviation or response to additional cost pressures

Disclaimers

- This presentation is intended to be used in conjunction with the actuarial valuation reports issued in December 2017. This presentation should not be relied on for any purpose other than the purpose described in the valuation reports.
- This presentation shall not be construed to provide tax advice, legal advice or investment advice.

GRS Retirement Consulting

Employees Retirement System of Texas

Annual Actuarial Valuation - Funding

As of August 31, 2017

GRS Retirement Consulting

P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

November 28, 2017

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, 2017

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, 2017. 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.

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, 2017 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 Section D of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. Additionally, this actuarial valuation incorporates the significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. The current actuarial assumptions and methods are outlined in Section E of this report.

Data

The valuation was based upon information as of August 31, 2017, 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 audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Certification

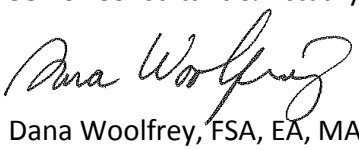
All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

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 & Actuary

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader & Actuary



Dana Woolfrey, FSA, EA, MAAA
Consultant & Actuary

Table of Contents

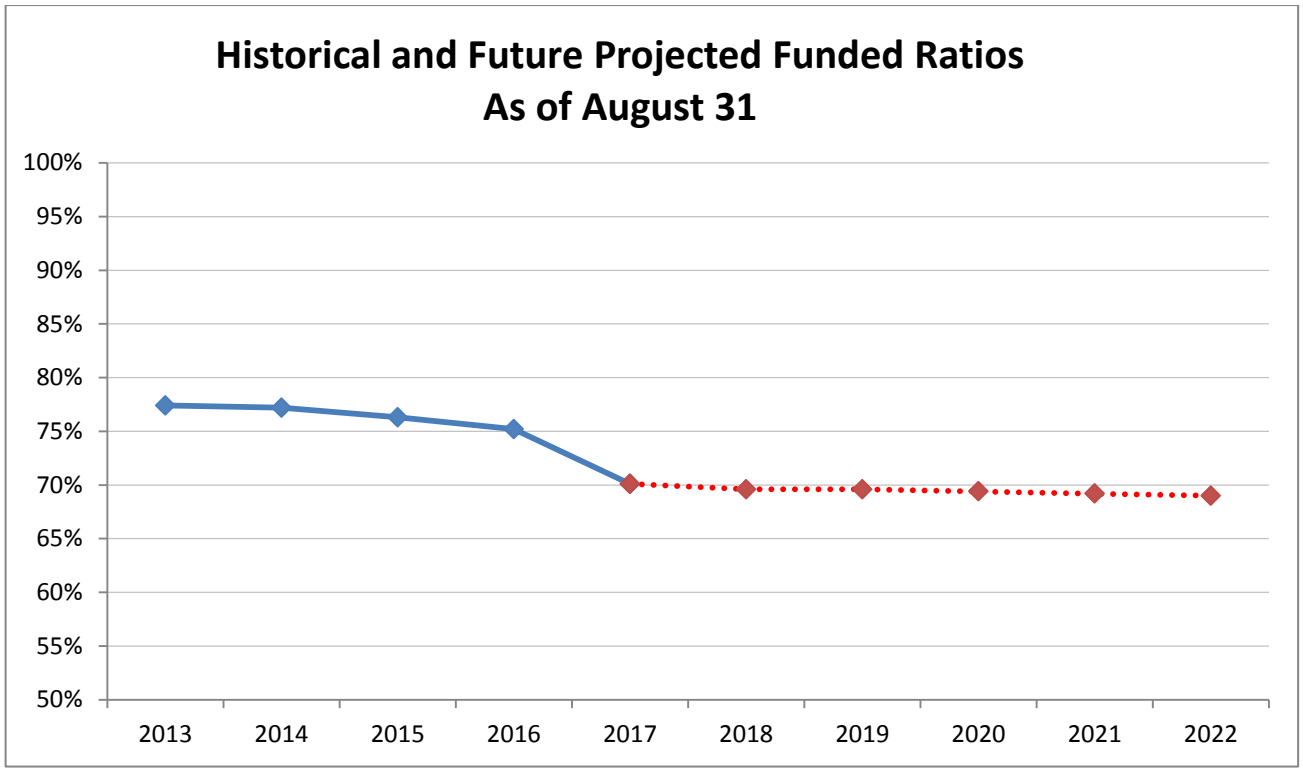
SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2017	2016
Membership		
• Number of		
- Active members*	141,629	146,390
- Retirees and beneficiaries	107,530	103,758
- Inactive, vested	16,110	16,597
- Inactive, nonvested	96,082	92,276
- Total	361,351	359,021
• Valuation Payroll	$ 6,796,226,304	$ 6,806,457,317
Statutory contribution rates	FY 2018	FY 2017
• Members	9.50%	9.50%
• Employers	0.50%	0.50%
• State	9.50%	9.50%
Actuarially Sound Rate (funds normal cost and amortizes unfunded accrued liability over 31 years, per Section 811.006 of the Texas Government Code)	23.21%	19.88%
Assets		
• Market value (MVA)	$ 26,371,827,298	$ 24,465,580,124
• Actuarial value (AVA)	$ 26,371,827,298	$ 26,557,130,705
• Return on market value (gross)	12.15%	5.32%
• Return on market value (net)	12.11%	5.28%
• Return on actuarial value	2.8%	5.9%
Actuarial Information on AVA (smoothed)		
• Normal cost %	13.95%	12.28%
• Total normal cost	$ 948,073,569	$ 835,832,959
• Actuarial accrued liability	$ 37,629,785,374	$ 35,303,165,362
• Unfunded actuarial accrued liability (UAAL)	$ 11,257,958,076	$ 8,746,034,657
• Funded ratio	70.1%	75.2%
• Funding period (years)	Never	35
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 11,257,958,076	$ 10,837,585,238
• Funded ratio	70.1%	69.3%
• Funding period (years)	Never	73

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



August 31,	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Funded Ratio	77.4%	77.2%	76.3%	75.2%	70.1%	69.6%	69.6%	69.4%	69.2%	69.0%
UAAL (in billions)	$7.2	$7.5	$8.0	$8.7	$11.3	$11.8	$12.2	$12.6	$13.0	$13.5
ASC	18.73%	18.76%	19.62%	19.88%	23.21%	23.27%	23.33%	23.40%	23.47%	23.53%

The projections beyond 2017 are based on the same assumptions, methods and provisions used for the August 31, 2017 valuation, which include the significant across-the-board pay increases budgeted by the State Legislature when they are granted and the assumptions adopted by the Board in August 2017. Additionally, the market value of assets is expected to earn 7.5% 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, ERS is projected to remain solvent until the year 2084, 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 ERS to improve the overall financial health of the retirement system. Each successive biennium that ERS receives the currently scheduled contribution rates, the unfunded actuarial accrued liability (UAAL) is projected to increase by almost $1 billion and the ASC is projected to increase by over 0.10% of payroll resulting strictly from a deficiency in contributions.

SECTION B

DISCUSSION

Discussion

Introduction

The results of the August 31, 2017 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 5.55% of payroll, which, on both an actuarial and market value of assets basis, is not sufficient to amortize the unfunded liability over a finite period of time. Based on current expectations and assumptions, ERS is expected to remain solvent until the year 2084, after which the funding would revert to a pay-as-you-go status. In the prior valuation, the total contribution rate was expected to be sufficient to amortize the unfunded liability over time. This change is primarily due to the changes in actuarial assumptions and methods described below.

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 Section D of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of ERS.

A detailed account of the revised actuarial assumptions and methods can be found in our Actuarial Experience Study report dated June 28, 2017. A summary of key changes in assumptions and methods is highlighted below:

Economic Assumptions

- Decrease the investment return assumption from 8.00% to 7.50%
- Decrease the inflation assumption from 3.50% to 2.50%
- No change to the salary scales above inflation for regular State employees. For LECO members, the merit component was increased by 0.50%, and thus when combined with the decrease in inflation, the nominal assumption is 0.50% lower than the previous assumption. Additionally, the step rates for LECO members were extended from 10 years of service to 19 years of service.
- Establish a general wage inflation assumption of 0.50% above inflation, or 3.00%.

Mortality Assumptions

- The post-retirement mortality tables for non-disabled retirees are based on recent ERS experience. A one year set-forward is applied to male LECO members. Fully generational mortality

improvements are assumed using the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP").

- The post-retirement mortality tables for disabled retirees is based on the most recently published national tables, the RP-2014 tables for disabled lives. Fully generational mortality improvements are assumed using Scale U-MP.
- The pre-retirement mortality tables for active employees are based on the most recently published national tables, the RP-2014 tables for employees. Fully generational mortality improvements are assumed using Scale U-MP.

Other Demographic Assumptions

- Modifications to the methodologies used to project termination patterns for members, with small adjustments in the overall rates consistent with experience and future expectations.
- Modifications to the methodologies used to project retirement patterns for members, with small adjustments in the overall rates consistent with experience and future expectations and to better reflect expected differences among the benefit groups.
- Small decreases to the disability patterns for members consistent with experience and future expectations.
- For LECO members that retire in the future, 40% of males are assumed to choose a 100% joint and survivor annuity option.

Actuarial Methods and Policies

- Change in the asset smoothing method to a method that recognizes each year's gain or loss over a closed five-year period. However, the method will continue to allow direct offsetting of gains and losses. The actuarial (smoothed) value of assets was set to equal to market value (mark to market) as of August 31, 2017, with the smoothing method to be applied prospectively.
- Modified the application of the Entry Age Normal (EAN) actuarial cost method to base the normal cost rate on the benefits payable to each individual active member, generally referred to as "individual" EAN. Previously, the normal cost rate was based on the benefits payable to a new member and the entry age characteristics of the current active membership, generally referred to as "ultimate" EAN. As a result of this change, the funding period and Actuarially Sound Contribution (ASC) rate will be determined based on an open group projection.

The actuarial valuation as of August 31, 2017 incorporates the significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. Specifically, employees were assumed to receive no across-the-board increase on September 1, 2017 or September 1, 2018.

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 Section E 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 $8.7 billion as of August 31, 2016 to $11.3 billion as of August 31, 2017. Additionally, the funded ratio of ERS—actuarial value of assets divided by the actuarial accrued liability—decreased from 75.2% to 70.1% as of August 31, 2017. This decrease was primarily due to the changes in actuarial assumptions and methods adopted by the Board in August 2017. 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 13.95% 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 5.55% of payroll which will be available to amortize the unfunded liability. As the number of members eligible for the newest benefit provisions increases over time, the normal cost rate is expected to decrease, and the amount available to amortize the unfunded liability will increase as a percentage of payroll. However, the projected contributions are not expected to be sufficient to eliminate the unfunded liability over a finite period of time. Assuming the market value of assets earns 7.5% per year, ERS is projected to remain solvent until the year 2084, after which the funding would revert to a pay-as-you-go status.

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, 2017, the Actuarially Sound Contribution (ASC) rate for ERS is 23.21% of payroll.

As noted, the ASC is currently calculated based on a 31-year open amortization period. This means that the ASC will always be calculated with the same 31-year period and the UAAL would never completely be eliminated. 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 $24.5 billion to $26.4 billion as of August 31, 2017. Table 5 reconciles the changes in the fund during the year. Total contributions increased slightly from $1,361 million to $1,386 million.

Table 6 shows the development of the actuarial value of assets. As part of the actuarial experience study and adoption of revised actuarial assumptions and methods, the Board voted to reset the actuarial value of assets (AVA) to be equal to the market value of assets (MVA), or "mark to market" as of August 31, 2017. In subsequent years the AVA will be calculated using a new method. The new method will recognize each year's gain or loss over a closed five year period. However, the method will continue to allow direct offsetting of gains and losses.

When measured on a market value, the approximate gross investment return for the fiscal year ending August 31, 2017 was 12.15%, and the return net of investment expenses was 12.11%. When measured on an actuarial value, the net investment return was 2.8%. The lower return on an actuarial basis is due to the transition to the new asset smoothing method as of August 31, 2017. Table 7 shows a history of return rates. The ERS ten-year average market return, gross of all expenses as reported by the ERS Master Trust Custodian, is 5.67%. The ten-year average return net of investment expenses is 5.54%.

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 $806 million (or 3.3% of assets) in fiscal year 2016 and the amount was $926 million (or 3.5% of assets) in fiscal year 2017. ERS should continue to monitor this deficit as it could impact the future liquidity needs of ERS. Table 11 provides a history of contribution rates, as a percent of payroll, paid into the trust by the State, agencies, and members. This table also shows a history of the total normal cost and the Actuarially Sound Contribution (ASC), as defined by Section 811.006 of the Texas Government Code.

Data

The valuation was based upon information as of August 31, 2017, 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 Section F show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Table 1
Development of Employer Cost

	August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1. Payroll			
a. Reported Payroll (August Payroll of Active Members)	$ 6,796,226,304	$ 6,796,226,304	$ 6,806,457,317
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	6,796,226,304	6,796,226,304	6,806,457,317
2. Total Normal Cost Rate			
a. Gross normal cost rate	13.62%	12.03%	12.03%
b. Administrative expenses	0.33%	0.25%	0.25%
c. Total (Item 2a + Item 2b)	13.95%	12.28%	12.28%
3. Actuarial Accrued Liability for Active Members			
a. Present value of future benefits for active members	$ 20,957,726,436	$ 19,874,913,086	$ 20,307,684,320
b. Less: present value of future normal costs	(6,298,157,130)	(5,352,499,726)	(5,429,877,061)
c. Actuarial accrued liability	$ 14,659,569,306	$ 14,522,413,360	$ 14,877,807,259
4. Total Actuarial Accrued Liability for:			
a. Retirees and beneficiaries	$ 21,378,759,742	$ 19,993,121,879	$ 19,017,977,910
b. Inactive members	1,591,456,326	1,458,569,867	1,407,380,193
c. Active members (Item 3c)	14,659,569,306	14,522,413,360	14,877,807,259
d. Total	$ 37,629,785,374	$ 35,974,105,106	$ 35,303,165,362
5. Actuarial Value of Assets	$ 26,371,827,298	$ 27,448,977,878	$ 26,557,130,705
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 11,257,958,076	$ 8,525,127,228	$ 8,746,034,657
7. Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	23.21%	19.94%	19.88%
8. Allocation of Contribution Rate			
a. Combined State and employer rates	10.00%	10.00%	10.00%
b. Member rate	9.50%	9.50%	9.50%
c. Total contribution rate	19.50%	19.50%	19.50%
d. Total normal cost rate	13.95%	12.28%	12.28%
e. Available contribution rate to amortize UAAL	5.55%	7.22%	7.22%
f. Total contribution rate	19.50%	19.50%	19.50%
9. Funding period based on statutory contribution rates and Actuarial Value of Assets (years)	Never	36	35

Table 2
Actuarial Present Value of Future Benefits

		August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1.	Active Members			
	a. Service Retirement	$ 18,996,374,108	$ 18,050,093,694	$ 18,497,623,991
	b. Disability Benefits	159,942,672	290,240,164	289,378,636
	c. Death Before Retirement	241,281,528	300,702,101	305,729,174
	d. Termination	1,560,128,128	1,233,877,127	1,214,952,519
	e. Total	$ 20,957,726,436	$ 19,874,913,086	$ 20,307,684,320
2.	Inactive Members	$ 1,591,456,326	$ 1,458,569,867	$ 1,407,380,193
3.	Annuitants	$ 21,378,759,742	$ 19,993,121,879	$ 19,017,977,910
4.	Total Actuarial Present Value of Future Benefits	$ 43,927,942,504	$ 41,326,604,832	$ 40,733,042,423

Table 3
Analysis of Normal Cost

		August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1.	Gross Normal Cost Rate			
	a. Service Retirement	9.72%	8.63%	8.63%
	b. Disability Benefits	0.14%	0.28%	0.28%
	c. Death Before Retirement	0.18%	0.24%	0.24%
	d. Termination	3.58%	2.88%	2.88%
	e. Total	13.62%	12.03%	12.03%
2.	Administrative Expenses	0.33%	0.25%	0.25%
3.	Total Normal Cost	13.95%	12.28%	12.28%
4.	Less: Member Rate	9.50%	9.50%	9.50%
5.	Employer Normal Cost Rate	4.45%	2.78%	2.78%

Table 4
Historical Summary of Active Member Data

	Active Members		Covered Payroll		Average Salary			
Valuation as of August 31,	Number	Percent Increase	Amount in $ Millions	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
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
2017	141,629	-3.3%	6,796	-0.2%	47,986	3.2%	43.6	8.7

Table 5
Reconciliation of Plan Net Assets

	Year Ending August 31, 2017 (1)	Year Ending August 31, 2016 (2)
1. Market value of assets at beginning of year	$ 24,465,580,124	$ 23,998,481,161
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	$ 700,078,188	$ 686,763,354
ii. Member (including penalty interest)	685,461,587	674,677,886
iii. Total	$ 1,385,539,775	$ 1,361,441,240
b. Net investment income	$ 2,832,627,596	$ 1,273,413,421
c. Total revenue	$ 4,218,167,371	$ 2,634,854,661
3. Disbursements for the year		
a. Benefit payments and refunds	2,360,181,202	$ 2,215,784,680
b. Net transfers from TRS	(71,356,413)	(68,477,651)
c. Administrative expenses	23,095,408	20,448,669
d. Total expenditures	2,311,920,197	2,167,755,698
4. Increase in net assets (Item 2c - Item 3d)	$ 1,906,247,174	$ 467,098,963
5. Market value of assets at end of year (Item 1 + Item 4)	$ 26,371,827,298	$ 24,465,580,124

Table 6
Development of Actuarial Value of Assets

	Year Ending August 31, 2017
1. Actuarial value of assets at beginning of year	$ 26,557,130,705
2. Net new investments	
a. Contributions for the year (Table 5)	$ 1,385,539,775
b. Disbursements for the year (Table 5)	(2,311,920,197)
c. Subtotal	(926,380,422)
3. Assumed investment return rate	7.50%
4. Expected return	$ 1,957,045,537
5. Expected actuarial value of assets at end of year (Item 1 + Item 2c + Item 4)	$ 27,587,795,820
6. Market value of assets at end of year	$ 26,371,827,298
7. Market Adjustment as of August 31, 2017*	$ (1,215,968,522)
8. Actuarial value of assets (Item 5 + Item 7)	$ 26,371,827,298
9. Estimated rate of return	2.8%
10. Actuarial value as percentage of market value	100.0%

* A one-time adjustment to reset the actuarial value to market value was applied as of August 31, 2017. Smoothing will be applied in future valuation reports.

Table 7
History of Investment Return Rates

Year Ending August 31 of	Market Returns (Gross)	Market Returns (Net)	Actuarial
(1)	(2)	(3)	(4)
1998	8.30%	8.23%	11.5%
1999	16.26%	16.46%	12.5%
2000	9.43%	9.40%	11.8%
2001	-6.91%	-6.93%	7.6%
2002	-7.17%	-7.21%	4.7%
2003	9.20%	9.14%	5.4%
2004	11.69%	11.64%	6.4%
2005	12.71%	12.62%	7.5%
2006	8.83%	8.76%	7.7%
2007	13.88%	13.76%	8.6%
2008	-4.58%	-4.69%	5.7%
2009	-6.60%	-6.71%	3.2%
2010	6.65%	6.48%	3.6%
2011	12.58%	12.36%	5.0%
2012	8.22%	8.04%	5.4%
2013	10.07%	9.87%	6.1%
2014	14.70%	14.58%	7.6%
2015	0.49%	0.44%	6.1%
2016	5.32%	5.28%	5.9%
2017	12.15%	12.11%	2.8%
Average Returns			
Last Five Years:	8.43%	8.34%	5.7%
Last Ten Years:	5.67%	5.54%	5.1%
Last Fifteen Years:	7.49%	7.39%	5.8%
Last Twenty Years:	6.49%	6.41%	6.7%

Market returns provided by ERS Master Trust Custodian.
Rates in Column (2) represent the market returns gross of all expenses.
Rates in Column (3) represent the market returns net of investment expenses.
Net returns may exceed gross returns in years where adjustments are made to fee expenses.

Table 8
History of Cash Flow

Year Ending August 31,	Contributions	Distributions and Expenditures: Benefit Payments and Refunds	Distributions and Expenditures: Administrative Expenses	Distributions and Expenditures: Total	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
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%
2017	1,385.5	(2,288.8)	(23.1)	(2,311.9)	(926.4)	26,372	-3.5%

Dollar amounts in millions

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

Table 9
Total Experience Gain or Loss

Item		Year Ending August 31, 2017	Year Ending August 31, 2016
(1)		(2)	(3)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 8,746,034,657	$ 8,017,817,926
2. Assumption/Method changes - Liability Only		$ 1,473,636,172	$ 0
3. UAAL, previous year, after assumption changes (Item 1 + Item 2)		$ 10,219,670,829	$ 8,017,817,926
4. Normal cost for the year (excluding administrative expenses)		930,442,715	800,489,556
5. Actual administrative expenses		23,095,408	20,448,669
6. Contributions for the year (excluding service purchases)		(1,345,514,398)	(1,321,742,138)
7. Interest at 7.5% for FYE 2017, 8% for FYE 2016			
a. On UAAL		$ 766,475,312	$ 641,425,434
b. On normal cost and administrative expenses		35,757,680	32,837,529
c. On contributions		(50,456,790)	(52,869,686)
d. Total		$ 751,776,202	$ 621,393,277
8. Legislative changes*			
– Across-the-board pay increases budgeted for upcoming biennium by the State Legislature		(616,581,747)	0
9. Expected UAAL (Sum of Items 3 through 8)		9,962,889,009	8,138,407,290
10. Actual UAAL		11,257,958,076	8,746,034,657
11. Total (gain)/loss for the year (Item 10 - Item 9)		$ 1,295,069,067	$ 607,627,367
B. Source of gains and losses	% of AAL		
12. Asset (Gain)/Loss for the year - Prior Smoothing Method	0.00%	$ 0	$ 522,887,645
13. Asset (Gain)/Loss for the year - New Smoothing Method	3.23%	1,215,968,522	0
14. Pay Increases (Less)/Greater than Expected	0.26%	98,199,712	39,084,397
15. Non-Retired Demographic (Gains)/Losses	0.06%	20,900,814	(9,121,228)
16. Post-Retirement Mortality (Gains)/Losses	0.10%	(35,749,657)	19,613,169
17. Other Demographic (Gains)/Losses	0.01%	(4,250,324)	35,163,384
18. Total (Sum of Items 12 through 17)	3.44%	$ 1,295,069,067	$ 607,627,367

* The plan experiences a (gain)/loss when across-the-board pay increases budgeted by the State Legislature are (less)/greater than assumed.

Table 10
Solvency Test

Actuarial Accrued Liability and Percent of Active Member Payroll for:

	Accumulated Member Contributions Including Interest		Retirees and Beneficiaries Currently Receiving Benefits		Employer Financed Portion of Vested and Nonvested Benefits			Portion of Accrued Liabilities Covered by Assets		
August 31,	(1)	% of Payroll	(2)	% of Payroll	(3)	% of Payroll	Actuarial Value of Assets	(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%
2017	5,709.1	84%	21,378.8	315%	10,541.9	155%	26,371.8	100%	97%	0%

Note : Dollar amounts in millions

Table 11
Historical Contribution Rates

Actuarial Valuation as of August 31,	Contributions from: State	Agency	Members	Total	Total Normal Cost Rate	ASC *
1998	6.00%	0.00%	6.00%	12.00%	11.86%	Not calculated
1999	6.00%	0.00%	6.00%	12.00%	12.33%	Not calculated
2000	6.00%	0.00%	6.00%	12.00%	12.41%	Not calculated
2001	6.00%	0.00%	6.00%	12.00%	12.67%	Not calculated
2002	6.00%	0.00%	6.00%	12.00%	12.71%	Not calculated
2003	6.00%	0.00%	6.00%	12.00%	12.26%	12.82%
2004	6.00%	0.00%	6.00%	12.00%	12.45%	13.12%
2005	6.45%	0.00%	6.00%	12.45%	12.28%	13.59%
2006	6.45%	0.00%	6.00%	12.45%	11.98%	13.20%
2007	6.45%	0.00%	6.00%	12.45%	11.98%	13.10%
2008	6.45%	0.00%	6.00%	12.45%	13.37%	15.45%
2009 **	6.78%	0.00%	6.48%	13.26%	12.38%	15.84%
2010	6.95%	0.00%	6.50%	13.45%	12.30%	17.07%
2011	6.00%	0.00%	6.50%	12.50%	12.31%	17.47%
2012	6.50%	0.00%	6.50%	13.00%	12.31%	18.25%
2013	7.50%	0.50%	6.60%	14.60%	11.57%	18.73%
2014	7.50%	0.50%	6.90%	14.90%	11.58%	18.76%
2015	9.50%	0.50%	9.50%	19.50%	12.27%	19.62%
2016	9.50%	0.50%	9.50%	19.50%	12.28%	19.88%
2017	9.50%	0.50%	9.50%	19.50%	13.95%	23.21%

* The Actuarially Sound Contribution Rate (ASC) is the rate determined as of the valuation date to fund the normal cost and amortize the UAAL over a 31 year period.

** For Fiscal Year 2010, members contributed 6.45% from September through December and 6.50% from January through August. Similarly, the State contributed 6.45% from September through December and 6.95% from January through August.

SECTION D

SUMMARY OF PLAN PROVISIONS

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 (collectively referred to as "LECOs"); 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 2019 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 State Employees):
    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 (LECO 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 choses 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.

SECTION E

ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016.

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 each individual active member.

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, and is calculated with the use of an open group projection that takes into account: (a) future market earnings, net of investment-related expenses, will equal 7.50% per year, (b) there will be no 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 Section D of the valuation report.

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 based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment-related expenses. The actuarial value of assets was reset to be equal to the market value of assets as of August 31, 2017 and the new method will be applied prospectively.

IV. Actuarial Assumptions

Investment Return: 7.50% per year, net of investment-related expenses (composed of an assumed 2.50% inflation rate and a 5.00% real rate of return)

Administrative Expenses: 0.33% of valuation payroll per year

Salary Increases: Inflationary pay increases are assumed to occur at the beginning of the year and the remaining pay increases associated with merit, promotion and longevity are assumed to occur at the middle of the valuation year and vary by employee group. The components of the annual increases are:

Employee Group	Inflation ***	Real Wage Growth (Productivity)	Merit, Promotion and Longevity
Legislators	0%	0%	0%
Judges and Elected Class other than Legislators	2.50%	0.50%	0%
Employee Class	2.50%	included in Merit, Promotion and Longevity Increases	See sample rates
State Salary of a District Judge*	2.50%	0.25%	0%
Inactive members who transfer to TRS**	2.50%	0%	2.50%

* 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 significant across-the-board pay increases appropriated by the State legislature for the current biennium compared to the assumed rate of inflation.

Sample Rates:

Annual Salary Increases for Merit, Promotion and Longevity Male and Female Regular State Employees							
	Years of Eligibility Service						
Age	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 LECO Members						
	Years of Eligibility Service					
Age	0	1	2 -4	5 - 8	9 - 17	18+
All	7.00 %	5.00 %	3.50 %	2.50 %	2.25 %	2.00 %

Payroll Growth: 3.00% 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 2.75% 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:

Eligibility Service:

Eligibility Service is considered to be all service eligible for vesting purposes, which includes service earned as a regular State employee, a LECO member, a member of the Elected Class, as State Judge, and service earned in the Teacher Retirement System of Texas ("TRS").

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 regular State employees, Benefit Service when eligible for service retirement is assumed to be increased by:

- 1.0 years if age plus service, prior to adjustment, is greater than or equal to 80; and
- 0.5 years if age plus service, prior to adjustment, is less than 80.

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

For LECO members, Benefit Service when eligible for service retirement is assumed to be increased by:

- 1.0 years if CPO/CO service, prior to adjustment, is at least 20 years; and
- 0.5 years if CPO/CO service, prior to adjustment, is less than 20 years.

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

For the Elected Class members, there is no assumed increase in service credit when eligible for service retirement.

Entry Age:

Entry age is calculated as the age at the valuation date minus Eligibility Service (excluding TRS 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 middle of the valuation year.

Mortality Decrements:

Service Retirees, Beneficiaries, and Inactive Members

2017 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP") and projected from the year 2017. Rates for male LECO members are set forward one year. Sample rates for the base mortality table included below.

Annual Mortality Rates per 100 Individuals		
Age	Males	Females
40	0.0603	0.0380
45	0.1059	0.0687
50	0.1825	0.1215
55	0.3145	0.2150
60	0.5421	0.3804
65	0.9344	0.6730
70	1.6105	1.1908
75	2.7757	2.1069
80	4.7842	3.7277
85	8.2459	6.5956
90	14.2527	11.7028

Active Members

RP-2014 Active Member Mortality table. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

Disability Retirees

RP-2014 Disabled Retiree Mortality. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

Occupational Death

1.0% of male and female active member deaths are assumed to be occupational.

Service Retirement Decrements: Graded tables based on ERS experience.

Active Regular State Employees

Service retirement rates are determined by the first set of eligibility requirements satisfied:

- Eligibility A: Age plus eligibility service is greater than or equal to 80 ("Rule of 80")
- Eligibility B: Retirement eligibility other than Rule of 80

Adjustments to the base rates are made to account for age at first eligibility or reduced retirement benefits, based on date of hire (described below sample table).

Base rates for eligible members:

Annual Service Retirement Rates Regular State Employees (Males & Females)		
	Eligibility A	Eligibility B
Age	Rule of 80	Other Age/Service
<50	0.50	
50	0.40	
51	0.35	
52	0.30	
53	0.28	
54	0.27	
55	0.26	
56	0.25	
57	0.24	
58	0.23	
59	0.22	
60	0.21	0.18
61	0.20	0.12
62	0.33	0.20
63	0.27	0.18
64	0.27	0.18
65 -74	0.27	0.27
75	1.00	1.00

Adjustments for members hired before September 1, 2009:

- Eligibility A: Add 0.30 at age of 1st eligibility

Adjustments for members hired on or after September 1, 2009, but before September 1, 2013:

- Eligibility A: Add 0.30 at age 60

Adjustments for members hired on or after September 1, 2013:

- Eligibility A: If age of 1st eligibility is before age 62, then
  - rates prior to age 62 are multiplied by 75% for each year prior to age 62
  - the rate at age 62 is the base table rate plus 0.20 plus 0.06 times the number of years the age at 1st eligibility was before age 62

Active LECO Members

Service retirement rates are determined by the first set of eligibility requirements satisfied:

- Eligibility A: 20 years of CPO/CO service
- Eligibility B: Age 55 and 10 years of CPO/CO service
- Eligibility C: Any eligibility pertaining to regular State employees (see rates and adjustments for regular State employees)

Adjustments to the base rates are made to account for age at first eligibility or reduced retirement benefits, based on date of hire (described below sample table).

Base rates for eligible members:

Annual Service Retirement Rates LECO Members (Males & Females)			
Eligibility A		Eligibility B	
Age	20 yrs CPO/CO	Age	Age 55 & 10 yrs CPO/CO
<48	0.03		
48	0.04	55	0.20
49	0.05	56	0.18
50	0.60	57	0.16
51 - 61	0.33	58 - 61	0.14
62 - 74	0.50	62 - 74	0.27
75	1.00	75	1.00

Adjustments for members hired before September 1, 2013:

- Eligibility A and B: Rate set to zero if member has 18 or 19 years of CPO/CO service. Rate is doubled if member has 20 years of CPO/CO service. Adjustments only apply to members that attain 20 years of CPO/CO service prior to age 65.

Adjustments for members hired on or after September 1, 2013:

- Eligibility A: If age of 1st eligibility is before age 57, then
  - rates prior to age 57 are multiplied by 75% for each year prior to age 57
  - the rate at age 57 is 100%
- Eligibility B: If member will attain 20 years of CPO/CO service at or before age 62, rates are zero prior to age 62 and 100% when member attains 20 years of CPO/CO service.
- Eligibility B: If member will attain 20 years of CPO/CO service after age 62, then
  - rates prior to age 62 are multiplied by 75% for each year prior to age 62
  - the rate at age 62 is the base table rate plus 0.20 plus 0.06 times the number of years the age at 1st eligibility was before age 62

Active Elected Class Members

Annual Service Retirement Rates Elected Class Members	
Age	Male and Female
50 - 61	0.10
62 - 74	0.20
75+	1.00

Disability Retirement Decrements: Graded Tables Based on ERS Experience

Active Regular State Employees

- The rates do not apply before someone is eligible for the benefit.
- 10 years of service is required for non-occupational disability retirement.
- Non-occupational disability rates are assumed to be zero once the sum of the member's age and eligibility service is greater than or equal to 80.

Active Elected Class Members

- The rates do not apply before someone is eligible for the benefit.
- No occupational disabilities are assumed for the elected class or judges.
- 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 service retirement eligibility.

Sample rates for eligible regular State employees and elected class members:

Annual Disability Rates per 100 Participants		
	Regular State Employes and Elected Class	
Age	Males	Females
30	0.0275	0.0135
35	0.0650	0.0442
40	0.0749	0.0896
45	0.1027	0.1455
50	0.1484	0.2072
55	0.2477	0.3488
60	0.3740	0.5583

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 LECO Members

- 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 sum of the member's age and eligibility service is greater than or equal to 80, or the member has attained age 55 with 10 or more years of CPO/CO service.

Sample rates for members:

Annual Disability Rates per 100 Participants LECO Members	
Age	Males and Females
30	0.0092
35	0.0314
40	0.0586
45	0.0980
50	0.1774
55	0.2460
60	0.3150

95% of the disability rates stated above are assumed to be attributable to non-occupational disabilities, 4.5% are assumed to be attributable to non-total occupational disabilities, and 0.5% 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. To account for active regular State employees and LECO members that accumulate additional eligibility service at retirement through converting sick/annual leave or other types of service purchases, termination rates are also set to zero in the year prior to first retirement eligibility.

Rates for members not eligible for service retirement:

Active Regular State Employees

Annual Rates of Termination per 100 Participants Regular State Employees		
Eligibility Service	Male and Female	
	Entry age 35 or younger	Entry age over 35
0	25.25	19.63
1	21.24	16.07
2	17.88	13.26
3	15.07	11.08
4	12.76	9.42
5	10.86	8.16
6	9.33	7.21
7	8.09	6.49
8	7.10	5.94
9	6.31	5.50
10	5.67	5.11
11	5.15	4.75
12	4.71	4.39
13	4.32	4.03
14	3.97	3.66
15	3.64	3.29
16	3.30	2.95
17	2.97	2.69
18	2.62	2.53
19	2.27	1.00
20	1.92	1.00
21	1.59	1.00
22	1.29	1.00
23	1.05	1.00
24	0.89	1.00
25+	0.85	1.00

Active LECO Members

Annual Rates of Termination per 100 Participants LECO Members	
Eligibility Service	Male and Female
0	23.00
1	19.22
2	15.36
3	12.48
4	10.36
5	8.81
6	7.67
7	6.81
8	6.11
9	5.52
10	4.96
11	4.42
12	3.90
13	3.43
14	3.07
15	2.90
16	2.50
17	1.00
18	1.00
19+	0.00

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%	50%	0%
Service Retirement			
Non-LECO	100%	0%	0%
LECO	60%	40%	0%
Death Benefit Plan	0%	85%	15%
Female Member			
Disability	75%	25%	0%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	70%	30%

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: Males are assumed to be two years older than females.

Transfers from ERS to TRS:

Contributing ERS members:

It is assumed that 10% of regular State employees and LECO 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, 2017 and does not take into account future members, with the exception of determining the funding period.
- 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 are currently immaterial in relation to the overall payroll contributions and have been ignored.

SECTION F

DETAILED SUMMARIES OF MEMBERSHIP DATA

Detailed Summaries of Membership Data

Table A

Summary of Membership Data

Active Members

Item	Male	Female	Regular State Employees	Elected Class	LECO Members	Total
Number of Members	61,902	79,727	103,097	326	38,206	141,629
Average Annual Salaries	$ 51,009	$ 45,639	$ 49,015	$ 69,356	$ 45,029	$ 47,986
Average Age	43.5	43.7	44.5	52.2	41.1	43.6
Average Entry Age	34.7	35.0	35.5	43.8	33.1	34.9
Average Service	8.8	8.7	9.0	8.4	8.0	8.7

Annuitants

Item	Number	Annual Annuities	Average Annuities	Average Age
Service Retirees*	96,651	$ 1,994,344,524	$ 20,634	68.7
Beneficiaries	8,532	$ 128,682,036	$ 15,082	73.8
Disability Retirees	2,347	$ 21,953,976	$ 9,354	66.5
Total	107,530	$ 2,144,980,536	$ 19,948	69.0

* Average Age and Service at Retirement for Service Retirees are 58.3 and 22.1, respectively

Inactive Members Assumed Eligible for Deferred Annuities

Item	Number	Annual Annuities	Average Annuities	Average Age
Vested Members who are not Active at TRS	13,791	$ 149,983,584	$ 10,875	49.5
Vested Members who are Active at TRS	2,319	$ 44,924,748	$ 19,372	51.8
Total	16,110	$ 194,908,332	$ 12,099	49.8
Non-vested Members who are Active at TRS	7,461	$ 24,694,452	$ 3,310	46.7

Non-vested Inactive Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Members who are not Active at TRS	88,621	$ 238,598,211	$ 2,692	40.6
Non-vested Members who are Active at TRS	7,461	$ 29,398,154	$ 3,940	46.7
(this group assumed eligible for deferred annuities)				
Total	96,082	$ 267,996,365	$ 2,789	41.1

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	8,669	51								8,720
	$ 31,212	$ 37,254								$ 31,247
25 - 29	12,796	1,650	43							14,489
	$ 39,037	$ 42,436	$ 39,341							$ 39,425
30 - 34	10,696	4,729	1,349	75						16,849
	$ 41,297	$ 49,884	$ 50,559	$ 51,653						$ 44,495
35 - 39	8,157	4,482	2,949	1,348	51					16,987
	$ 42,304	$ 50,795	$ 58,072	$ 56,755	$ 59,483					$ 48,480
40 - 44	6,688	3,757	2,655	2,981	1,314	55				17,450
	$ 42,568	$ 49,523	$ 56,687	$ 60,541	$ 60,229	$ 61,673				$ 50,674
45 - 49	6,042	3,636	2,590	3,238	3,313	1,469	72			20,360
	$ 42,413	$ 48,751	$ 54,021	$ 57,771	$ 62,810	$ 64,991	$ 64,627			$ 52,491
50 - 54	4,912	3,296	2,492	2,674	2,469	1,951	485	22		18,301
	$ 41,767	$ 47,253	$ 51,116	$ 54,600	$ 60,580	$ 66,886	$ 79,272	$ 64,208		$ 52,140
55 - 59	3,952	2,985	2,220	2,378	1,739	1,076	549	151	10	15,060
	$ 42,750	$ 46,522	$ 51,624	$ 53,553	$ 60,421	$ 67,792	$ 76,514	$ 71,915	$ 86,378	$ 51,893
60 - 64	2,130	2,351	1,579	1,632	894	556	294	143	22	9,601
	$ 42,882	$ 47,846	$ 50,175	$ 52,424	$ 60,776	$ 66,427	$ 69,359	$ 76,933	$ 60,584	$ 51,307
Over 64	814	1,038	684	541	366	200	100	39	30	3,812
	$ 43,351	$ 48,353	$ 50,641	$ 55,623	$ 61,070	$ 66,336	$ 70,638	$ 76,246	$ 71,284	$ 51,942
Total	64,856	27,975	16,561	14,867	10,146	5,307	1,500	355	62	141,629
	$ 40,067	$ 48,475	$ 53,585	$ 56,293	$ 61,265	$ 66,422	$ 75,041	$ 73,934	$ 69,922	$ 47,986

Table C

Active Members – Regular State Employees

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	4,706	21								4,727
	$ 28,605	$ 33,377								$ 28,626
25 - 29	8,754	937	18							9,709
	$ 38,946	$ 40,280	$ 33,024							$ 39,064
30 - 34	7,983	3,305	824	45						12,157
	$ 42,004	$ 49,437	$ 50,904	$ 52,608						$ 44,667
35 - 39	6,032	3,384	2,079	827	27					12,349
	$ 43,450	$ 51,342	$ 58,353	$ 56,000	$ 59,136					$ 48,997
40 - 44	4,993	2,873	1,901	2,061	710	34				12,572
	$ 43,789	$ 50,513	$ 57,554	$ 61,131	$ 60,501	$ 57,625				$ 51,231
45 - 49	4,548	2,721	1,849	2,327	2,058	999	58			14,560
	$ 43,507	$ 49,606	$ 55,365	$ 58,904	$ 64,272	$ 65,093	$ 62,624			$ 53,106
50 - 54	3,748	2,445	1,831	2,010	2,023	1,669	375	21		14,122
	$ 42,836	$ 48,119	$ 52,404	$ 56,051	$ 60,818	$ 66,188	$ 76,868	$ 62,430		$ 53,141
55 - 59	3,054	2,246	1,732	1,878	1,487	987	504	142	10	12,040
	$ 44,227	$ 47,434	$ 52,852	$ 55,253	$ 61,616	$ 67,511	$ 75,313	$ 69,825	$ 86,378	$ 53,480
60 - 64	1,665	1,784	1,305	1,331	738	529	277	140	22	7,791
	$ 43,982	$ 49,234	$ 51,489	$ 53,556	$ 63,080	$ 66,926	$ 68,639	$ 76,687	$ 60,584	$ 52,956
Over 64	626	780	550	439	326	191	92	37	29	3,070
	$ 44,867	$ 50,326	$ 52,148	$ 58,313	$ 62,221	$ 65,794	$ 74,330	$ 78,743	$ 73,494	$ 54,188
Total	46,109	20,496	12,089	10,918	7,369	4,409	1,306	340	61	103,097
	$ 40,912	$ 49,129	$ 54,512	$ 57,249	$ 62,196	$ 66,242	$ 73,711	$ 73,164	$ 70,950	$ 49,015

Table D

Active Members – LECO 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	3,963	30								3,993
	$ 34,307	$ 39,968								$ 34,350
25 - 29	4,042	713	25							4,780
	$ 39,234	$ 45,270	$ 43,890							$ 40,159
30 - 34	2,703	1,423	525	30						4,681
	$ 39,090	$ 50,950	$ 50,018	$ 50,222						$ 43,992
35 - 39	2,103	1,091	867	521	24					4,606
	$ 38,813	$ 49,014	$ 57,576	$ 57,954	$ 59,874					$ 47,036
40 - 44	1,667	876	750	920	604	21				4,838
	$ 38,311	$ 46,209	$ 54,221	$ 59,220	$ 59,910	$ 68,228				$ 49,010
45 - 49	1,466	895	730	906	1,253	470	14			5,734
	$ 38,512	$ 45,447	$ 50,212	$ 54,846	$ 60,499	$ 64,774	$ 72,923			$ 50,706
50 - 54	1,149	837	648	659	444	281	110	1		4,129
	$ 37,923	$ 43,489	$ 46,492	$ 49,728	$ 59,732	$ 71,243	$ 87,466	$ 101,551		$ 48,228
55 - 59	880	729	477	497	251	87	45	9		2,975
	$ 37,477	$ 43,522	$ 46,051	$ 46,607	$ 53,555	$ 70,844	$ 89,972	$ 104,893		$ 45,189
60 - 64	449	561	268	295	149	27	16	3		1,768
	$ 37,772	$ 43,156	$ 44,244	$ 46,883	$ 50,097	$ 56,633	$ 85,713	$ 88,410		$ 43,828
Over 64	178	253	125	96	36	9	4	1		702
	$ 37,067	$ 42,032	$ 42,774	$ 44,958	$ 52,944	$ 77,827	$ 49,148	$ 52,891		$ 42,380
Total	18,600	7,408	4,415	3,924	2,761	895	189	14		38,206
	$ 37,756	$ 46,380	$ 50,712	$ 53,505	$ 58,950	$ 67,361	$ 86,026	$ 97,408		$ 45,029

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	1								11
	$ 73,600	$ 7,200								$ 67,564
35 - 39	22	7	3							32
	$ 61,527	$ 64,114	$ 7,200							$ 57,000
40 - 44	28	8	4							40
	$ 78,287	$ 57,000	$106,800							$ 76,881
45 - 49	28	20	11	5	2					66
	$ 68,857	$ 80,287	$ 80,886	$ 60,320	$ 7,200					$ 71,810
50 - 54	15	14	13	5	2	1				50
	$ 69,173	$121,029	$100,196	$ 113,440	$ 7,200	$ 7,200				$ 92,467
55 - 59	18	10	11	3	1	2				45
	$ 49,911	$ 60,320	$ 99,895	$ 140,000	$ 7,200	$ 73,600				$ 70,552
60 - 64	16	6	6	6	7		1			42
	$ 71,850	$ 73,600	$ 29,333	$ 73,756	$ 45,143		$ 7,200			$ 60,308
Over 64	10	5	9	6	4		4	1	1	40
	$ 60,320	$ 60,320	$ 67,830	$ 29,490	$ 40,400		$ 7,200	$ 7,200	$ 7,200	$ 47,425
Total	147	71	57	25	16	3	5	1	1	326
	$ 67,336	$ 78,289	$ 79,411	$ 76,331	$ 32,100	$ 51,467	$ 7,200	$ 7,200	$ 7,200	$ 69,356

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	15,023	452,901,852	30,147
60 - 64	17,698	419,340,180	23,694
65 - 69	21,878	441,205,368	20,167
70 - 74	16,799	308,001,876	18,335
75 - 79	9,964	165,253,704	16,585
Over 79	10,480	186,410,328	17,787
Total	91,842	1,973,113,308	21,484
Beneficiaries			
Under 60	1,066	13,244,628	12,425
60 - 64	666	9,575,616	14,378
65 - 69	1,075	15,778,992	14,678
70 - 74	1,254	18,148,260	14,472
75 - 79	1,310	19,810,056	15,122
Over 79	2,955	51,335,796	17,373
Total	8,326	127,893,348	15,361
Disabled Retirees			
Under 60	533	4,364,292	8,188
60 - 64	391	4,088,292	10,456
65 - 69	492	5,157,168	10,482
70 - 74	374	3,805,812	10,176
75 - 79	196	1,948,704	9,942
Over 79	200	2,061,984	10,310
Total	2,186	21,426,252	9,802
Grand Total	102,354	2,122,432,908	20,736

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	23	413,052	17,959
Total	23	413,052	17,959
Grand Total	23	413,052	17,959

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	463	2,668,944	5,764
60 - 64	978	5,134,656	5,250
65 - 69	1,533	6,678,588	4,357
70 - 74	1,102	4,351,920	3,949
75 - 79	625	2,003,448	3,206
Over 79	291	769,296	2,644
Total	4,992	21,606,852	4,328
Disabled Retirees			
Under 60	56	242,640	4,333
60 - 64	40	127,056	3,176
65 - 69	37	107,580	2,908
70 - 74	20	39,156	1,958
75 - 79	8	11,292	1,412
Over 79	0	0	0
Total	161	527,724	3,278
Grand Total	5,153	22,134,576	4,295

SECTION G

GLOSSARY

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 ADC.

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 ADC.

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 ADC 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.

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 it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. 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.

SECTION H

LAW ENFORCEMENT AND CUSTODIAL OFFICER (LECO) PLAN ACCOUNTING

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 Section 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 Results

Item	Regular Class	Law Enforcement and Custodial Officers
Membership		
• Number of		
- Active members	103,423	38,206
- Retirees and beneficiaries*	89,326	18,204
- Inactive, vested*	13,733	2,377
- Inactive, nonvested*	74,158	21,924
- Total	280,640	80,711
• Valuation Payroll	$ 5,075,863,840	$ 1,720,362,464
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	$18.8 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	22.62%	28.61%
- In addition to Court Fees	22.62%	27.81%
Contribution Rate Sufficiency (Negative figures indicates contribution shortfall)	-3.12%	-7.31%
Assets		
• Market value (MVA)	$ 21,688,712,755	$ 5,607,104,123
• Actuarial value (AVA)	$ 21,688,712,755	$ 5,607,104,123
Actuarial Information on AVA (smoothed)		
• Normal cost %	13.67%	16.90%
• Total normal cost	$ 693,870,587	$ 290,741,256
• Actuarial accrued liability	$ 29,838,529,521	$ 9,191,132,510
• Unfunded actuarial accrued liability (UAAL)	$ 8,149,816,766	$ 3,584,028,387
• Funded ratio	72.7%	61.0%
• Funding period (years)	Never	Never
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 8,149,816,766	$ 3,584,028,387
• Funded ratio	72.7%	61.0%
• Funding period (years)	Never	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, 2017 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 Section, neither the stand-alone LECO plan nor the regular State (non-LECO) employees plan would be considered actuarially sound as of August 31, 2017.

Administrative Considerations

The asset allocation outlined in this Section 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 Enforcment and Custodial Officer Supplemental Retirement Fund of the Employees Retirement System of Texas

Annual Actuarial Valuation - Funding

As of August 31, 2017

GRS Retirement Consulting

P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

November 28, 2017

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, 2017

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, 2017. 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, 2017 reflects the benefit and contribution provisions set forth in Chapters 811 through 815 of the Texas Government Code with respect to the amounts payable from the Law Enforcement and Custodial Officer Supplemental Retirement Fund. The current plan provisions are outlined in Section D of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. Additionally, this actuarial valuation incorporates the significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. The current actuarial assumptions and methods are outlined in Section E of this report.

Data

The valuation was based upon information as of August 31, 2017, 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 audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Certification

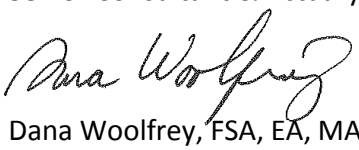
All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

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 & Actuary

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader & Actuary



Dana Woolfrey, FSA, EA, MAAA
Consultant & Actuary

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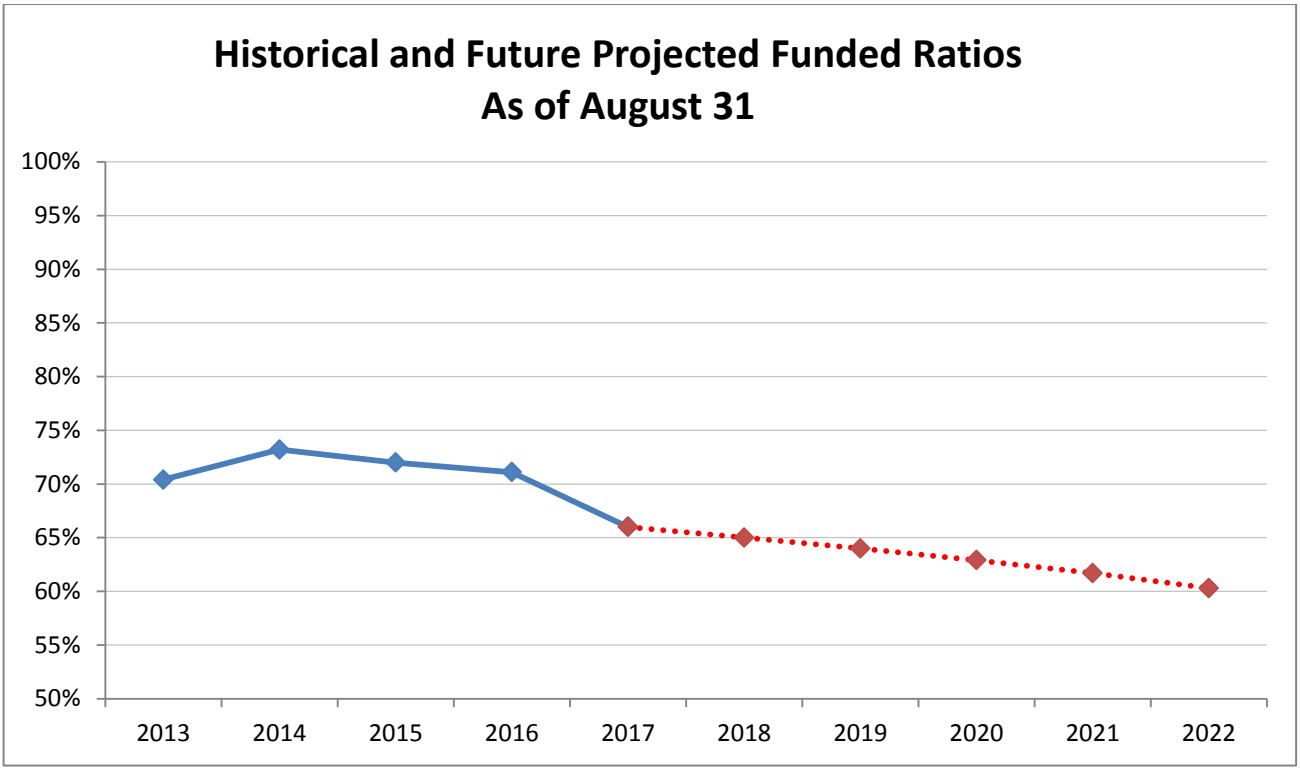
SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2017	2016
Membership		
• Number of		
- Active members	38,206	39,066
- Retirees and beneficiaries	12,248	11,515
- Inactive, vested	109	95
- Inactive, nonvested	16,991	15,108
- Total	67,554	65,784
• Valuation Payroll	$ 1,720,362,464	$ 1,743,679,004
Statutory contribution rates	FY 2018	FY 2017
• Members	0.50%	0.50%
• State	0.50%	0.50%
• Expected annual contributions from court fees	$18.8 million	$19.2 million
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	3.67%	3.10%
- In addition to Court Fees	2.87%	2.33%
Assets		
• Market value (MVA)	$ 923,989,580	$ 860,049,223
• Actuarial value (AVA)	$ 923,989,580	$ 933,534,062
• Return on market value (gross)	12.15%	5.32%
Return on market value (net)	12.11%	5.28%
• Return on actuarial value	2.8%	5.9%
Actuarial Information on AVA - smoothed		
• Normal cost %	2.11%	1.81%
• Total normal cost	$ 36,299,648	$ 31,560,590
• Actuarial accrued liability	$ 1,399,876,657	$ 1,312,392,501
• Unfunded actuarial accrued liability (UAAL)	$ 475,887,077	$ 378,858,439
• Funded ratio	66.0%	71.1%
• Funding period (years)	Never	Never
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 475,887,077	$ 452,343,278
• Funded ratio	66.0%	65.5%

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



August 31,	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Funded Ratio	70.4%	73.2%	72.0%	71.1%	66.0%	65.0%	64.0%	62.9%	61.7%	60.3%
UAAL (in millions)	$354	$323	$353	$379	$476	$512	$550	$592	$637	$687
ASC	3.09%	2.96%	3.01%	2.33%	2.87%	2.96%	3.06%	3.15%	3.25%	3.36%

* 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 from court fees. Prior to 2016, the expected court fees were included in the ASC as 1.20% of pay.

The projections beyond 2017 are based on the same assumptions, methods and provisions used for the August 31, 2017 valuation, which include the significant across-the-board pay increases budgeted by the State Legislature when they are granted and the assumptions adopted by the Board in August 2017. Additionally, the market value of assets is expected to earn 7.5% 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 2044, 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, 2017 actuarial valuation of the Law Enforcement and Custodial Officer Supplemental Retirement Fund (LECOSRF) of the Employees Retirement System (ERS) 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 is less than the normal cost by 0.02% of payroll, which, on both an actuarial and market value of assets basis, is not sufficient to amortize the unfunded liability 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 expected to remain solvent until the year 2044, after which the funding would revert to a pay-as-you-go status.

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 Section D of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of LECOSRF.

A detailed account of the revised actuarial assumptions and methods can be found in our Actuarial Experience Study report dated June 28, 2017. A summary of key changes in assumptions and methods is highlighted below:

Economic Assumptions

- Decrease the investment return assumption from 8.00% to 7.50%
- Decrease the inflation assumption from 3.50% to 2.50%
- The merit component of the salary scale for LECO members was increased by 0.50%, and thus when combined with the decrease in inflation, the nominal assumption is 0.50% lower than the previous assumption. Additionally, the step rates were extended from 10 years of service to 19 years of service.
- Establish a general wage inflation assumption of 0.50% above inflation, or 3.00%.

Mortality Assumptions

- The post-retirement mortality tables for non-disabled retirees are based on recent ERS experience. A one year set-forward is applied to male LECO members. Fully generational mortality

improvements are assumed using the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP").

- The post-retirement mortality tables for disabled retirees is based on the most recently published national tables, the RP-2014 tables for disabled lives. Fully generational mortality improvements are assumed using Scale U-MP.
- The pre-retirement mortality tables for active employees are based on the most recently published national tables, the RP-2014 tables for employees. Fully generational mortality improvements are assumed using Scale U-MP.

Other Demographic Assumptions

- Modifications to the methodologies used to project termination patterns for members, with small adjustments in the overall rates consistent with experience and future expectations.
- Modifications to the methodologies used to project retirement patterns for members, with small adjustments in the overall rates consistent with experience and future expectations and to better reflect expected differences among the benefit groups.
- Small decreases to the disability patterns for members consistent with experience and future expectations.
- For members that retire in the future, 40% of males are assumed to choose a 100% joint and survivor annuity option.

Actuarial Methods and Policies

- Change in the asset smoothing method to a method that recognizes each year's gain or loss over a closed five-year period. However, the method will continue to allow direct offsetting of gains and losses. The actuarial (smoothed) value of assets was set to equal to market value (mark to market) as of August 31, 2017, with the smoothing method to be applied prospectively.
- Modified the application of the Entry Age Normal (EAN) actuarial cost method to base the normal cost rate on the benefits payable to each individual active member, generally referred to as "individual" EAN. Previously, the normal cost rate was based on the benefits payable to a new member and the entry age characteristics of the current active membership, generally referred to as "ultimate" EAN. As a result of this change, the funding period and Actuarially Sound Contribution (ASC) rate will be determined based on an open group projection.

The actuarial valuation as of August 31, 2017 incorporates the significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. Specifically, employees were assumed to receive no across-the-board increase on September 1, 2017 or September 1, 2018.

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 LECOSRF is outside the scope of this actuarial valuation.

The current actuarial assumptions and methods are outlined in Section E 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 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, 2017, members contribute 0.50% of payroll and the State contributes 0.50% of payroll. LECOSRF also receives a portion of the court fees collected under Section 133.102 of the Local Government Code. The contribution from this source is expected to be approximately $18.8 million for fiscal year 2018 and all subsequent years based on a four-year average of the actual contributions. It should be noted that level dollar contributions from court fees 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 2018, the contribution from court fees is expected to be approximately 1.09% of payroll.

The unfunded actuarial accrued liability (UAAL) of LECOSRF increased from $379 million as of August 31, 2016 to $476 million as of August 31, 2017. Additionally, the funded ratio of LECOSRF—actuarial value of assets divided by the actuarial accrued liability—decreased from 71.1% to 66.0% as of August 31, 2017. This decrease was primarily due to the changes in actuarial assumptions and methods adopted by the Board in August 2017. 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 2.11% of payroll. The approximate total contribution rate is currently 2.09% of payroll. Thus, the total contribution rate for the current fiscal year is less than the normal cost by 0.02% of payroll and no payment will be available to amortize the unfunded liability. As the number of members eligible for the newest benefit provisions increases over time, the normal cost rate is expected to decrease. However, the projected contributions are not expected to exceed the normal cost in any year and will not be sufficient to eliminate the unfunded liability over a finite period of time. Assuming the market value of assets earns 7.5% per year, LECOSRF is projected to remain solvent until the year 2044, after which the funding would revert to a pay-as-you-go status.

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, 2017, the actuarially sound contribution (ASC) rate for LECOSRF is 2.87% of payroll in addition to the expected annual contributions from court fees of $18.8 million.

As noted, the ASC is currently calculated based on a 31-year open amortization period. This means that the ASC will always be calculated with the same 31-year period and the UAAL would never completely be eliminated. 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 $860 million to $924 million as of August 31, 2017. Table 5 reconciles the changes in the fund during the year. Total contributions decreased slightly from $37.0 million to $36.2 million. Contributions for fiscal year 2018 are anticipated to be approximately 2.09% of pay. Contributions in subsequent years are expected to increase in dollar amount, but at a declining percentage of pay since contributions from court fees are expected to remain level.

Table 6 shows the development of the actuarial value of assets. As part of the actuarial experience study and adoption of revised actuarial assumptions and methods, the Board voted to reset the actuarial value of assets (AVA) to be equal to the market value of assets (MVA), or "mark to market" as of August 31, 2017. In subsequent years the AVA will be calculated using a new method. The new method will recognize each year's gain or loss over a closed five year period. However, the method will continue to allow direct offsetting of gains and losses.

When measured on a market value, the approximate gross investment return for the fiscal year ending August 31, 2017 was 12.15%, and the return net of investment expenses was 12.11%. When measured on an actuarial value, the net investment return was 2.8%. The much lower return on an actuarial basis is due to the transition to the new asset smoothing method as of August 31, 2017. Table 7 shows a history of return rates. The LECOSRF ten-year average market return, gross of all expenses as reported by the ERS Master Trust Custodian, is 5.67%. The ten-year average return net of investment expenses is 5.54%.

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 $28.9 million (or 3.4% of assets) in fiscal year 2016 and that amount was $35.4 million (or 3.8% of assets) in fiscal year 2017. ERS should continue to monitor this deficit as it could impact the future liquidity needs of LECOSRF. Table 11 provides a history of contribution rates, as a percent of payroll, paid into the trust by the state, agencies, and members. This table also shows a history of the total normal cost and the Actuarially Sound Contribution rate (ASC), as defined by Section 811.006 of the Texas Government Code.

Data

The valuation was based upon information as of August 31, 2017, 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 Section F show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Table 1
Development of Employer Cost

	August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1. Payroll			
a. Reported Payroll (August Payroll of Active Members)	$ 1,720,362,464	$ 1,720,362,464	$ 1,743,679,004
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	1,720,362,464	1,720,362,464	1,743,679,004
2. Total Normal Cost Rate			
a. Gross normal cost rate	2.03%	1.71%	1.71%
b. Administrative expenses	0.08%	0.10%	0.10%
c. Total (Item 2a + Item 2b)	2.11%	1.81%	1.81%
3. Actuarial Accrued Liability for Active Members			
a. Present value of future benefits for active members	$ 933,603,380	$ 851,371,868	$ 882,442,051
b. Less: present value of future normal costs	(248,727,185)	(191,115,131)	(198,521,400)
c. Actuarial accrued liability	$ 684,876,195	$ 660,256,737	$ 683,920,651
4. Total Actuarial Accrued Liability for:			
a. Retirees and beneficiaries	$ 702,926,185	$ 664,031,042	$ 618,987,770
b. Inactive members	12,074,277	11,624,788	9,484,080
c. Active members (Item 3c)	684,876,195	660,256,737	683,920,651
d. Total	$ 1,399,876,657	$ 1,335,912,567	$ 1,312,392,501
5. Actuarial Value of Assets	$ 923,989,580	$ 961,918,154	$ 933,534,062
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 475,887,077	$ 373,994,413	$ 378,858,439
7. Total Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	3.67%	3.14%	3.10%
8. Expected Contribution from Court Fees			
a. Expected future contributions	$ 18,800,000	$ 18,800,000	$ 19,200,000
b. Equivalent contribution rate for fiscal year	1.09%	1.09%	1.10%
9. Contribution Rate In Addition to Expected Court Fees Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	2.87%	2.35%	2.33%
10. Allocation of Contribution Rate for the Current Fiscal Year			
a. Equivalent employer rate for fiscal year*	1.59%	1.59%	1.60%
b. Member rate	0.50%	0.50%	0.50%
c. Total contribution rate for fiscal year*	2.09%	2.09%	2.10%
d. Total normal cost rate	2.11%	1.81%	1.81%
e. Available contribution rate to amortize UAAL*	-0.02%	0.28%	0.29%
f. Total contribution rate for fiscal year*	2.09%	2.09%	2.10%
11. Funding period based on statutory contribution rates, expected court fees, and Actuarial Value of Assets (years)	Never	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.

Table 2
Actuarial Present Value of Future Benefits

		August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1.	Active Members			
	a. Service Retirement	$ 908,044,629	$ 822,593,512	$ 853,320,981
	b. Disability Benefits	5,111,458	8,774,789	9,032,240
	c. Death Before Retirement	6,857,252	7,007,466	7,297,649
	d. Termination	13,590,041	12,996,101	12,791,181
	e. Total	$ 933,603,380	$ 851,371,868	$ 882,442,051
2.	Inactive Members	$ 12,074,277	$ 11,624,788	$ 9,484,080
3.	Annuitants	$ 702,926,185	$ 664,031,042	$ 618,987,770
4.	Total Actuarial Present Value of Future Benefits	$ 1,648,603,842	$ 1,527,027,698	$ 1,510,913,901

Table 3
Analysis of Normal Cost

	August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1. Gross Normal Cost Rate			
a. Service Retirement	1.85%	1.53%	1.53%
b. Disability Benefits	0.02%	0.03%	0.03%
c. Death Before Retirement	0.01%	0.02%	0.02%
d. Termination	0.15%	0.13%	0.13%
e. Total	2.03%	1.71%	1.71%
2. Administrative Expenses	0.08%	0.10%	0.10%
3. Total Normal Cost	2.11%	1.81%	1.81%
4. Less: Member Rate	0.50%	0.50%	0.50%
5. Employer Normal Cost Rate	1.61%	1.31%	1.31%

Table 4
Historical Summary of Active Member Data

	Active Members		Covered Payroll		Average Salary			
Valuation as of August 31,	Number	Percent Increase	Amount in $ Millions	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
(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
2017	38,206	-2.2%	1,720	-1.3%	45,029	0.9%	41.1	8.0

Table 5
Reconciliation of Plan Net Assets

		Year Ending August 31, 2017 (1)	Year Ending August 31, 2016 (2)
1.	Market value of assets at beginning of year	$ 860,049,223	$ 844,145,332
2.	Revenue for the year		
	a. Contributions for the year		
	i. State (including membership fees)	$ 26,583,162	$ 27,497,297
	ii. Member (including penalty interest)	9,583,044	9,538,658
	iii. Total	$ 36,166,206	$ 37,035,955
	b. Net investment income	$ 99,340,827	$ 44,831,113
	c. Total revenue	$ 135,507,033	$ 81,867,068
3.	Disbursements for the year		
	a. Benefit payments and refunds	69,755,566	$ 64,541,719
	b. Net transfers from TRS	0	0
	c. Administrative expenses	1,811,110	1,421,458
	d. Total expenditures	71,566,676	65,963,177
4.	Increase in net assets (Item 2c - Item 3d)	$ 63,940,357	$ 15,903,891
5.	Market value of assets at end of year (Item 1 + Item 4)	$ 923,989,580	$ 860,049,223

Table 6
Development of Actuarial Value of Assets

		Year Ending August 31, 2017
1.	Actuarial value of assets at beginning of year	$ 933,534,062
2.	Net new investments	
	a. Contributions for the year (Table 5)	$ 36,166,206
	b. Disbursements for the year (Table 5)	(71,566,676)
	c. Subtotal	(35,400,470)
3.	Assumed investment return rate	7.50%
4.	Expected return	$ 68,687,537
5.	Expected actuarial value of assets at end of year (Item 1 + Item 2c + Item 4)	$ 966,821,129
6.	Market value of assets at end of year	$ 923,989,580
7.	Market Adjustment as of August 31, 2017*	$ (42,831,549)
8.	Actuarial value of assets (Item 5 + Item 7)	$ 923,989,580
9.	Estimated rate of return	2.8%
10.	Actuarial value as percentage of market value	100.0%

* A one-time adjustment to reset the actuarial value to market value was applied as of August 31, 2017. Smoothing will be applied in future valuation reports.

Table 7
History of Investment Return Rates

Year Ending August 31 of	Market Returns (Gross)	Market Returns (Net)	Actuarial
(1)	(2)	(3)	(4)
1998	8.30%	8.23%	N/A
1999	16.26%	16.46%	N/A
2000	9.43%	9.40%	N/A
2001	-6.91%	-6.93%	N/A
2002	-7.17%	-7.21%	N/A
2003	9.20%	9.14%	5.2%
2004	11.69%	11.64%	6.3%
2005	12.71%	12.62%	7.4%
2006	8.83%	8.76%	7.6%
2007	13.88%	13.76%	8.5%
2008	-4.58%	-4.69%	5.7%
2009	-6.60%	-6.71%	3.2%
2010	6.65%	6.48%	3.7%
2011	12.58%	12.36%	5.1%
2012	8.22%	8.04%	5.4%
2013	10.07%	9.87%	6.1%
2014	14.70%	14.58%	7.6%
2015	0.49%	0.44%	6.1%
2016	5.32%	5.28%	5.9%
2017	12.15%	12.11%	2.8%
Average Returns			
Last Five Years:	8.43%	8.34%	5.7%
Last Ten Years:	5.67%	5.54%	5.2%
Last Fifteen Years:	7.49%	7.39%	5.8%
Last Twenty Years:	6.49%	6.41%	N/A

Market returns provided by ERS Master Trust Custodian.
Rates in Column (2) represent the market returns gross of all expenses.
Rates in Column (3) represent the market returns net of investment expenses.
Net returns may exceed gross returns in years where adjustments are made to fee expenses.

Table 8
History of Cash Flow

Year Ending August 31,	Contributions	Distributions and Expenditures: Benefit Payments and Refunds	Distributions and Expenditures: Administrative Expenses	Distributions and Expenditures: Total	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
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%
2017	36.2	(69.8)	(1.8)	(71.6)	(35.4)	924.0	-3.8%

Dollar amounts in millions

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

Table 9
Total Experience Gain or Loss

Item		Year Ending August 31, 2017	Year Ending August 31, 2016
(1)		(2)	(3)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 378,858,439	$ 353,061,775
2. Assumption/Method changes - Liability Only		$ 62,287,122	$ 0
3. UAAL, previous year, after assumption changes (Item 1 + Item 2)		$ 441,145,561	$ 353,061,775
4. Normal cost for the year (excluding administrative expenses)		35,571,052	29,236,842
5. Actual administrative expenses		1,811,110	1,421,458
6. Contributions for the year (excluding service purchases)		(35,327,522)	(36,180,288)
7. Interest at 7.5% for FYE 2017, 8% for FYE 2016			
a. On UAAL		$ 33,085,917	$ 28,244,942
b. On normal cost and administrative expenses		1,401,831	1,226,332
c. On contributions		(1,324,782)	(1,447,212)
d. Total		$ 33,162,966	$ 28,024,062
8. Legislative changes*			
– Across-the-board pay increases budgeted for upcoming biennium by the State Legislature		(34,995,327)	0
9. Expected UAAL (Sum of Items 3 through 8)		441,367,840	375,563,849
10. Actual UAAL		475,887,077	378,858,439
11. Total (gain)/loss for the year (Item 10 - Item 9)		$ 34,519,237	$ 3,294,590
B. Source of gains and losses	% of AAL		
12. Asset (Gain)/Loss for the year - Prior Smoothing Method	0.00%	$ 0	$ 18,371,210
13. Asset (Gain)/Loss for the year - New Smoothing Method	3.06%	42,831,549	0
14. Pay Increases (Less)/Greater than Expected	0.06%	908,628	(4,012,226)
15. Non-Retired Demographic (Gains)/Losses	0.70%	(9,838,111)	(12,523,340)
16. Post-Retirement Mortality (Gains)/Losses	0.19%	(2,669,207)	214,071
17. Other Demographic (Gains)/Losses	0.23%	3,286,378	1,244,875
18. Total (Sum of Items 12 through 17)	2.47%	$ 34,519,237	$ 3,294,590

* The plan experiences a (gain)/loss when across-the-board pay increases budgeted by the State Legislature are (less)/greater than assumed.

Table 10
Solvency Test

Actuarial Accrued Liability and Percent of Active Member Payroll for:

August 31,	Accumulated Member Contributions Including Interest (1)	% of Payroll	Retirees and Beneficiaries Currently Receiving Benefits (2)	% of Payroll	Employer Financed Portion of Vested and Nonvested Benefits (3)	% of Payroll	Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Assets (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%
2017	47.0	3%	702.9	41%	649.9	38%	924.0	100%	100%	27%

Note: Dollar amounts in millions

Table 11
Historical Contribution Rates

Actuarial Valuation as of August 31,	Contributions from: State	Court Fees*	Members	Total	Total Normal Cost Rate	ASC**
1998	0.00%	0.00%	0.00%	0.00%	1.70%	Not calculated
1999	0.00%	0.00%	0.00%	0.00%	1.98%	Not calculated
2000	0.00%	0.00%	0.00%	0.00%	1.95%	Not calculated
2001	0.00%	0.00%	0.00%	0.00%	1.76%	Not calculated
2002	0.00%	0.00%	0.00%	0.00%	1.75%	Not calculated
2003	0.00%	0.00%	0.00%	0.00%	1.61%	Not calculated
2004	0.00%	0.00%	0.00%	0.00%	1.62%	Not calculated
2005	0.00%	0.00%	0.00%	0.00%	1.63%	1.54%
2006	0.00%	0.00%	0.00%	0.00%	1.55%	1.50%
2007	1.59%	0.00%	0.00%	1.59%	1.54%	1.61%
2008	1.59%	0.00%	0.00%	1.59%	2.18%	2.51%
2009	1.59%	0.00%	0.50%	2.09%	2.07%	2.58%
2010	1.59%	0.00%	0.50%	2.09%	2.07%	2.72%
2011	0.00%	0.00%	0.50%	0.50%	2.07%	2.72%
2012	0.50%	0.00%	0.50%	1.00%	2.02%	2.86%
2013	0.50%	1.20%	0.50%	2.20%	1.80%	3.09%
2014	0.50%	1.20%	0.50%	2.20%	1.77%	2.96%
2015	0.50%	1.20%	0.50%	2.20%	1.77%	3.01%
2016	0.50%	1.10%	0.50%	2.10%	1.81%	3.10%
2017	0.50%	1.09%	0.50%	2.09%	2.11%	3.67%

* From 2013 to 2015, it was assumed that contributions from court fees would remain level as a percentage of pay. Beginning in 2016 and thereafter, the amount shown is the assumed level dollar amount as a percentage of valuation payroll.

** The Actuarially Sound Contribution (ASC) rate is the rate determined as of the valuation date to fund the normal cost and amortize the UAAL over a 31 year period. In all cases, the ASC is calculated as the total contribution necessary to meet the objective, including any expected contributions from court fees.

***LECOSRF did not receive any contributions for 14 years, from fiscal years 1994 through 2007.

SECTION D

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions for Law Enforcement and Custodial Officer Supplemental Retirement Fund of the Employees Retirement System of Texas

Classes of Membership

1. 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 (collectively referred to as "LECOs"); 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.

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 and Employer 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 2018 and 2019 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 fees collected under Section 133.102 of the Local Government Code. Based on historical information, the contribution from this source is expected to be approximately $18.8 million for fiscal year 2018.

State contributions after the 2019 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. *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.

Standard Service Retirement Annuity

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
    d. *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 (LECO 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 ERS trust and the LECOSRF.

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 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.

SECTION E

ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016.

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 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 each individual active member.

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, and is calculated with the use of an open group projection that takes into account: (a) future market earnings, net of investment-related expenses, will equal 7.50% per year, (b) there will be no 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 Section D of the valuation report.

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 based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment-related expenses. The actuarial value of assets was reset to be equal to the market value of assets as of August 31, 2017 and the new method will be applied prospectively.

IV. Actuarial Assumptions

Investment Return: 7.50% per year, net of investment-related expenses (composed of an assumed 2.50% inflation rate and a 5.00% real rate of return)

Administrative Expenses: 0.08% of valuation payroll per year

Salary Increases: Inflationary pay increases are assumed to occur at the beginning of the year and the remaining pay increases associated with merit, promotion and longevity are assumed to occur at the middle of the valuation year and vary by employee group. The components of the annual increases are:

Employee Group	Inflation *	Real Wage Growth (Productivity)	Merit, Promotion and Longevity
Employee Class	2.50%	included in Merit, Promotion and Longevity Increases	See sample rates

* Total liabilities for this valuation reflect the significant across-the-board pay increases appropriated by the State legislature for the current biennium compared to the assumed rate of inflation.

Annual Salary Increases for Merit, Promotion and Longevity Male and Female LECO Members						
	Years of Eligibility Service					
Age	0	1	2 -4	5 - 8	9 - 17	18+
All	7.00 %	5.00 %	3.50 %	2.50 %	2.25 %	2.00 %

Payroll Growth: 3.00% per year, compounded annually (for projecting valuation payroll).

Age and Service Assumptions and Methods:

Eligibility Service:

Eligibility Service is considered to be all service eligible for vesting purposes, which includes service earned as a regular State employee, a LECO member, a member of the Elected Class, as State Judge, and service earned in the Teacher Retirement System of Texas ("TRS").

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 LECO members, Benefit Service when eligible for service retirement is assumed to be increased by:

- 1.0 years if CPO/CO service, prior to adjustment, is at least 20 years; and
- 0.5 years if CPO/CO service, prior to adjustment, is less than 20 years.

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

Entry Age:

Entry age is calculated as the age at the valuation date minus Eligibility Service (excluding TRS 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 middle of the valuation year.

Mortality Decrements:

Service Retirees, Beneficiaries, and Inactive Members

2017 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP") and projected from the year 2017. Rates for male LECO members are set forward one year. Sample rates for the base mortality table included below.

Annual Mortality Rates per 100 Individuals		
Age	Males	Females
40	0.0603	0.0380
45	0.1059	0.0687
50	0.1825	0.1215
55	0.3145	0.2150
60	0.5421	0.3804
65	0.9344	0.6730
70	1.6105	1.1908
75	2.7757	2.1069
80	4.7842	3.7277
85	8.2459	6.5956
90	14.2527	11.7028

Active Members

RP-2014 Active Member Mortality table. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

Disability Retirees

RP-2014 Disabled Retiree Mortality. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

Occupational Death

1.0% of male and female active member deaths are assumed to be occupational.

Service Retirement Decrements: Graded tables based on ERS experience.

Active LECO Members

Service retirement rates are determined by the first set of eligibility requirements satisfied:

- Eligibility A: 20 years of CPO/CO service
- Eligibility B: Age 55 and 10 years of CPO/CO service
- Eligibility C: Any eligibility pertaining to regular State employees (see rates and adjustments for regular State employees)

Adjustments to the base rates are made to account for age at first eligibility or reduced retirement benefits, based on date of hire (described below sample table).

Base rates for eligible members:

Annual Service Retirement Rates LECO Members (Males & Females)			
Eligibility A		Eligibility B	
Age	20 yrs CPO/CO	Age	Age 55 & 10 yrs CPO/CO
<48	0.03		
48	0.04	55	0.20
49	0.05	56	0.18
50	0.60	57	0.16
51 - 61	0.33	58 - 61	0.14
62 - 74	0.50	62 - 74	0.27
75	1.00	75	1.00

Adjustments for members hired before September 1, 2013:

- Eligibility A and B: Rate set to zero if member has 18 or 19 years of CPO/CO service. Rate is doubled if member has 20 years of CPO/CO service. Adjustments only apply to members that attain 20 years of CPO/CO service prior to age 65.

Adjustments for members hired on or after September 1, 2013:

- Eligibility A: If age of 1st eligibility is before age 57, then
  - rates prior to age 57 are multiplied by 75% for each year prior to age 57
  - the rate at age 57 is 100%
- Eligibility B: If member will attain 20 years of CPO/CO service at or before age 62, rates are zero prior to age 62 and 100% when member attains 20 years of CPO/CO service.
- Eligibility B: If member will attain 20 years of CPO/CO service after age 62, then
  - rates prior to age 62 are multiplied by 75% for each year prior to age 62
  - the rate at age 62 is the base table rate plus 0.20 plus 0.06 times the number of years the age at 1st eligibility was before age 62

Disability Retirement Decrements: Graded Tables Based on ERS Experience

Active LECO Members

- 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 sum of the member's age and eligibility service is greater than or equal to 80, or the member has attained age 55 with 10 or more years of CPO/CO service.

Sample rates for members:

Annual Disability Rates per 100 Participants LECO Members	
Age	Males and Females
30	0.0092
35	0.0314
40	0.0586
45	0.0980
50	0.1774
55	0.2460
60	0.3150

95% of the disability rates stated above are assumed to be attributable to non-occupational disabilities, 4.5% are assumed to be attributable to non-total occupational disabilities, and 0.5% 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. To account for active members that accumulate additional eligibility service at retirement through converting sick/annual leave or other types of service purchases, termination rates are also set to zero in the year prior to first retirement eligibility.

Rates for members not eligible for service retirement:

Active LECO Members

Annual Rates of Termination per 100 Participants LECO Members	
Eligibility Service	Male and Female
0	23.00
1	19.22
2	15.36
3	12.48
4	10.36
5	8.81
6	7.67
7	6.81
8	6.11
9	5.52
10	4.96
11	4.42
12	3.90
13	3.43
14	3.07
15	2.90
16	2.50
17	1.00
18	1.00
19+	0.00

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%	50%	0%
Service Retirement	60%	40%	0%
Death Benefit Plan	0%	85%	15%
Female Member			
Disability	75%	25%	0%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	70%	30%

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: Males are assumed to be two years older than females.

Transfers from ERS to TRS:

Contributing ERS members:

It is assumed that 10% of regular State employees and LECO 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 LECOSRF as of August 31, 2017 and does not take into account future members, with the exception of determining the funding period.
- 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 are currently immaterial in relation to the overall payroll contributions and have been ignored.

SECTION F

DETAILED SUMMARIES OF MEMBERSHIP DATA

Detailed Summaries of Membership Data

Table A

Summary of Membership Data

Active Members

Item	Male	Female	Total
Number of Members	24,000	14,206	38,206
Average Annual Salaries	$ 47,572	$ 40,731	$ 45,029
Average Age	40.9	41.4	41.1
Average Entry Age	32.7	33.7	33.1
Average Service	8.2	7.7	8.0

Annuitants

Item	Number	Annual Annuities	Average Annuities	Average Age
Service Retirees*	11,448	$ 61,716,852	$ 5,391	62.5
Beneficiaries	700	$ 2,761,584	$ 3,945	72.4
Disability Retirees	100	$ 939,312	$ 9,393	68.4
Total	12,248	$ 65,417,748	$ 5,341	63.1

* Average Age and Service at Retirement for Service Retirees are 54.0 and 23.6, respectively

Inactive Members Assumed Eligible for Deferred Annuities

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	109	$ 820,452	$ 7,527	49.8

Non-vested Inactive Members

Item	Number	Account Balances	Average Account Balances	Average Age
Non-vested Members	16,991	$ 4,150,672	$ 244	35.8

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	3,963	30								3,993
	$ 34,307	$ 39,968								$ 34,350
25 - 29	4,042	713	25							4,780
	$ 39,234	$ 45,270	$ 43,890							$ 40,159
30 - 34	2,703	1,423	525	30						4,681
	$ 39,090	$ 50,950	$ 50,018	$ 50,222						$ 43,992
35 - 39	2,103	1,091	867	521	24					4,606
	$ 38,813	$ 49,014	$ 57,576	$ 57,954	$ 59,874					$ 47,036
40 - 44	1,667	876	750	920	604	21				4,838
	$ 38,311	$ 46,209	$ 54,221	$ 59,220	$ 59,910	$ 68,228				$ 49,010
45 - 49	1,466	895	730	906	1,253	470	14			5,734
	$ 38,512	$ 45,447	$ 50,212	$ 54,846	$ 60,499	$ 64,774	$ 72,923			$ 50,706
50 - 54	1,149	837	648	659	444	281	110	1		4,129
	$ 37,923	$ 43,489	$ 46,492	$ 49,728	$ 59,732	$ 71,243	$ 87,466	$ 101,551		$ 48,228
55 - 59	880	729	477	497	251	87	45	9		2,975
	$ 37,477	$ 43,522	$ 46,051	$ 46,607	$ 53,555	$ 70,844	$ 89,972	$ 104,893		$ 45,189
60 - 64	449	561	268	295	149	27	16	3		1,768
	$ 37,772	$ 43,156	$ 44,244	$ 46,883	$ 50,097	$ 56,633	$ 85,713	$ 88,410		$ 43,828
Over 64	178	253	125	96	36	9	4	1		702
	$ 37,067	$ 42,032	$ 42,774	$ 44,958	$ 52,944	$ 77,827	$ 49,148	$ 52,891		$ 42,380
Total	18,600	7,408	4,415	3,924	2,761	895	189	14		38,206
	$ 37,756	$ 46,380	$ 50,712	$ 53,505	$ 58,950	$ 67,361	$ 86,026	$ 97,408		$ 45,029

Table C

Retired and Beneficiary Members

Distribution by Age and Category

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees			
Under 60	4,940	27,746,208	5,617
60 - 64	2,531	13,282,944	5,248
65 - 69	2,005	10,145,892	5,060
70 - 74	1,081	5,535,288	5,121
75 - 79	512	2,730,792	5,334
Over 79	379	2,275,728	6,005
Total	11,448	61,716,852	5,391
Beneficiaries			
Under 60	105	460,848	4,389
60 - 64	72	279,828	3,887
65 - 69	107	384,492	3,593
70 - 74	97	351,972	3,629
75 - 79	115	458,916	3,991
Over 79	204	825,528	4,047
Total	700	2,761,584	3,945
Disabled Retirees			
Under 60	25	199,740	7,990
60 - 64	14	102,684	7,335
65 - 69	15	131,628	8,775
70 - 74	20	246,876	12,344
75 - 79	8	64,116	8,015
Over 79	18	194,268	10,793
Total	100	939,312	9,393
Grand Total	12,248	65,417,748	5,341

SECTION G

GLOSSARY

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 ADC.

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 ADC.

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 ADC 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.

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 it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. 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, 2017

GRS Retirement Consulting

P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

November 28, 2017

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, 2017

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, 2017. 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 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, 2017 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 Section D of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. Additionally, this actuarial valuation incorporates the significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. The current actuarial assumptions and methods are outlined in Section E of this report.

Data

The valuation was based upon information as of August 31, 2017, 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 audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

Certification

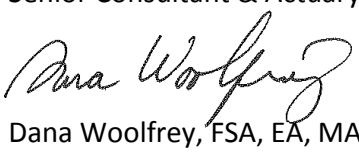
All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

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 & Actuary

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader & Actuary



Dana Woolfrey, FSA, EA, MAAA
Consultant & Actuary

Table of Contents

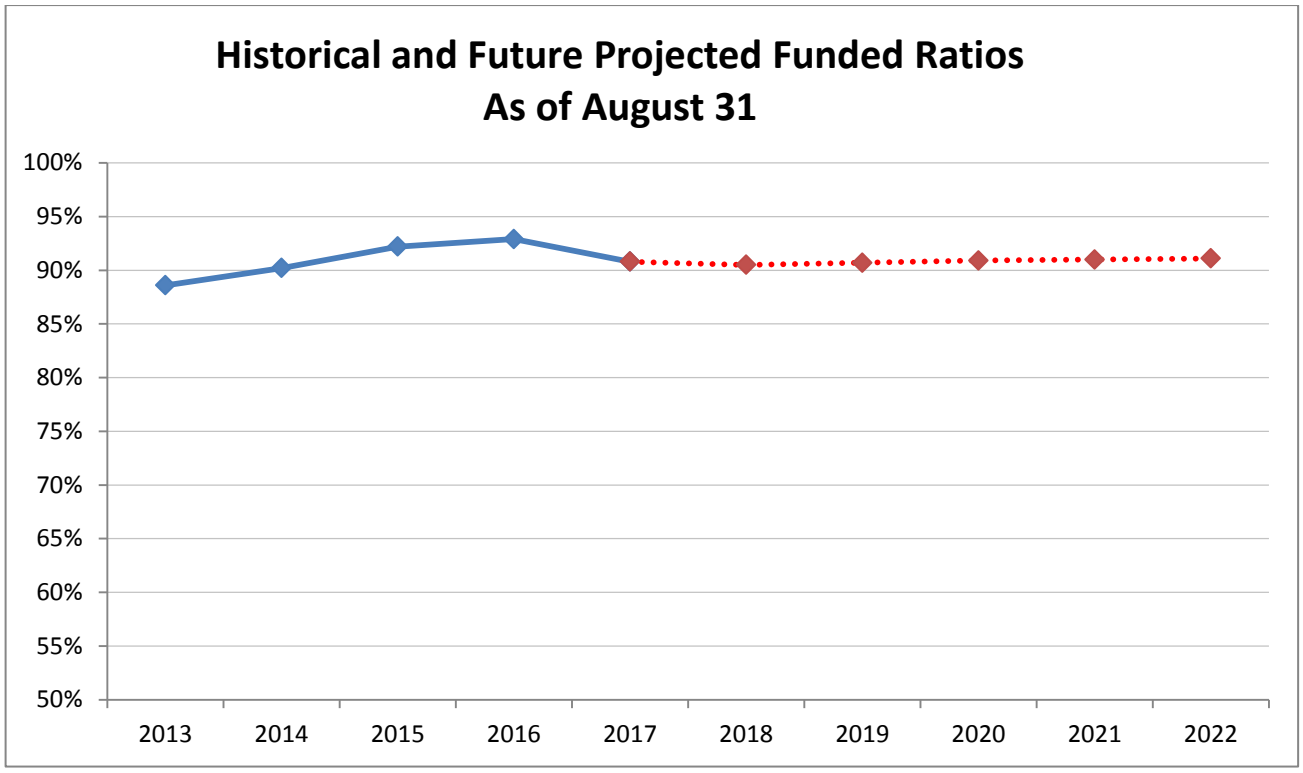
SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2017	2016
Membership		
• Number of		
- Active members	557	548
- Retirees and beneficiaries	378	331
- Inactive, vested	13	16
- Inactive, nonvested	145	150
- Total	1,093	1,045
• Valuation Payroll	$ 79,330,000	$ 78,238,000
Statutory contribution rates	FY 2018	FY 2017
• Members	7.43%	7.44%
• State	15.663%	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)	23.85%	23.48%
Assets		
• Market value (MVA)	$ 420,850,181	$ 381,119,508
• Actuarial value (AVA)	$ 420,850,181	$ 395,457,335
• Return on market value (gross)*	12.2%	5.3%
• Return on market value (net)	12.1%	5.3%
• Return on actuarial value	7.8%	7.0%
Actuarial Information on AVA (smoothed)		
• Normal cost %	20.57%	21.18%
• Total normal cost	$ 16,318,181	$ 16,570,808
• Actuarial accrued liability	$ 463,603,690	$ 425,865,307
• Unfunded actuarial accrued liability (UAAL)	$ 42,753,509	$ 30,407,972
• Funded ratio	90.8%	92.9%
• Funding period (years)	63	49
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 42,753,509	$ 44,745,799
• Funded ratio	90.8%	89.5%

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



August 31,	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Funded Ratio	88.6%	90.2%	92.2%	92.9%	90.8%	90.5%	90.7%	90.9%	91.0%	91.1%
UAAL (in millions)	$41.0	$37.9	$31.4	$30.4	$42.8	$46.1	$46.9	$47.8	$48.7	$49.6
ASC	24.08%	23.86%	23.79%	23.48%	23.85%	24.00%	23.98%	23.96%	23.94%	23.90%

The projections beyond 2017 are based on the same assumptions, methods and provisions used for the August 31, 2017 valuation, which include the significant across-the-board pay increases budgeted by the State Legislature when they are granted and the assumptions adopted by the Board in August 2017. Additionally, the market value of assets is expected to earn 7.5% per year.

Assuming the actuarial (smoothed) value of assets earns 7.5% per year, JRS-2 is projected to reach full funding in 2080. 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, 2017 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 and employer contribution rates, 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 2.523% of payroll, which, on both an actuarial and market value of assets basis, is sufficient to amortize the unfunded liability over a period of 63 years.

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 Section D of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of JRS-2.

A detailed account of the revised actuarial assumptions and methods can be found in our Actuarial Experience Study report dated June 28, 2017. A summary of key changes in assumptions and methods is highlighted below:

Economic Assumptions

- Decrease the investment return assumption from 8.00% to 7.50%
- Decrease the inflation assumption from 3.50% to 2.50%
- The merit component was increased from 0.00% to 0.50%, and thus when combined with the decrease in inflation, the nominal assumption is 0.50% lower than the previous assumption.
- Establish a general wage inflation assumption of 0.50% above inflation, or 3.00%.

Mortality Assumptions

- The post-retirement mortality tables for non-disabled retirees are based on recent ERS experience. Fully generational mortality improvements are assumed using the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP").
- The post-retirement mortality tables for disabled retirees is based on the most recently published national tables, the RP-2014 tables for disabled lives. Fully generational mortality improvements are assumed using Scale U-MP.

- The pre-retirement mortality tables for active employees are based on the most recently published national tables, the RP-2014 tables for employees. Fully generational mortality improvements are assumed using Scale U-MP.

Other Demographic Assumptions

- No change to termination patterns for members.
- Small adjustments in the overall retirement rates consistent with experience and future expectations and to better reflect expected differences among the benefit groups. Reduced rates for members eligible for early retirement.
- Small decreases to the disability patterns for members consistent with experience and future expectations.

Actuarial Methods and Policies

- Change in the asset smoothing method to a method that recognizes each year's gain or loss over a closed five-year period. However, the method will continue to allow direct offsetting of gains and losses. The actuarial (smoothed) value of assets was set to equal to market value (mark to market) as of August 31, 2017, with the smoothing method to be applied prospectively.

The actuarial valuation as of August 31, 2017 incorporates the significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. Specifically, judges were assumed to receive no increase on September 1, 2017 or September 1, 2018.

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 Section E 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, 2017, 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, 2017 is 7.43% of payroll. This State contribution rate is subject to future legislative appropriations.

The unfunded actuarial accrued liability (UAAL) of JRS-2 increased from $30.4 million as of August 31, 2016 to $42.8 million as of August 31, 2017. Additionally, the funded ratio of JRS-2—actuarial value of assets divided by the actuarial accrued liability—decreased from 92.9% to 90.8% as of August 31, 2017. This decrease was primarily due to the changes in actuarial assumptions and methods adopted by the Board in August 2017. 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 20.57% of payroll. The total contribution rate is 23.093% of payroll for the current fiscal year. The total contribution rate for the current fiscal year exceeds the normal cost by 2.523% of payroll, which is sufficient to amortize the UAAL over 63 years on an actuarial value of assets basis. As a result, the current contribution rates are expected to eliminate the UAAL for JRS-2 in 63 years based on the current benefit provisions and actuarial assumptions.

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, 2017, the actuarially sound contribution (ASC) rate for JRS-2 is 23.85% of payroll.

As noted, the ASC is currently calculated based on a 31-year open amortization period. This means that the ASC will always be calculated with the same 31-year period and the UAAL would never completely be eliminated. 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 ERS assets.

The total market value of assets increased from $381.1 million to $420.9 million as of August 31, 2017. Table 5 reconciles the changes in the fund during the year. Total contributions increased slightly from $18.1 million to $18.5 million.

Table 6 shows the development of the actuarial value of assets. As part of the actuarial experience study and adoption of revised actuarial assumptions and methods, the Board voted to reset the actuarial value of assets (AVA) to be equal to the market value of assets (MVA), or "mark to market" as of August 31, 2017. In subsequent years the AVA will be calculated using a new method. The new method will recognize each year's gain or loss over a closed five year period. However, the method will continue to allow direct offsetting of gains and losses.

When measured on a market value, the approximate gross investment return for the fiscal year ending August 31, 2017 was 12.15%, and the return net of investment expenses was 12.11%. When measured on an actuarial value, the net investment return was 7.8%. The lower return on an actuarial basis is due to the transition to the new asset smoothing method as of August 31, 2017. Table 7 shows a history of return rates. The JRS-2 ten-year average market return, gross of all expenses as reported by the ERS Master Trust Custodian, is 5.67%. The ten-year average return net of investment expenses is 5.54%.

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 JRS-2 paid administrative expenses and

benefit payments, in excess of contributions received, of $3.3 million (or 0.9% of assets) in fiscal year 2016 and the amount was $5.1 million (or 1.2% of assets) in fiscal year 2017. ERS should continue to monitor this deficit as it could impact the future liquidity needs of JRS-2. Table 11 provides a history of contribution rates, as a percent of payroll, paid into the trust by the State, agencies, and members. This table also shows a history of the total normal cost and the Actuarially Sound Contribution (ASC), as defined by Section 840.106 of the Texas Government Code.

Data

The valuation was based upon information as of August 31, 2017, 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 audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff.

The tables in Section F show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Table 1
Development of Employer Cost

	August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1. Payroll			
a. Reported Payroll (August Payroll of Active Members)	$ 79,330,000	$ 79,330,000	$ 78,238,000
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	79,330,000	79,330,000	78,238,000
2. Total Normal Cost Rate			
a. Gross normal cost rate	20.24%	20.81%	20.68%
b. Administrative expenses	0.33%	0.50%	0.50%
c. Total (Item 2a + Item 2b)	20.57%	21.31%	21.18%
3. Actuarial Accrued Liability for Active Members			
a. Present value of future benefits for active members	$ 291,526,354	$ 289,954,635	$ 300,182,639
b. Less: present value of future normal costs	(80,659,690)	(83,533,927)	(82,520,893)
c. Actuarial accrued liability	$ 210,866,664	$ 206,420,708	$ 217,661,746
4. Total Actuarial Accrued Liability for:			
a. Retirees and beneficiaries	$ 241,314,049	$ 225,217,978	$ 196,779,287
b. Inactive members	11,422,977	10,833,371	11,424,274
c. Active members (Item 3c)	210,866,664	206,420,708	217,661,746
d. Total	$ 463,603,690	$ 442,472,057	$ 425,865,307
5. Actuarial Value of Assets	$ 420,850,181	$ 421,564,714	$ 395,457,335
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 42,753,509	$ 20,907,343	$ 30,407,972
7. Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	23.85%	22.92%	23.48%
8. Allocation of Contribution Rate			
a. Employer rate	15.663%	15.663%	15.663%
b. Member rate	7.43%	7.44%	7.44%
c. Total contribution rate	23.093%	23.103%	23.103%
d. Total normal cost rate	20.57%	21.31%	21.18%
e. Available contribution rate to amortize UAAL	2.523%	1.793%	1.923%
f. Total contribution rate	23.093%	23.103%	23.103%
9. Funding period based on statutory contribution rates and Actuarial Value of Assets (years)	63	26	49

Table 2
Actuarial Present Value of Future Benefits

		August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1.	Active Members			
	a. Service Retirement	$ 246,762,309	$ 263,602,228	$ 273,908,650
	b. Disability Benefits	2,811,567	3,649,852	3,610,321
	c. Death Before Retirement	30,209,524	10,454,944	10,766,912
	d. Termination	11,742,954	12,247,611	11,896,756
	e. Total	$ 291,526,354	$ 289,954,635	$ 300,182,639
2.	Inactive Members	$ 11,422,977	$ 10,833,371	$ 11,424,274
3.	Annuitants	$ 241,314,049	$ 225,217,978	$ 196,779,287
4.	Total Actuarial Present Value of Future Benefits	$ 544,263,380	$ 526,005,984	$ 508,386,200

Table 3
Analysis of Normal Cost

		August 31, 2017 Final Assumptions	August 31, 2017 Prior Assumptions	August 31, 2016
1.	Gross Normal Cost Rate			
	a. Service Retirement	15.20%	17.33%	17.28%
	b. Disability Benefits	0.40%	0.57%	0.55%
	c. Death Before Retirement	2.71%	0.78%	0.77%
	d. Termination	1.93%	2.13%	2.08%
	e. Total	20.24%	20.81%	20.68%
2.	Administrative Expenses	0.33%	0.50%	0.50%
3.	Total Normal Cost	20.57%	21.31%	21.18%
4.	Less: Member Rate	7.43%	7.44%	7.44%
5.	Employer Normal Cost Rate	13.14%	13.87%	13.74%

Table 4
Historical Summary of Active Member Data

	Active Members		Covered Payroll		Average Salary			
Valuation as of August 31,	Number	Percent Increase	Annual Payroll ($)	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2008	518	N/A	66,110,000	N/A	127,625	N/A	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
2017	557	1.6%	79,330,000	1.4%	142,424	-0.2%	57.2	9.8

Table 5
Reconciliation of Plan Net Assets

	Year Ending August 31, 2017 (1)	Year Ending August 31, 2016 (2)
1. Market value of assets at beginning of year	$ 381,119,508	$ 364,510,248
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	$ 12,494,828	$ 12,374,200
ii. Member (including penalty interest)	6,016,757	5,754,349
iii. Total	$ 18,511,585	$ 18,128,549
b. Net investment income	$ 44,875,456	$ 19,861,581
c. Total revenue	$ 63,387,041	$ 37,990,130
3. Disbursements for the year		
a. Benefit payments and refunds	23,361,377	$ 21,154,764
b. Administrative expenses	294,991	226,106
c. Total expenditures	23,656,368	21,380,870
4. Increase in net assets (Item 2c - Item 3c)	$ 39,730,673	$ 16,609,260
5. Market value of assets at end of year (Item 1 + Item 4)	$ 420,850,181	$ 381,119,508

Table 6
Development of Actuarial Value of Assets

		Year Ending August 31, 2017
1.	Actuarial value of assets at beginning of year	$ 395,457,335
2.	Net new investments	
	a. Contributions for the year (Table 5)	$ 18,511,585
	b. Disbursements for the year (Table 5)	(23,656,368)
	c. Subtotal	(5,144,783)
3.	Assumed investment return rate	7.50%
4.	Expected return	$ 29,466,371
5.	Expected actuarial value of assets at end of year (Item 1 + Item 2c + Item 4)	$ 419,778,923
6.	Market value of assets at end of year	$ 420,850,181
7.	Market Adjustment as of August 31, 2017*	$ 1,071,258
8.	Actuarial value of assets (Item 5 + Item 7)	$ 420,850,181
9.	Estimated rate of return	7.8%
10.	Actuarial value as percentage of market value	100.0%

* A one-time adjustment to reset the actuarial value to market value was applied as of August 31, 2017. Smoothing will be applied in future valuation reports.

Table 7
History of Investment Return Rates

Year Ending August 31 of	Market Returns (Gross)	Market Returns (Net)	Actuarial
(1)	(2)	(3)	(4)
1998	8.30%	8.23%	N/A
1999	16.26%	16.46%	N/A
2000	9.43%	9.40%	N/A
2001	-6.91%	-6.93%	N/A
2002	-7.17%	-7.21%	N/A
2003	9.20%	9.14%	5.2%
2004	11.69%	11.64%	6.2%
2005	12.71%	12.62%	7.5%
2006	8.83%	8.76%	7.7%
2007	13.88%	13.76%	8.8%
2008	-4.58%	-4.69%	5.9%
2009	-6.60%	-6.71%	3.5%
2010	6.65%	6.48%	4.1%
2011	12.58%	12.36%	5.7%
2012	8.22%	8.04%	7.6%
2013	10.07%	9.87%	8.0%
2014	14.70%	14.58%	9.3%
2015	0.49%	0.44%	7.4%
2016	5.32%	5.28%	7.0%
2017	12.15%	12.11%	7.8%
Average Returns			
Last Five Years:	8.43%	8.34%	7.9%
Last Ten Years:	5.67%	5.54%	6.6%
Last Fifteen Years:	7.49%	7.39%	6.8%
Last Twenty Years:	6.49%	6.41%	N/A

Market returns provided by ERS Master Trust Custodian.
Rates in Column (2) represent the market returns gross of all expenses.
Rates in Column (3) represent the market returns net of investment expenses.
Net returns may exceed gross returns in years where adjustments are made to fee expenses.

Table 8
History of Cash Flow

Year Ending August 31,	Contributions	Distributions and Expenditures: Benefit Payments and Refunds	Distributions and Expenditures: Administrative Expenses	Distributions and Expenditures: Total	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
(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%
2017	18,511	(23,361)	(295)	(23,656)	(5,145)	420,850	-1.2%

Dollar amounts in thousands

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

Table 9
Total Experience Gain or Loss

Item		Year Ending August 31, 2017	Year Ending August 31, 2016
(1)		(2)	(3)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 30,407,972	$ 31,395,567
2. Assumption/Method changes - Liability Only		$ 18,378,089	$ 0
3. UAAL, previous year, after assumption changes (Item 1 + Item 2)		$ 48,786,061	$ 31,395,567
4. Normal cost for the year (excluding administrative expenses)		15,725,838	16,793,568
5. Actual administrative expenses		294,991	226,106
6. Contributions for the year (excluding service purchases)		(18,251,419)	(18,113,430)
7. Interest at 7.5% for FYE 2017, 8% for FYE 2016			
a. On UAAL		$ 3,658,955	$ 2,511,645
b. On normal cost and administrative expenses		600,781	680,787
c. On contributions		(684,428)	(724,537)
d. Total		$ 3,575,308	$ 2,467,895
8. Legislative changes* – Pay increases budgeted for upcoming biennium by the State Legislature		(11,736,556)	0
9. Expected UAAL (Sum of Items 3 through 8)		38,394,223	32,769,706
10. Actual UAAL		42,753,509	30,407,972
11. Total (gain)/loss for the year (Item 10 - Item 9)		$ 4,359,286	$ (2,361,734)
B. Source of gains and losses	% of AAL		
12. Asset (Gain)/Loss for the year - Prior Smoothing Method	0.00%	$ 0	$ 3,584,457
13. Asset (Gain)/Loss for the year - New Smoothing Method	0.23%	(1,071,258)	0
14. Pay Increases (Less)/Greater than Expected	0.00%	0	0
15. Non-Retired Demographic (Gains)/Losses	0.73%	3,384,069	(7,807,497)
16. Post-Retirement Mortality (Gains)/Losses	0.15%	717,849	885,212
17. Other Demographic (Gains)/Losses	0.29%	1,328,626	976,094
18. Total (Sum of Items 12 through 17)	0.94%	$ 4,359,286	$ (2,361,734)

* The plan experiences a (gain)/loss when across-the-board pay increases budgeted by the State Legislature are (less)/greater than assumed.

Table 10
Solvency Test

Actuarial Accrued Liability and Percent of Active Member Payroll for:

	Accumulated Member Contributions Including Interest		Retirees and Beneficiaries Currently Receiving Benefits		Employer Financed Portion of Vested and Nonvested Benefits			Portion of Accrued Liabilities Covered by Assets		
August 31,	(1)	% of Payroll	(2)	% of Payroll	(3)	% of Payroll	Actuarial Value of Assets	(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%
2017	72,977	92%	241,314	304%	149,313	188%	420,850	100%	100%	71%

Note : Dollar amounts in thousands

Table 11
Historical Contribution Rates

Actuarial Valuation as of August 31,	Contributions from: State	Members*	Total	Total Normal Cost Rate	ASC**
1998	16.830%	6.00%*	22.830%	21.43%	Not calculated
1999	16.830%	6.00%*	22.830%	21.82%	Not calculated
2000	16.830%	6.00%*	22.830%	22.01%	Not calculated
2001	16.830%	6.00%*	22.830%	22.37%	Not calculated
2002	16.830%	6.00%*	22.830%	22.88%	Not calculated
2003	16.830%	6.00%*	22.830%	19.58%	Not calculated
2004	16.830%	6.00%*	22.830%	19.58%	Not calculated
2005	16.830%	5.98%	22.810%	20.98%	22.64%
2006	16.830%	5.95%	22.780%	20.59%	21.70%
2007	16.830%	5.98%	22.810%	20.83%	21.60%
2008	16.830%	5.99%	22.820%	19.26%	19.81%
2009	16.830%	5.99%	22.820%	20.30%	20.94%
2010	16.830%	5.98%	22.810%	20.19%	21.68%
2011	6.000%	5.97%	11.970%	20.38%	21.76%
2012	6.500%	5.98%	12.480%	20.25%	21.52%
2013	15.663%	6.57%	22.233%	20.96%	24.08%
2014	15.663%	6.87%	22.533%	21.03%	23.86%
2015	15.663%	7.16%	22.823%	21.40%	23.79%
2016	15.663%	7.44%	23.103%	21.18%	23.48%
2017	15.663%	7.43%	23.093%	20.57%	23.85%

* Effective member contribution rate due to the active JRS-2 members that have elected to cease contributing to the plan as well as cease accruing additional benefits. FY 1998-2004 shows the rate members contributed if they chose to continue contributions. FY 2005 and forward reflects the effective rate that accounts for some JRS 2 members choosing not to participate after 20 years (or 12 years, if member is an appellate court justice).

** The Actuarially Sound Contribution Rate (ASC) is the rate determined as of the valuation date to fund the normal cost and amortize the UAAL over a 31 year period.

SECTION D

SUMMARY OF PLAN PROVISIONS

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 2018 and 2019, 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 Service Credit.

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 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:

Attained Age	Percent of Final Compensation
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.

SECTION E

ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016.

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 total normal cost rate is based on the benefits payable to each individual active member.

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 7.50% 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 based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment-related expenses. The actuarial value of assets was reset to be equal to the market value of assets as of August 31, 2017 and the new method will be applied prospectively.

IV. Actuarial Assumptions

Investment Return: 7.50% per year, net of investment-related expenses (composed of an assumed 2.50% inflation rate and a 5.00% real rate of return)

Administrative Expenses: 0.33% of valuation payroll per year

Salary Increases: Inflationary pay increases are assumed to occur at the beginning of the year and the remaining pay increases associated with merit, promotion and longevity are assumed to occur at the middle of the valuation year. The components of the annual increases are:

Inflation	Real Wage Growth (Productivity)	Merit, Promotion and Longevity
2.50%	0.50%	0.00%

Payroll Growth: 3.00% per year, compounded annually (for projecting valuation payroll).

Post-Retirement Increases: None

Age and Service Assumptions and Methods:

Eligibility Service:

Eligibility Service is considered to be all service eligible for vesting purposes, which includes contributory and non-contributory service.

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 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).

Entry Age:

Entry age is calculated as the age at the valuation date minus Eligibility 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 middle of the valuation year.

Mortality Decrements:

Service Retirees, Beneficiaries, and Inactive Members

2017 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP") and projected from the year 2017. Sample rates for the base mortality table included below.

Annual Mortality Rates per 100 Individuals		
Age	Males	Females
40	0.0603	0.0380
45	0.1059	0.0687
50	0.1825	0.1215
55	0.3145	0.2150
60	0.5421	0.3804
65	0.9344	0.6730
70	1.6105	1.1908
75	2.7757	2.1069
80	4.7842	3.7277
85	8.2459	6.5956
90	14.2527	11.7028

Active Members

RP-2014 Active Member Mortality table. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

Disability Retirees

RP-2014 Disabled Retiree Mortality. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

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

Eligibility 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 State Judges		
	Male and Female	
Age	Unreduced	Reduced
50 - 64	0.20	0.10
65 - 69	0.20	N/A
70 - 74	0.25	N/A
75+	1.00	N/A

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

- The rates do not apply before someone is eligible for the benefit.
- No occupational disabilities are assumed for the elected class or judges.
- 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 service retirement eligibility.

Sample rates for eligible members:

Annual Disability Rates per 100 Participants		
Age	Males	Females
30	0.0275	0.0135
35	0.0650	0.0442
40	0.0749	0.0896
45	0.1027	0.1455
50	0.1484	0.2072
55	0.2477	0.3488
60	0.3740	0.5583

99% of the disability rates stated above are assumed to be attributable to nonoccupational 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: Graded Tables Based on JRS-1 and JRS-2 Experience.

Four 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%	50%	0%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	85%	15%
Female Member			
Disability	75%	25%	0%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	70%	30%

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: Males are assumed to be two years older than females.

Census Data and Assets

- The valuation was based on members of JRS-2 as of August 31, 2017 and does not take into account future members, with the exception of determining the funding period.
- 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.

SECTION F

DETAILED SUMMARIES OF MEMBERSHIP DATA

Detailed Summaries of Membership Data

Table A

Summary of Membership Data

Active Members

Item	Male	Female	Total
Number of Members	348	209	557
Average Annual Salaries	$ 142,216	$ 142,770	$ 142,424
Average Age	58.6	55.1	57.2
Average Entry Age	48.6	45.8	47.4
Average Service	10.0	9.3	9.8

Inactive Members

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	13	$ 974,220	$ 74,940	58.9
Service Retirees*	335	$ 21,660,744	$ 64,659	69.2
Beneficiaries	41	$ 2,295,564	$ 55,989	70.9
Disability Retirees	2	$ 159,000	$ 79,500	65.2
Total	391	$ 25,089,528	$ 64,168	69.0

* Average Age and Service at Retirement for Service Retirees are 62.8 and 15.1, respectively

Non-vested Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Participants	145	$ 4,988,498	$ 34,403	60.9

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	1 $ 140,000									1 $ 140,000
35 - 39	12 $ 140,000									12 $ 140,000
40 - 44	28 $ 141,000	9 $ 141,556								37 $ 141,135
45 - 49	39 $ 141,436	24 $ 141,167	14 $ 142,000	1 $ 168,000						78 $ 141,795
50 - 54	34 $ 142,882	26 $ 141,615	21 $ 143,333	10 $ 144,200	1 $ 140,000					92 $ 142,739
55 - 59	39 $ 142,513	20 $ 140,000	20 $ 141,400	19 $ 144,421	11 $ 141,273					109 $ 142,055
60 - 64	23 $ 141,826	23 $ 141,217	17 $ 142,471	21 $ 145,571	17 $ 149,353	3 $ 144,667				104 $ 143,865
Over 64	16 $ 140,000	26 $ 140,538	38 $ 141,908	16 $ 145,563	17 $ 144,118	7 $ 142,000	4 $ 147,625			124 $ 142,339
Total	192 $ 141,677	128 $ 140,984	110 $ 142,186	67 $ 145,373	46 $ 145,283	10 $ 142,800	4 $ 147,625			557 $ 142,424

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	1,020,828	51,041
60 - 64	69	4,472,688	64,822
65 - 69	97	6,514,692	67,162
70 - 74	88	5,755,932	65,408
75 - 79	45	2,941,524	65,367
Over 79	16	955,080	59,693
Total	335	21,660,744	64,659
Beneficiaries			
Under 60	6	287,328	47,888
60 - 64	5	365,544	73,109
65 - 69	9	508,152	56,461
70 - 74	8	447,564	55,946
75 - 79	3	164,892	54,964
Over 79	10	522,084	52,208
Total	41	2,295,564	55,989
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	378	24,115,308	63,797

SECTION G

GLOSSARY

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 ADC.

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 ADC.

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 ADC 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.

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 it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. 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, 2017

GRS Retirement Consulting

P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

November 28, 2017

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, 2017

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, 2017. 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 provide a detailed summary of the provisions, assumptions, methods and data used to prepare 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, 2017.

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

Our actuarial valuation as of August 31, 2017 reflects the benefit and contribution provisions set forth in Chapters 831 through 835 of the Texas Government Code. The current plan provisions are outlined in Section B of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016. Additionally, this actuarial valuation incorporates the

significant across-the-board pay increases budgeted by the State Legislature when they are granted for the current biennium. The current actuarial assumptions and methods are outlined in Section C of this report.

Data

The valuation was based upon information as of August 31, 2017, 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 audit the data. We are not responsible for the accuracy or completeness of the information provided by ERS staff. A summary of the membership data is provided in Section D of this report.

Certification

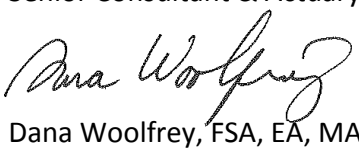
All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

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 & Actuary

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader & Actuary



Dana Woolfrey, FSA, EA, MAAA
Consultant & Actuary

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SECTION A

ACTUARIAL VALUATION RESULTS

Summary of Plan Obligations

		August 31, 2017	August 30, 2016
1.	Valuation Discount Rate*	3.42%	2.84%
2.	Payroll		
	a. Reported Payroll (August Payroll of Active Members)	$ 1,330,000	$ 1,470,000
	b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	1,330,000	1,470,000
3.	Total Normal Cost Rate		
	a. Gross normal cost rate	53.23%	69.78%
	b. Administrative expenses	0.00%	0.00%
	c. Total (Item 2a + Item 2b)	53.23%	69.78%
4.	Actuarial Accrued Liability for Active Members		
	a. Present value of future benefits for active members	$ 13,975,563	$ 17,975,306
	b. Less: present value of future normal costs	(667,388)	(870,908)
	c. Actuarial accrued liability	$ 13,308,175	$ 17,104,398
5.	Total Actuarial Accrued Liability for:		
	a. Retirees and beneficiaries	$ 263,234,223	$ 310,939,899
	b. Inactive members	0	112
	c. Active members (Item 3c)	13,308,175	17,104,398
	d. Total	$ 276,542,398	$ 328,044,409
6.	Actuarial Value of Assets	$ 0	$ 0
7.	Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 276,542,398	$ 328,044,409

*Valuation Discount Rate based on municipal bond rate as of end of August each year.

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
2018	$ 23,344,889	$ 31,180	$ 23,313,709
2019	22,552,994	16,790	22,536,204
2020	21,922,250	12,272	21,909,978
2021	21,271,837	8,945	21,262,892
2022	20,597,298	6,500	20,590,798
2023	19,912,284	3,791	19,908,493
2024	19,216,004	1,053	19,214,951
2025	18,417,235	0	18,417,235
2026	17,676,924	0	17,676,924
2027	16,935,426	0	16,935,426

The projections are based on the same assumptions, methods and provisions used for the August 31, 2017 valuation, which include known across-the-board pay increases budgeted by the State Legislature and the assumptions adopted by the Board in August 2017.

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 no judicial pay increases on September 1, 2017 or September 1, 2018, and 2.75% per year beginning September 1, 2019 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, a reasonable measure of the plan's obligation is 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. Therefore, each year the Actuarial Accrued Liability for JRS-1 will be calculated using a municipal bond rate, which is expected to fluctuate from year to year.

As of August 31, 2017, the Actuarial Accrued Liability of JRS-1 is $276,542,398 based on a municipal bond rate of 3.42%. As of August 31, 2016, the Actuarial Accrued Liability was $328,044,409 based on a municipal bond rate of 2.84%.

The source of the municipal bond rate as of August 31, 2017 is the rate for Fixed Income Market Data/Yield Curve/Data Municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index." In describing this index, Fidelity notes that the municipal curves are constructed using option adjusted analytics of a diverse population of over 10,000 tax exempt securities. The rate shown is as of the last date available on or before the measurement date.

SECTION B

SUMMARY OF PLAN PROVISIONS

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, beginning in fiscal year 2018.

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

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 Service Credit.

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 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:

Attained Age	Percent of Final Compensation
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.

SECTION C

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on August 23, 2017 based on the experience investigation that covered the five-year period from September 1, 2011 through August 31, 2016.

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-1.

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 each individual active member.

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.

V. Actuarial Assumptions

Discount Rate: Municipal bond rate as of the end of August

Salary Increases: Inflationary pay increases are assumed to occur at the beginning of the year and the remaining pay increases associated with merit, promotion and longevity are assumed to occur at the middle of the valuation year. The components of the annual increases are:

Inflation	Real Wage Growth (Productivity)	Merit, Promotion and Longevity
2.50%	0.50%	0.00%

Payroll Growth: Not applicable.

Post-Retirement Increases: Benefits are assumed to increase 2.75% 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:

Eligibility Service:

Eligibility Service is considered to be all service eligible for vesting purposes, which includes contributory and non-contributory service.

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 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).

Entry Age:

Entry age is calculated as the age at the valuation date minus Eligibility 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 middle of the valuation year.

Mortality Decrements:

Service Retirees, Beneficiaries, and Inactive Members

2017 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scale most recently published by Retirement Plans Experience Committee of the Society of Actuaries ("Scale U-MP") and projected from the year 2017. Sample rates for the base mortality table included below.

Annual Mortality Rates per 100 Individuals		
Age	Males	Females
40	0.0603	0.0380
45	0.1059	0.0687
50	0.1825	0.1215
55	0.3145	0.2150
60	0.5421	0.3804
65	0.9344	0.6730
70	1.6105	1.1908
75	2.7757	2.1069
80	4.7842	3.7277
85	8.2459	6.5956
90	14.2527	11.7028

Active Members

RP-2014 Active Member Mortality table. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

Disability Retirees

RP-2014 Disabled Retiree Mortality. Generational mortality improvements in accordance with Scale U-MP are projected from the year 2014.

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

Eligibility 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 State Judges		
	Male and Female	
Age	Unreduced	Reduced
50 - 64	0.20	0.10
65 - 69	0.20	N/A
70 - 74	0.25	N/A
75+	1.00	N/A

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

- The rates do not apply before someone is eligible for the benefit.
- No occupational disabilities are assumed for the elected class or judges.
- 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 service retirement eligibility.

Sample rates for eligible members:

Annual Disability Rates per 100 Participants		
Age	Males	Females
30	0.0275	0.0135
35	0.0650	0.0442
40	0.0749	0.0896
45	0.1027	0.1455
50	0.1484	0.2072
55	0.2477	0.3488
60	0.3740	0.5583

99% of the disability rates stated above are assumed to be attributable to nonoccupational 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: Graded Tables Based on JRS-1 and JRS-2 Experience.

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

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%	50%	0%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	85%	15%
Female Member			
Disability	75%	25%	0%
Service Retirement	100%	0%	0%
Death Benefit Plan	0%	70%	30%

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: Males are assumed to be two years older than females.

Census Data and Assets

- The valuation was based on members of JRS-1 as of August 31, 2017 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, when they are granted 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.

SECTION D

SUMMARY OF MEMBERSHIP DATA

Summary of Membership Data

Active Members

Item	Male	Female	Total
Number of Members	9	0	9
Average Annual Salaries	$ 147,778	N/A	$ 147,778
Average Age	70.7	N/A	70.7
Average Service	30.4	N/A	30.4

Inactive Members

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	0	$ 0	N/A	N/A
Service Retirees	230	$ 16,767,408	72,902	79.1
Beneficiaries	125	$ 6,752,352	54,019	82.9
Disability Retirees	0	$ 0	N/A	N/A
Total	355	$ 23,519,760	$ 66,253	80.4

Non-vested Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Participants	0	$ 0	N/A	N/A

SECTION E

GLOSSARY

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 ADC.

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 ADC.

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 ADC 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.

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 it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. 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.