Actuarial Valuation Reports

FOR PENSION PLANS ADMINISTERED BY ERS

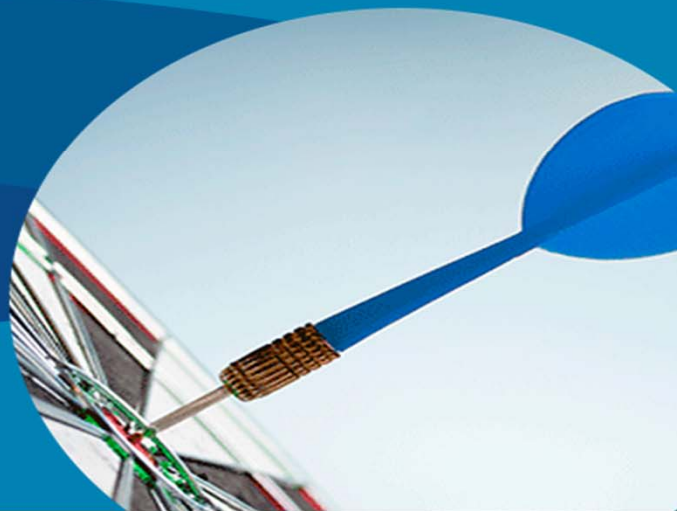
As of August 31, 2021
Prepared by Gabriel Roeder Smith & Company

ERS®
Employees Retirement System of Texas

Actuarial Valuations of the ERS Retirement Funds as of August 31, 2021

Ryan Falls, FSA, EA, MAAA
Joe Newton, FSA, EA, MAAA

December 8, 2021



Agenda

- ERS Funding Valuation Results
  - Review of 2021 Legislative Reform
  - Impact on Accounting Results as of August 31, 2021
  - Impact of FY2021 Investment Performance
- LECOSRF and JRS2 Funding Valuation Results

Purpose of Actuarial Valuation

- Snapshot as of August 31, 2021 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
    - Set future amounts of contributions if current found to be inadequate
  - Provide other information for reporting
    - GASB 67/68, Annual Comprehensive Financial Report
  - Explain changes in actuarial condition of the plans
  - Track changes over time
  - Analyze future outlook

My, what a difference a year makes!

- SB 321 passed by the 2021 Legislature made foundational changes to the funding mechanisms and to benefits for future hires
  - As we will show, the "ability to adapt" is the most impactful feature of the new package of policies
  - Went from a projected depletion date of 41 years to a target full funding date in 33 years
- The 25% return on market assets equates to three and a half years worth of expected investment earnings generated in one year
  - This will be smoothed in over the next five valuation cycles
  - This takes significant pressure off of needing to generate 7.0% returns on a market basis over the short to intermediate term in order to maintain the same contribution expectations discussed when SB 321 was implemented

SB 321 - Funding

Sec. 815.407 LEGACY PAYMENTS. (a) In addition to the state contributions required by this subtitle, each fiscal year the state shall make an actuarially determined payment in the amount necessary to amortize the system's unfunded actuarial liabilities by not later than the fiscal year ending August 31, 2054.

- This amount is a level dollar amount schedule, not tied to payroll or headcount
- $510 million per year in the 2022-2023 biennium
- Projected at $510 million per year through 2054 in the impact statement
- ERS will also continue to receive contributions from the members and 10% of pay contributions from the State/agencies

New Terminology

- Moving from a world with a “Funding Period” to one with an “Amortization Period”

- Funding Period is used to convert a contribution stream into a time period
  - UAAL is $100, receive $10 a year, how long until the UAAL is paid off?
    - 10 years would be the funding period, it is the output

- Amortization Period is used to convert a time period into a contribution stream
  - UAAL is $100, want to pay it off in 10 years, how much to pay each year?
    - 10 years is the amortization period, it is an input
    - The contribution stream is the output

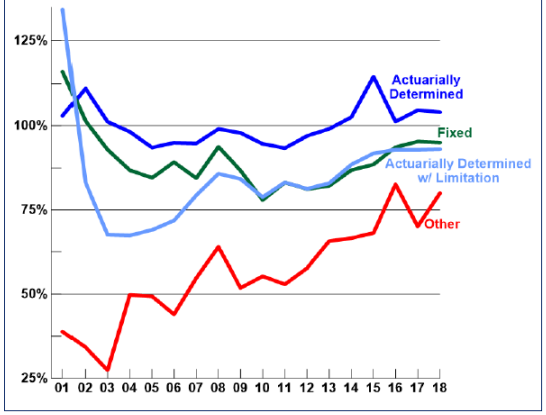
Plans with pre-determined, automatic formulas received substantially more of their needed contributions over the past two decades

Table 1. Median ARC/ADC received by each classification of employer contribution, FY 01 to FY 18

Method for Determining Employer Contributions	Actuarially Determined	Fixed	Actuarially Determined w/ Limitation	Other
Median ARC/ADC Received	100.0%	87.9%	86.8%	71.7%

SB 321 Moved ERS from polices that created the Green line (**Fixed**)

Figure F: Average ARC/ADC received for each employer classification: Actuarially Determined, Fixed, Actuarially Determined w/Limitation, and Other, FY 01 to FY 18



Source: State retirement system CAFRS, compiled by NASRA

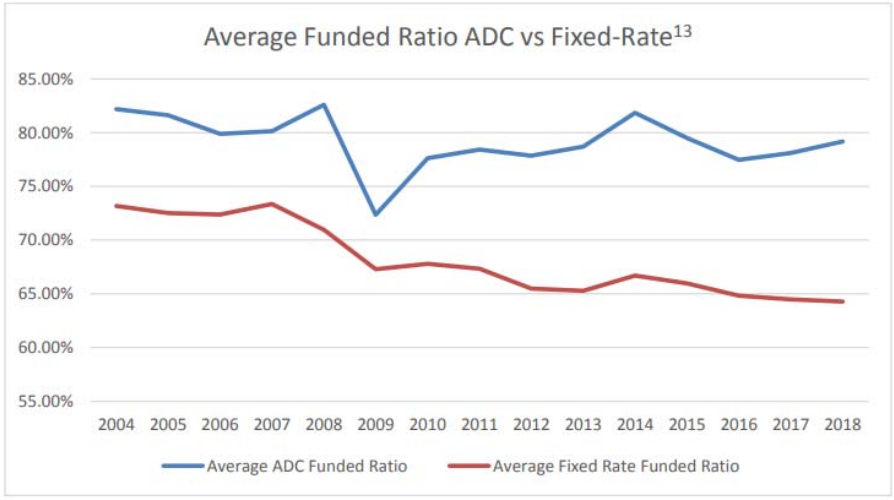
To policies that created the bright Blue Line (**Actuarially Determined**)

NASRA Issue Brief: State and Local Government Contributions to Statewide Pension Plans: FY 18
Issued April 2020

Automatic Funding Policies Provide Benefit Security

- Excerpt from a Study by the Texas Pension Review Board

SB 321 Moved ERS from polices that created the Red line

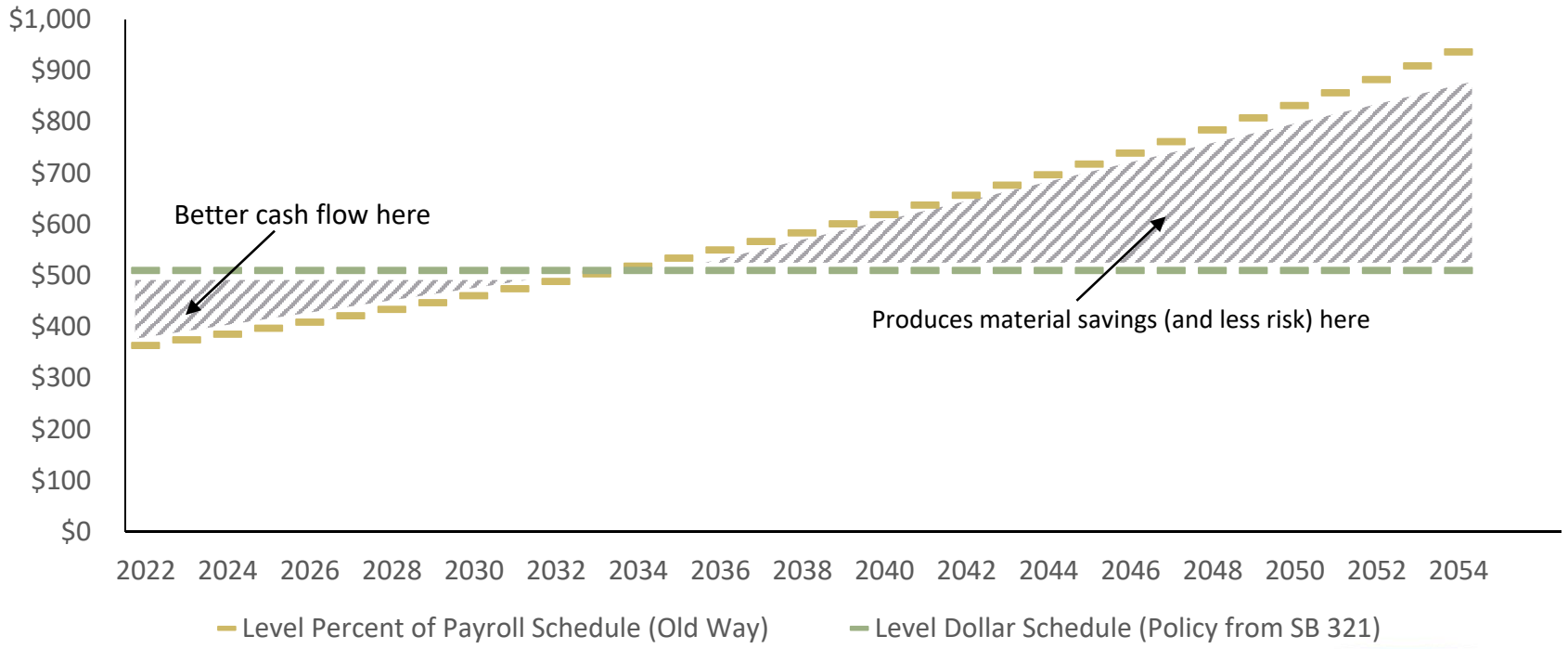


To policies that created the Blue Line

- Fixed Rate Plans: Situations where the contribution is a set percentage of payroll specified in statute/ordinance or local bargaining agreements
- Actuarially Determined Plans: Situations where a predetermined formula, either set by the Board or by Statute sets the amount of contribution

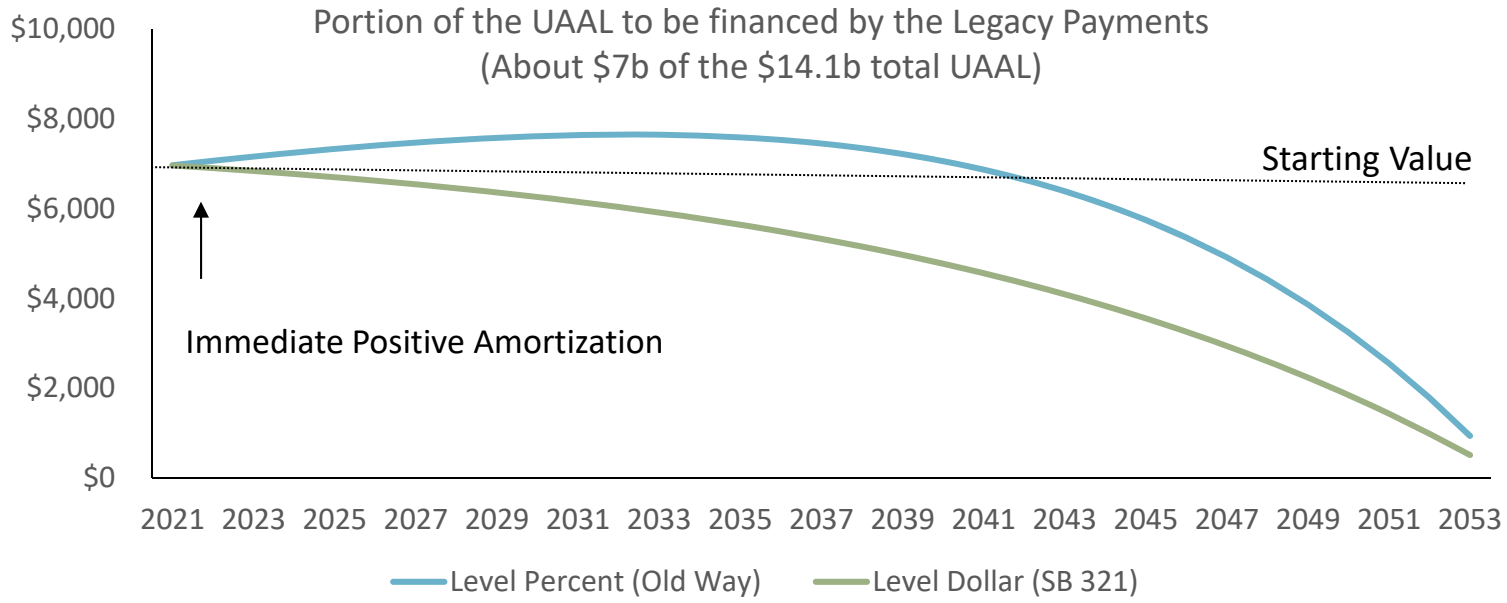
https://www.prb.state.tx.us/txpen/wp-content/uploads/2019/02/Funding-Policy-Paper.pdf

Level dollar Legacy Payment schedule saves $3.2b in interest charges over the time period compared to the previous level percent approach



$ in millions

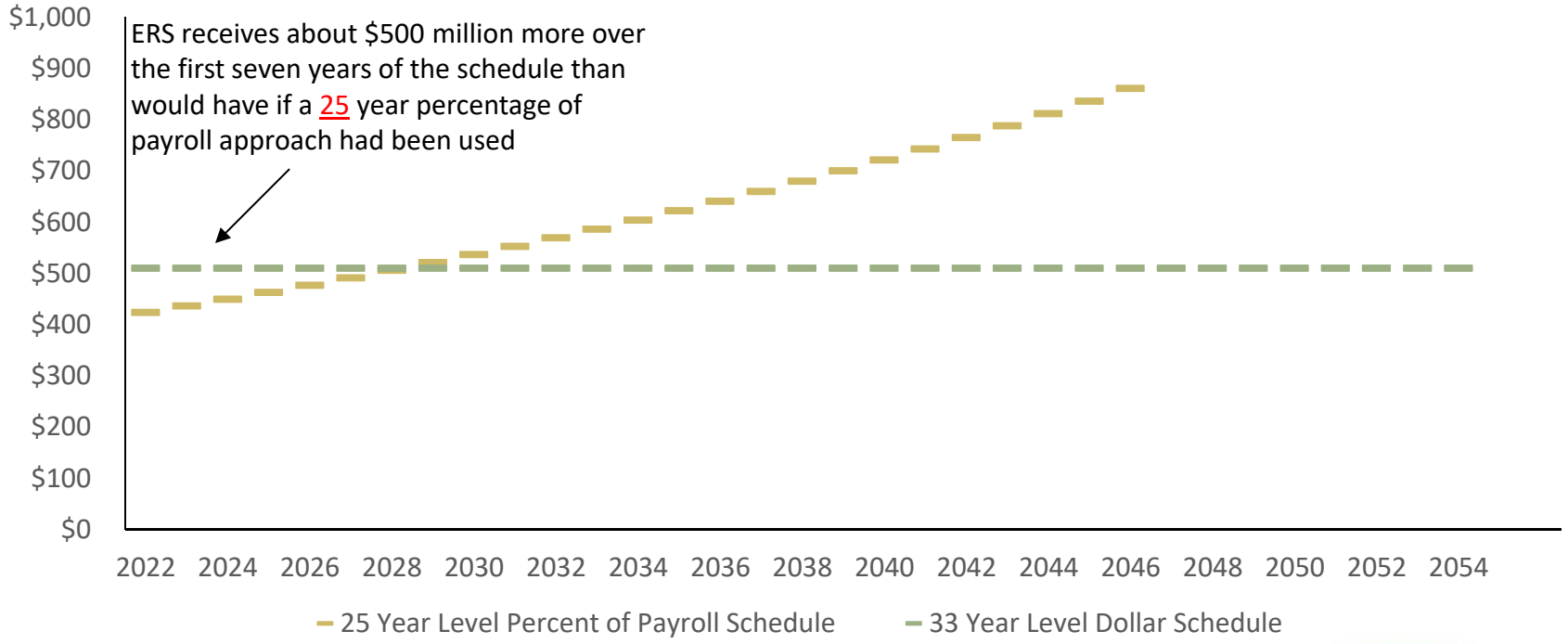
Level Dollar Schedules Produce Immediate Positive Amortization



If had chosen the prior method (percentage of payroll financing), this portion of the UAAL would have increased for 11 years, and is still larger than the original amount 19 years later

$ in millions

Hypothetical Example to Show the Strength of Level Dollar Amortization: Compare 33 Year Level Dollar to 25 Year Level Percent



$ in millions

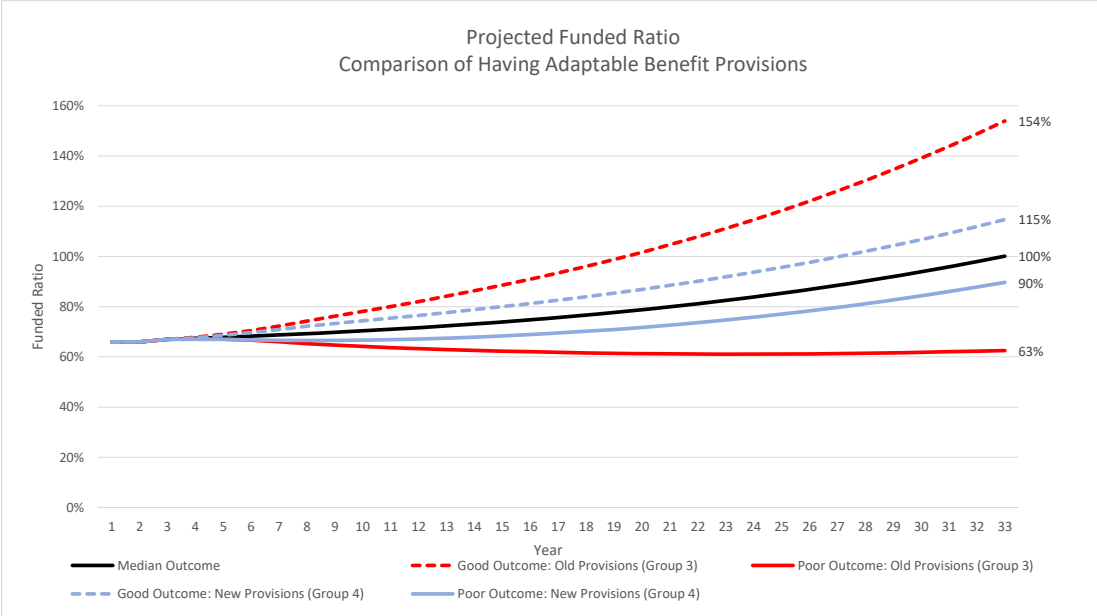
Impact from Contraction in Membership on Payroll

- Active membership declined about 3.5% year over year
  - Even more pronounced for LECOs which declined 8%
- This led to an actual decline in covered payroll from $7.2b to $7.1b
  - Valuation assumes this increases at 2.7% per year
- Under old policies where all contributions were tied to this payroll, lower payroll would have increased the funding period (and ASC) materially
- The change to level dollar financing separates a significant portion of the funding from the headcount or payroll
  - The $510m stays the same, regardless of headcount or payroll (or inflation)
  - More dependable, less risk

SB 321

- There will be more detail in future meetings from ERS Staff and GRS on the new benefit structure as there are details/rules that need to be codified
- This only applies to future hires so has no impact on the 2021 valuation results
- The overall employer provided value is approximately the same so this has minimal impact on projected future results if assumptions are met
  - Difference will emerge when experience is different than the assumptions (positively or negatively)

Illustration of Future Impact from Having Adaptable Benefit Provisions



This graph compares the adaptable benefit package from group 4 to the non-adaptable benefits from group 3 based on actual investment performance

The red lines represent a "poor" and a "good" investment scenario with group 3 benefits. The likely range of funded ratio 33 years out is 63% to 154%

The blue lines represent a "poor" and a "good" investment scenario with group 4 benefits. The likely range of funded ratio 33 years out is 90% to 115%

For this hypothetical example, we modeled all current and future members in either group 3 or group 4 to show the impact once all members are in group 4. Thus, this gives a view into the future risk profile of ERS, 30-50 years from now

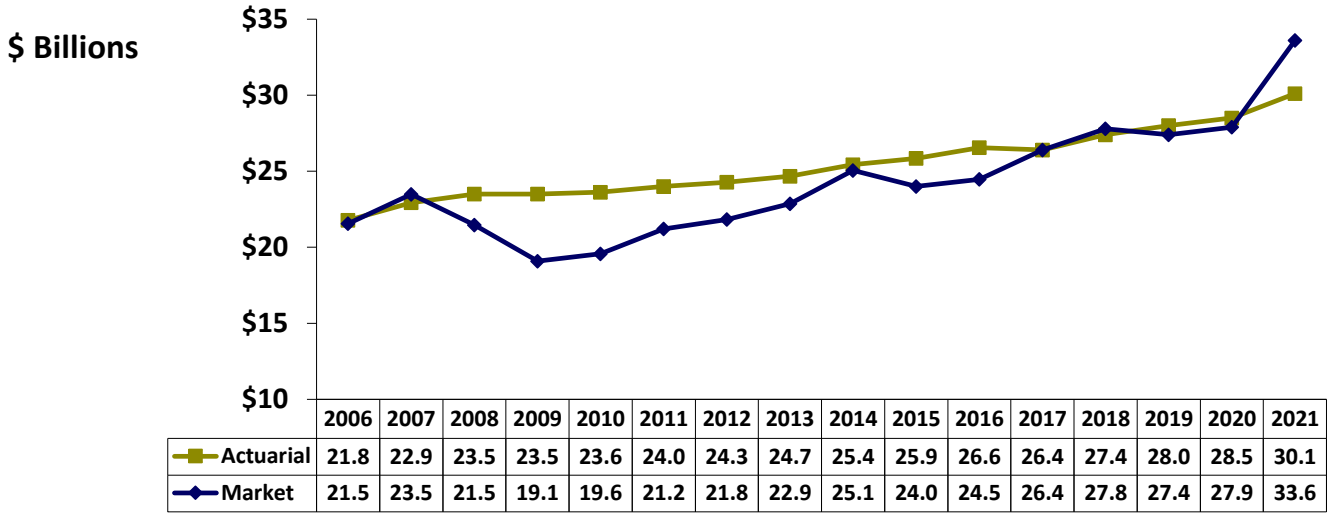
ERS
Funding Valuation Results
at August 31, 2021

Investment Experience

- Actual rate of return on market for FY21 was ≈ 25%
- All of the actuarial funding metrics based on 5-year smoothed value of assets (actuarial value, or AVA), not market value
- 5-year smoothed return on AVA was 10.0% in FY21
- $3.5 billion in net deferred gains, not yet recognized
  - Represents 8% of the current actuarial accrued liability
  - Represents 10% of current market assets
  - Will be recognized over next four years, either to improve the funded status of ERS or to offset adverse experience during that time

ERS Asset Values: Market vs Smoothed

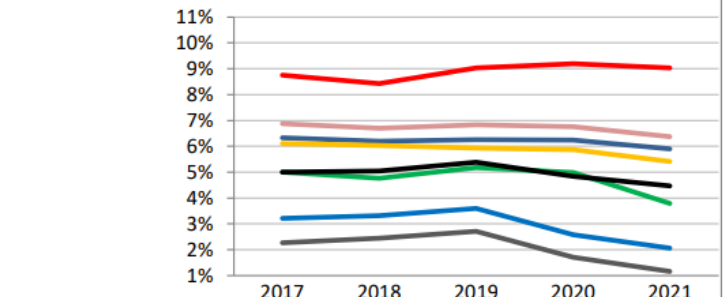
- The strong investment performance put the System in a situation with material deferred investment gains



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
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	27.4	28.0	28.5	30.1
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	27.8	27.4	27.9	33.6

Recent Strong Performance has lead to declines in Return Expectations

Average Expected Returns (10-Year Horizon)

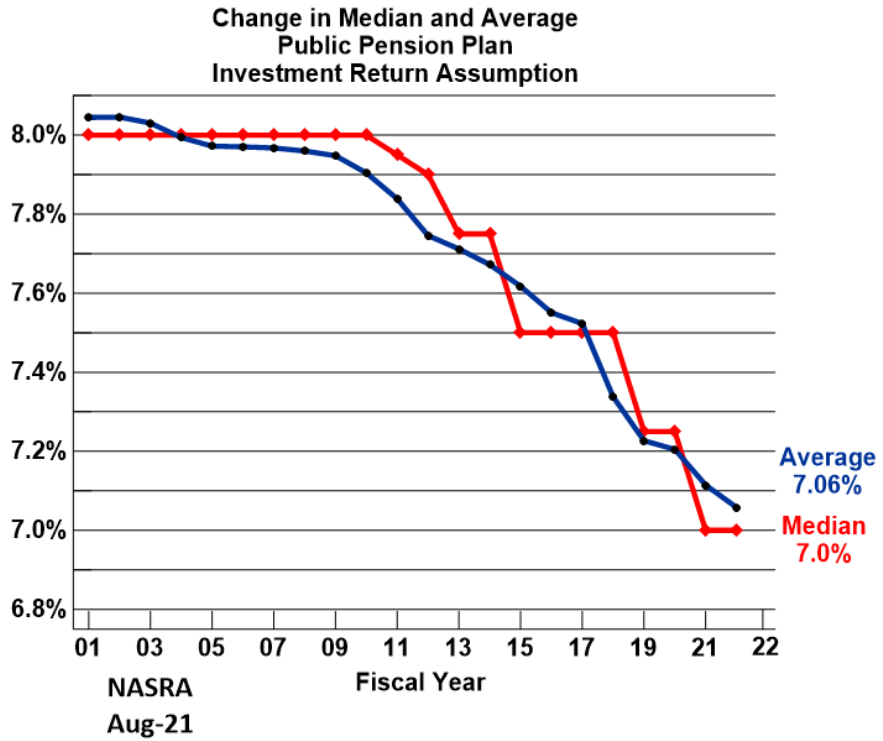


	2017	2018	2019	2020	2021
Private Equity	8.7%	8.4%	9.0%	9.2%	9.0%
Non-US Eq. (Dev)	6.9%	6.7%	6.8%	6.8%	6.4%
US Eq. (Large Cap)	6.3%	6.2%	6.2%	6.2%	5.9%
Real Estate	6.1%	6.0%	5.9%	5.9%	5.4%
US Bonds (HY)	5.0%	4.8%	5.2%	5.0%	3.8%
Hedge Funds	5.0%	5.0%	5.4%	4.8%	4.5%
US Bonds (Core)	3.2%	3.3%	3.6%	2.6%	2.1%
US Treasuries	2.3%	2.5%	2.7%	1.7%	1.2%

Figures are average geometric returns for selected asset classes for the 30 advisors who provided short-term assumptions in each of the surveys from 2017 through 2021.

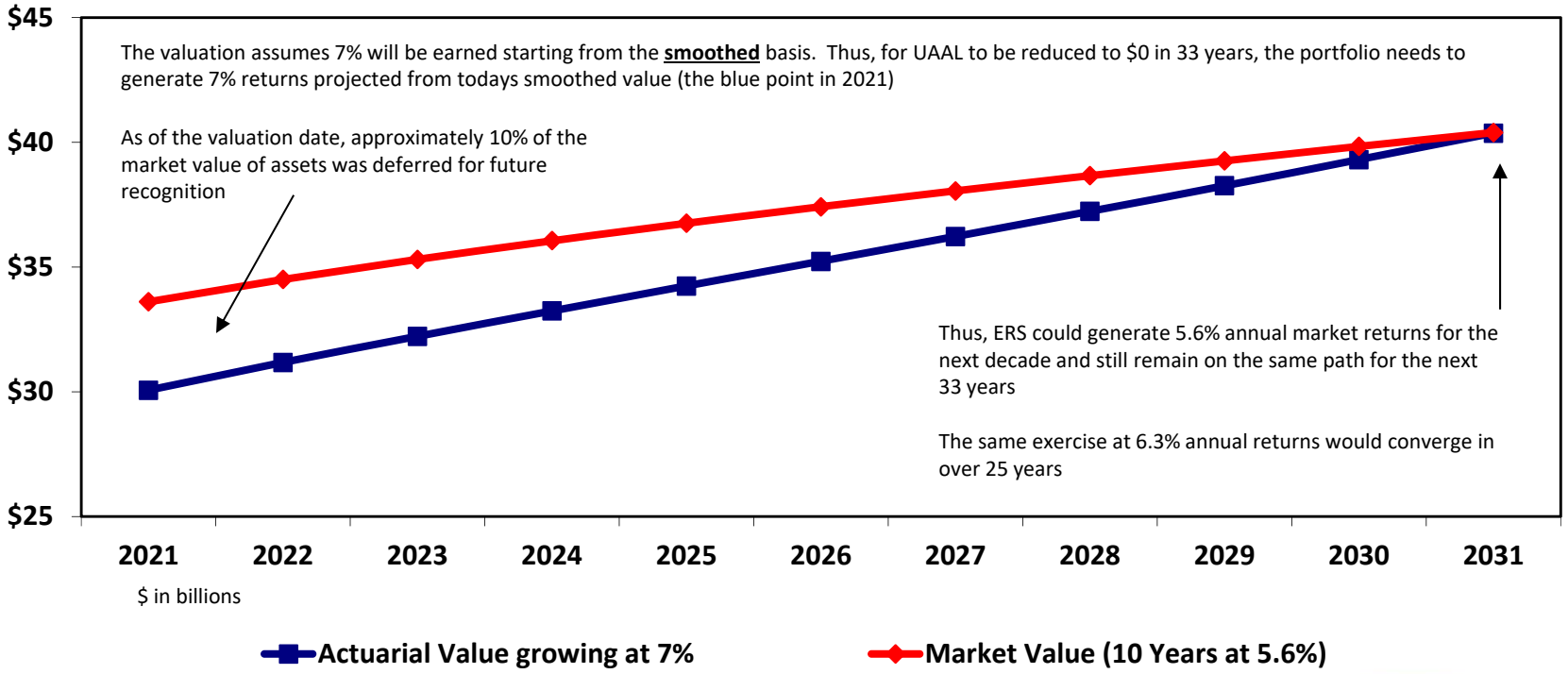
Survey of Capital Market Assumptions, 2021 Edition by Horizon Actuarial Services, LLC https://www.horizonactuarial.com/uploads/3/0/4/9/30499196/rpt_cma_survey_2021_v0804.pdf

Investment Return Assumptions have been Declining



Data compiled by the National Association of State Retirement Administrators

What the deferred gains does for ERS: Projected Growth of Market and Actuarial Assets



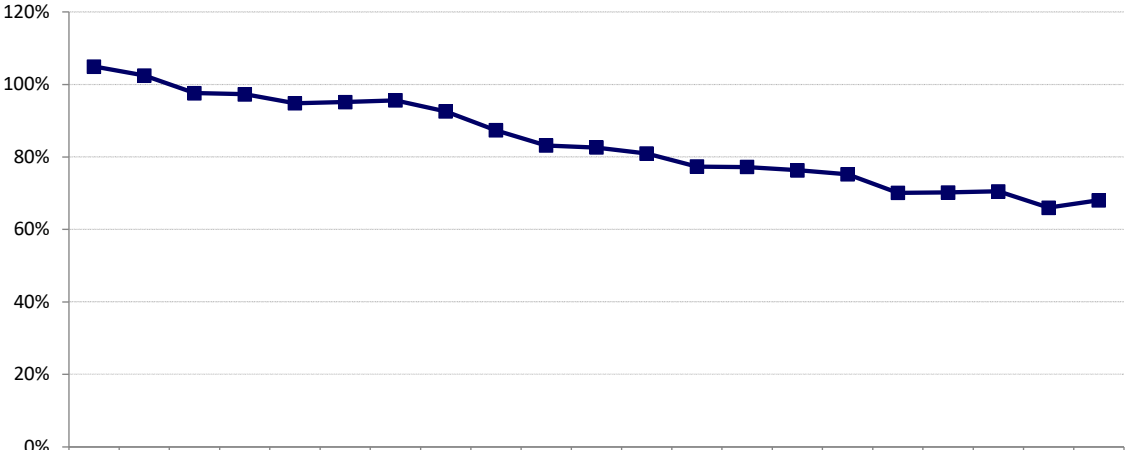
UAAL and Funded Status (ERS)

($ in millions)

Actuarial Valuation as of August 31,		
	2021	**2020**
Actuarial Accrued Liability	$44,184	$43,258
Actuarial Value of Assets	30,065	28,543
Unfunded Accrued Liability	$14,119	$14,715
Funded Ratio	68.0%	66.0%
Amortization Period Per Section 815.407	33 years	Never

Funded Ratio

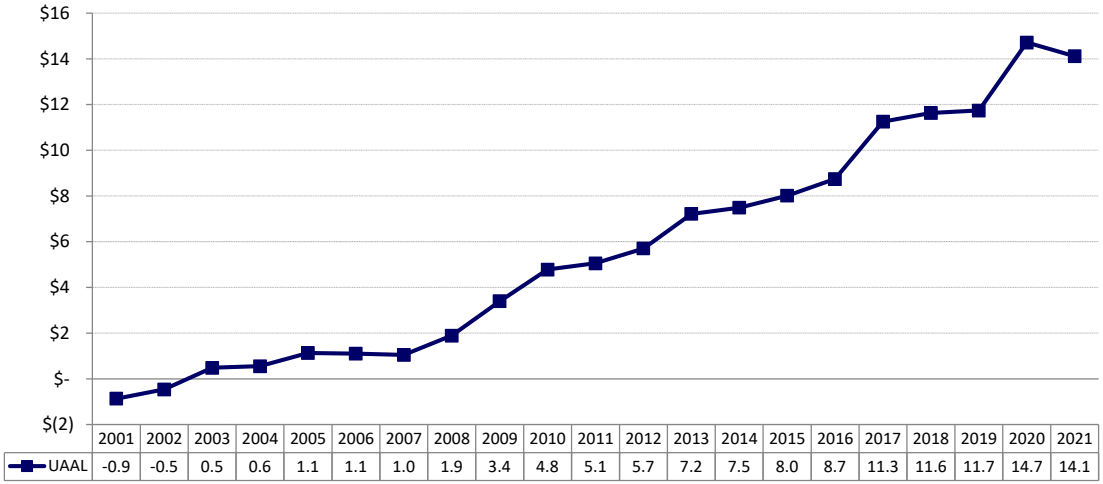
- The Funded Ratio increased from 66% to 68% on a smoothed basis
- This was based on experience, not because of SB 321



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Funded Ratio on AVA	105%	102%	98%	97%	95%	95%	96%	93%	87%	83%	83%	81%	77%	77%	76%	75%	70%	70%	71%	66%	68%

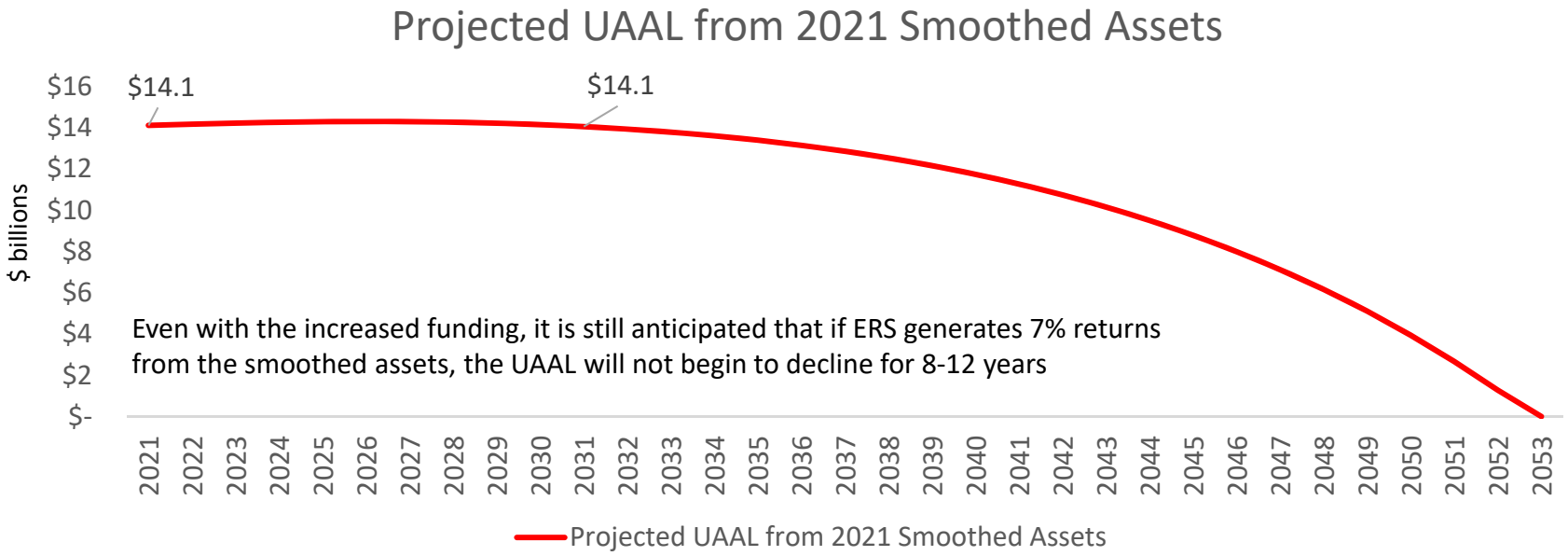
UAAL History

- UAAL decreased for the first time since 2007
- Trend in UAAL is the main metric for monitoring the strength of a pension system
- An increasing UAAL means the accumulation of assets is falling further behind the target
- A declining UAAL (especially for a number of years in a row) means the package of benefits, funding, and investments is strengthening in comparison to the target



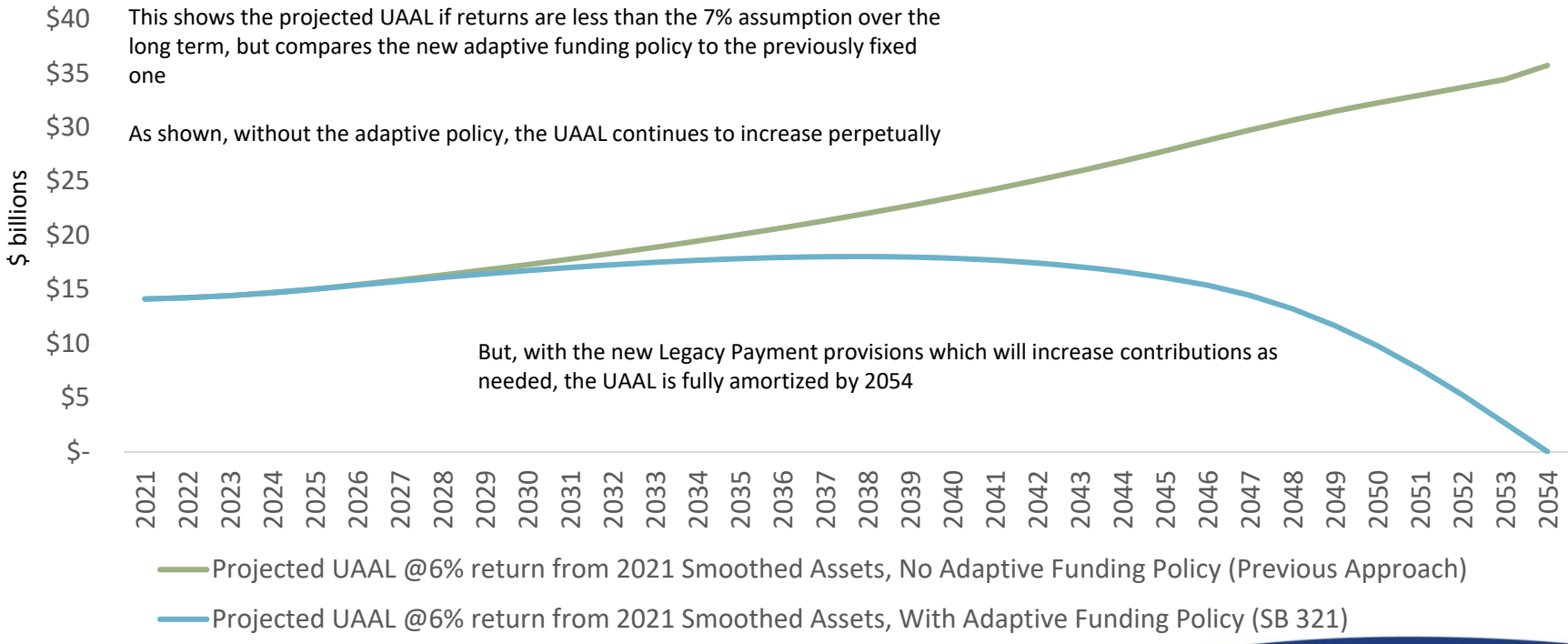
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
UAAL	-0.9	-0.5	0.5	0.6	1.1	1.1	1.0	1.9	3.4	4.8	5.1	5.7	7.2	7.5	8.0	8.7	11.3	11.6	11.7	14.7	14.1

Projections



Assumes 7% annual returns on the smoothed assets and annual $510m legacy payments, and all other assumptions met

Sensitivity Projections



LECOSRF and JRS2
Funding Valuation Results
at August 31, 2021

LECOSRF and JRS2 Need Additional Funding

- Current level of contributions are not sufficient to sustain either plan
  - LECOSRF projected depletion date in 29 years
    - Need 2.75% of payroll increase in contribution
  - JRS2 projected depletion date in 55 years
    - Need 8.05% of payroll increase in contribution

Funded Status

($ in millions)

LECO Supplemental Retirement Fund		
Actuarial Valuation as of	**2021**	**2020**
Actuarial Accrued Liability	$1,650	$1,610
Actuarial Value of Assets	998	968
Unfunded Accrued Liability	$652	$642
Funded Ratio	60.5%	60.1%
Funding Period	Never	Never

Judicial Retirement System of Texas, Plan 2		
Actuarial Valuation as of	**2021**	**2020**
Actuarial Accrued Liability	$618	$591
Actuarial Value of Assets	523	487
Unfunded Accrued Liability	$95	$104
Funded Ratio	84.6%	82.3%
Funding Period	Never	Never

Utilization of a Legacy Payment Structure

- Legacy Payment Structure could be implemented to finance the UAAL
- However, in both cases, the current contribution rates are less than the normal cost
  - Contribution rates need to be increased to cover at least the normal cost
  - At that point, UAAL could be financed through level dollar fixed payments

Summary

Summary

- SB 321, along with one of the strongest 12 month investment performance periods in plan history, have remarkably changed the outlook for ERS

- For LECOSRF and JRS-2, current contribution levels are not sufficient to sustain the plans
  - Benefit security will continue to deteriorate without an increase in contributions over the current schedules

Disclaimers

- This presentation is intended to be used in conjunction with the actuarial valuation reports issued in December 2021. 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.

Employees Retirement System of Texas

Annual Actuarial Valuation - Funding
As of August 31, 2021

P: 469.524.0000 | www.grsconsulting.com

November 23, 2021

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, 2021

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, 2021. 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 contributions, describe the current financial condition of ERS, analyze changes in the condition of ERS, and provide various summaries of the data.

Senate Bill 321 in the 2021 Legislative Session significantly improved the funding of the plan as well as introduced a new benefit structure for new hires on or after September 1, 2022. As a result of these changes, the funded ratio is expected to improve every year until the unfunded actuarial accrued liability is eliminated by 2054.

Plan Provisions

Our actuarial valuation as of August 31, 2021 reflects the benefit and contribution provisions set forth in Chapters 811 through 815 and Chapter 820 of the Texas Government Code. The current plan provisions are outlined in Section E of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019. Additionally, this actuarial valuation incorporates the notable 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 F of this report.

Data

This valuation was based upon information as of August 31, 2021, 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. Mr. Falls, Mr. Newton and Ms. Woolfrey are Enrolled Actuaries and Fellows of the Society of Actuaries, and all of the undersigned are 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
Senior Consultant & Actuary

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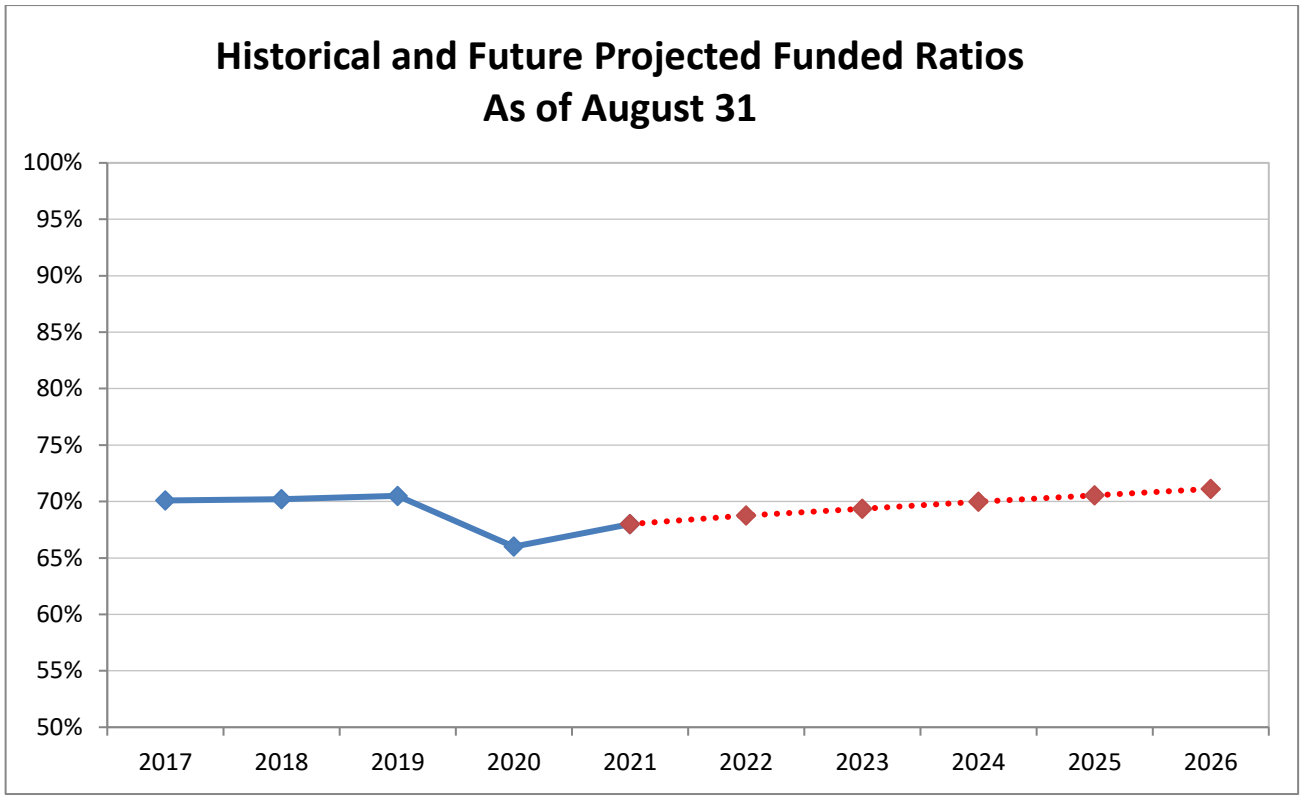
SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2021	2020
Membership		
• Number of		
- Active members	136,726	142,062
- Retirees and beneficiaries	120,294	117,996
- Inactive, vested	14,867	15,109
- Inactive, nonvested	130,183	119,800
- Total	402,070	394,967
• Valuation Payroll	$ 7,144,623,435	$ 7,221,558,595
Statutory contribution rates	FY 2022	FY 2021
• Members	9.50%	9.50%
• Employers	0.50%	0.50%
• State	9.50%	9.50%
• Total	19.50%	19.50%
Annual Legacy Contributions Budgeted for 2022-2023 Biennium Per Section 815.407	$510,000,000	NA
Assets		
• Market value (MVA)	$ 33,608,244,434	$ 27,946,206,540
• Actuarial value (AVA)	$ 30,065,356,135	$ 28,543,207,745
• Return on market value (gross)	25.51%	6.85%
• Return on market value (net)	25.46%	6.82%
• Return on actuarial value	10.0%	6.1%
Actuarial Information on AVA (smoothed)		
• Normal cost %	14.12%	14.16%
• Total normal cost	$ 1,008,820,829	$ 1,022,572,697
• Actuarial accrued liability	$ 44,183,687,166	$ 43,258,312,073
• Unfunded actuarial accrued liability (UAAL)	$ 14,118,331,031	$ 14,715,104,328
• Funded ratio	68.0%	66.0%
• Maximum Amortization Period Per Section 815.407 (ending 2054)	33 years	Never
• Will payroll contributions and Legacy Payments amortize the UAAL over the Required Period	Yes	No
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 10,575,442,732	$ 15,312,105,533
• Funded ratio	76.1%	64.6%

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



August 31,	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Funded Ratio	70.1%	70.2%	70.5%	66.0%	68.0%	68.7%	69.4%	70.0%	70.5%	71.1%
UAAL (in billions)	$11.3	$11.6	$11.7	$14.7	$14.1	$14.2	$14.2	$14.3	$14.3	$14.3

The projections beyond 2021 are based on the same assumptions, methods and provisions used for the August 31, 2021 valuation, which include the State continuing the Legacy Payments and the notable across-the-board pay increases budgeted by the State Legislature when they are granted. Additionally, the actuarial (smoothed) value of assets is expected to earn 7.00% per year.

This is remarkable improvement compared to last year's projections, which had a projected fund depletion date of 2061, with a 37% probability of being depleted by 2050. With the new commitment from the State to make consistent adequate contributions and the strong investment performance from fiscal year 2021, the sustainability of ERS has been materially improved. Please also note, the above projections do not recognize any of the current $3.5 billion in deferred asset gains that will be recognized in future valuations unless offset by future adverse experience. Given the size of the currently deferred gains, it is likely the funded ratio projection will exceed the above projection over the short term.

However, there are good reasons that the investment performance is smoothed on a year to year basis and the financing of a retirement system like ERS is a long-term arrangement. It is important to put strong, reliable policies in place and then have the discipline to keep a longer-term perspective without overreacting to short term positive, or negative, experience. The policies adopted by the 2021 Legislature are strong long-term policies.

SECTION B

DISCUSSION

Discussion

Introduction

This report presents the results of the August 31, 2021 actuarial valuation of the Employees Retirement System of Texas (ERS).

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

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

Funding Adequacy

Senate Bill 321, enacted during the 2021 Regular Legislative Session, introduced a new level dollar contribution structure in Texas Government Code Section 815.407, called Legacy Payments. These amounts are calculated for each biennium to fully amortize the Unfunded Actuarial Accrued Liability (UAAL) as required before the end of fiscal year 2054. The 2021 Legislature appropriated $510 million per year for fiscal years 2022 and 2023. The target date of 2054 produces an amortization period of 33 years as of this 2021 valuation. Senate Bill 321 changed the funding structure of ERS from a fixed contribution rate structure to an actuarially determined structure. Each year during the actuarial valuation process a Legacy Payment account will be determined to meet the requirements of Section 815.407. This valuation finds the $510 million annual Legacy Payments fulfill these requirements.

The ERS Board of Trustees approved the Pension Funding Priorities and Guidelines on May 23, 2018 and adopted updates in August 2020. For the Board, adoption of this policy is intended to:

- enhance communications and provide transparency to the Legislature and plan members and retirees regarding Board of Trustees' positions on plan funding strategy;
- provide policy guidance to current and future Boards;
- ensure that legislators, elected officials and other stakeholders have clear and accurate information about the Trust's funding goals and the needs of the Board in supporting sound fiduciary investment decisions in accordance with Texas Government Code Section 815.106; and
- identify a recommended plan for the state of Texas, as the plan sponsor, to achieve a 100% funded ratio while following funding best practices and sound actuarial principles, in accordance with Texas Government Code Section 802.2011.

The policy states that the main objective of ERS' retirement programs is to fully fund the long-term cost of benefits provided by statute, through disciplined and timely accumulation of contributions and prudent investment of assets to deliver earned benefits on a continuing basis. In support of this objective, the policy laid out a multi-level funding period goal to gradually achieve funding on sound actuarial principles:

1. Fund normal costs;
2. Avoid trust fund depletion of the pre-funded plans;
3. Meet current statutory standard of a 31-year funding period for unfunded liabilities, per Texas Government Code Sections 811.006 and 840.106; and

4. Match funding period to the average years of service at retirement once a 31-year funding period is achieved, and closed.

With the passage of SB 321 and the introduction of the Legacy Payment structure, every objective of this policy should eventually be met. This valuation finds ERS now meets the first and second levels of the policy. In addition, since the new policy has a closed amortization structure, actuarial projections indicate the third level funding goal will be met within a couple of years and the fourth level will be met within approximately 10 years.

The unfunded actuarial accrued liability (UAAL) decreased from $14.7 billion as of August 31, 2020 to $14.1 billion as of August 31, 2021. **This is the first year to year decrease in the UAAL since 2007. Combined with the new Legacy Payment contribution structure, and assuming all other assumptions are met, it is likely the UAAL will continue to decline year over year going forward.**

Additionally, the funded ratio—actuarial value of assets divided by the actuarial accrued liability—increased from 66.0% to 68.0%, as of August 31, 2021. This increase in the funded ratio was primarily due to the strong investment performance from fiscal year 2021. 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.

Plan Provisions

SB 321 created a new defined benefit structure for state employees who began work on or after September 1, 2022. The new structure is a cash balance retirement benefit with meaningful cost and risk sharing mechanisms. The overall average value provided by the State is not meaningfully different from the previous benefit structure. As no current members are in the new benefit structure and the value is similar, the change to the benefit structure had minimal impact to this valuation and forward-looking projections. However, the new structure is designed to mitigate unexpected future increases in the UAAL. The impact will be realized in the future if experience deviates from the assumptions.

In addition, Section 814.604 provides for a one-time limited group of retirees to receive a permanent monthly annuity increase once the funding period will remain under the 31-year requirement after the increase is reflected. This statutory requirement is incorporated into the actuarial accrued liability in this valuation now that the plan is expected to be in a position to pay this increase in the future. The current plan provisions are outlined in Section E of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of ERS.

This actuarial valuation adjusts for any notable across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, regular State employees did not receive an across-the-board increase effective September 1, 2021 nor September 1, 2022. Additionally, commissioned law

enforcement positions were assumed to receive the scheduled increases to State Salary Schedule C on September 1, 2021. There were no other changes to the assumptions.

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 F of this report.

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 $27.9 billion to $33.6 billion as of August 31, 2021. Table 5 reconciles the changes in the fund during the year. Total contributions increased slightly from $1,450 million to $1,458 million.

Table 6 shows the development of the Actuarial Value of Assets (AVA). The current AVA method recognizes each year's gain or loss over a closed five-year period and allows for direct offsetting of gains and losses. The AVA increased from $28.5 billion to $30.1 billion, as of August 31, 2021.

When measured on a market value, the gross investment return for the fiscal year ending August 31, 2021 was 25.51%, and the return net of investment expenses was 25.46% as reported by the ERS Master Trust Custodian. When measured on an actuarial value, the net investment return was 10.0%. Table 7 shows a history of return rates. The ERS ten-year average gross market return, as reported by the ERS Master Trust Custodian, is 9.40%. The ten-year average return net of investment expenses is 9.32%.

Table 8 provides a history of the contributions paid into ERS and the administrative expenses and benefit payments paid out of ERS. ERS paid administrative expenses and benefit payments, in excess of contributions received, of $1,196 million (or 4.3% of assets) in fiscal year 2020 and $1,275 million (or 3.8% of assets) in fiscal year 2021. ERS should continue to monitor this deficit as it could impact future liquidity needs. 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).

Data

This valuation was based upon information as of August 31, 2021, 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 G show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Table 1
Development of Employer Cost

	August 31, 2021	August 31, 2020
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	$ 7,097,447,703	$ 7,221,558,595
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	7,144,623,435	7,221,558,595
2. Total Normal Cost Rate		
a. Gross normal cost rate	13.79%	13.83%
b. Administrative expenses	0.33%	0.33%
c. Total (Item 2a + Item 2b)	14.12%	14.16%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	$ 22,424,684,449	$ 22,732,816,061
b. Less: present value of future normal costs	(6,835,029,659)	(7,023,939,828)
c. Actuarial accrued liability	$ 15,589,654,790	$ 15,708,876,233
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	$ 26,547,208,800	$ 25,604,780,179
b. Inactive members	2,046,823,576	1,944,655,661
c. Active members (Item 3c)	15,589,654,790	15,708,876,233
d. Total	$ 44,183,687,166	$ 43,258,312,073
5. Actuarial Value of Assets	$ 30,065,356,135	$ 28,543,207,745
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 14,118,331,031	$ 14,715,104,328
7. Annual Legacy Contribution Budgeted for 2022-2023 Biennium	$510,000,000	NA
8. Allocation of Contribution Rate in Addition to Legacy Contribution		
a. Combined State and employer rates	10.00%	10.00%
b. Member rate	9.50%	9.50%
c. Total contribution rate	19.50%	19.50%
d. Total normal cost rate	14.12%	14.16%
e. Available contribution rate to amortize UAAL	5.38%	5.34%
f. Total contribution rate	19.50%	19.50%
9. Maximum Amortization Period Per Section 815.407 (ending 2054)	33 years	Never

Table 2
Actuarial Present Value of Future Benefits

		August 31, 2021	August 31, 2020
1.	Active Members		
	a. Service Retirement	$ 20,249,302,685	$ 20,518,535,700
	b. Disability Benefits	176,796,812	173,006,886
	c. Death Before Retirement	177,623,914	176,360,290
	d. Termination	1,820,961,038	1,864,913,185
	e. Total	$ 22,424,684,449	$ 22,732,816,061
2.	Inactive Members	$ 2,046,823,576	$ 1,944,655,661
3.	Annuitants*	$ 26,547,208,800	$ 25,604,780,179
4.	Total Actuarial Present Value of Future Benefits	$ 51,018,716,825	$ 50,282,251,901

* The Present Value of Future Benefits as of August 31, 2021 includes $26,448,263,074 for the current annuitant benefits and $98,945,726 for the one-time permanent monthly annuity increase payable to a limited group of retirees described in Section 814.604 of the Texas Government Code which will be paid once the funding period is less than 31 years after the COLA is granted.

Table 3
Analysis of Normal Cost

		August 31, 2021	August 31, 2020
1.	Gross Normal Cost Rate		
	a. Service Retirement	9.74%	9.78%
	b. Disability Benefits	0.15%	0.14%
	c. Death Before Retirement	0.13%	0.13%
	d. Termination	3.77%	3.78%
	e. Total	13.79%	13.83%
2.	Administrative Expenses	0.33%	0.33%
3.	Total Normal Cost	14.12%	14.16%
4.	Less: Member Rate	9.50%	9.50%
5.	Employer Normal Cost Rate	4.62%	4.66%

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
2018	141,535	-0.1%	6,876	1.2%	48,581	1.2%	43.6	8.6
2019	141,865	0.2%	6,983	1.6%	49,220	1.3%	43.5	8.4
2020	142,062	0.1%	7,222	3.4%	50,834	3.3%	43.6	8.3
2021	136,726	-3.8%	7,097	-1.7%	51,910	2.1%	44.0	8.6

Table 5
Reconciliation of Plan Net Assets

	Year Ending August 31, 2021 (1)	Year Ending August 31, 2020 (2)
1. Market value of assets at beginning of year	$ 27,946,206,540	$ 27,351,224,157
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	$ 739,572,907	$ 735,855,712
ii. Member (including penalty interest)	718,357,239	713,985,036
iii. Total	$ 1,457,930,146	$ 1,449,840,748
b. Net investment income	$ 6,937,214,844	$ 1,791,061,478
c. Total revenue	$ 8,395,144,990	$ 3,240,902,226
3. Disbursements for the year		
a. Benefit payments and refunds	2,794,250,855	$ 2,701,976,920
b. Net transfers from TRS	(82,994,484)	(80,239,510)
c. Administrative expenses	21,850,725	24,182,433
d. Total expenditures	2,733,107,096	2,645,919,843
4. Increase in net assets (Item 2c - Item 3d)	$ 5,662,037,894	$ 594,982,383
5. Market value of assets at end of year (Item 1 + Item 4)	$ 33,608,244,434	$ 27,946,206,540

Table 6
Development of Actuarial Value of Assets

	Year Ending August 31, 2021
1. Market value of assets at beginning of year	$ 27,946,206,540
2. Net new investments	
a. Contributions for the year (Table 5)	$ 1,457,930,146
b. Disbursements for the year (Table 5)	(2,733,107,096)
c. Subtotal	(1,275,176,950)
3. Market value of assets at end of year	$ 33,608,244,434
4. Net earnings (Item 3 - Item 1 - Item 2)	$ 6,937,214,844
5. Assumed investment return rate for fiscal year	7.00%
6. Expected return	$ 1,911,603,265
7. Excess return (Item 4 - Item 6)	$ 5,025,611,579

8. Development of amounts to be recognized as of August 31, 2021:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for this valuation	Remaining after this valuation
	(1)	(2)	(3) = (1) + (2)	(4)	(5) = (3) / (4)	(6) = (3) - (5)
2017	$ 0	$ 0	$ 0	1	$ 0	$ 0
2018	0	0	0	2	0	0
2019	(531,672,049)	531,672,049	0	3	0	0
2020	(65,329,156)	65,329,156	0	4	0	0
2021	5,025,611,579	(597,001,205)	4,428,610,374	5	885,722,075	3,542,888,299
Total	$ 4,428,610,374	$ 0	$ 4,428,610,374		$ 885,722,075	$ 3,542,888,299

9. Actuarial value of assets as of August 31, 2021 (Item 3 - Item 8, Column 6)	$ 30,065,356,135
10. Ratio of actuarial value to market value	89.5%

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%
2018	9.58%	9.54%	7.9%
2019	3.04%	3.00%	6.9%
2020	6.85%	6.82%	6.1%
2021	25.51%	25.46%	10.0%
Average Returns			
Last Five Years:	11.17%	11.13%	6.7%
Last Ten Years:	9.40%	9.32%	6.5%
Last Fifteen Years:	7.58%	7.48%	6.0%
Last Twenty Years:	7.38%	7.29%	6.1%

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%
2018	1,381.1	(2,406.4)	(23.5)	(2,429.9)	(1,048.8)	27,753	-3.8%
2019	1,407.4	(2,540.3)	(27.7)	(2,568.0)	(1,160.6)	27,351	-4.2%
2020	1,449.8	(2,621.7)	(24.2)	(2,645.9)	(1,196.1)	27,946	-4.3%
2021	1,457.9	(2,711.2)	(21.9)	(2,733.1)	(1,275.2)	33,608	-3.8%

Dollar amounts in millions

Table 9
Total Experience Gain or Loss

Item		Year Ending August 31, 2021	Year Ending August 31, 2020
(1)		(2)	(3)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 14,715,104,328	$ 11,741,238,455
2. Assumption/Method changes - Liability Only		$ 0	$ 1,907,916,019
3. UAAL, previous year, after assumption changes (Item 1 + Item 2)		$ 14,715,104,328	$ 13,649,154,474
4. Normal cost for the year (excluding administrative expenses)		998,741,554	971,554,619
5. Actual administrative expenses		21,850,725	24,182,433
6. Contributions for the year (excluding service purchases)		(1,422,458,567)	(1,415,880,179)
7. Interest at 7.00%			
a. On UAAL		$ 1,030,057,303	$ 955,440,813
b. On normal cost and administrative expenses		35,720,730	34,850,797
c. On contributions		(49,786,050)	(49,555,806)
d. Total		$ 1,015,991,983	$ 940,735,804
8. Legislative actions*			
a. Across-the-board pay increases budgeted for upcoming biennium by the State Legislature		(410,126,083)	0
b. Section 814.604 Impact		98,945,726	0
9. Expected UAAL (Sum of Items 3 through 8)		15,018,049,666	14,169,747,151
10. Actual UAAL		14,118,331,031	14,715,104,328
11. Total (gain)/loss for the year (Item 10 - Item 9)		$ (899,718,635)	$ 545,357,177
B. Source of gains and losses	% of AAL		
12. Asset (Gain)/Loss for the year	1.91%	(843,931,991)	243,179,030
13. Pay Increases (Less)/Greater than Expected	0.15%	65,368,927	284,709,391
14. Non-Retired Demographic (Gains)/Losses	0.11%	(48,402,938)	16,675,583
15. Post-Retirement Mortality (Gains)/Losses	0.19%	(85,211,212)	(45,484,219)
16. Other Demographic (Gains)/Losses	0.03%	12,458,579	46,277,392
17. Total (Sum of Items 12 through 16)	2.04%	$ (899,718,635)	$ 545,357,177

* 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%
2018	5,897.5	86%	22,528.0	328%	10,563.8	154%	27,359.9	100%	95%	0%
2019	6,044.4	87%	23,686.0	339%	10,070.9	144%	28,060.1	100%	93%	0%
2020	6,279.0	87%	25,604.8	355%	11,374.5	158%	28,543.2	100%	87%	0%
2021	6,524.1	92%	26,547.2	374%	11,112.4	157%	30,065.4	100%	89%	0%

Note : Dollar amounts in millions

Table 11
Historical Contribution Rates

Actuarial Valuation as of August 31,	Contributions from: State	Agency	Members	Total	Legacy Payments (millions)	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%
2018	9.50%	0.50%	9.50%	19.50%		13.86%	23.12%
2019	9.50%	0.50%	9.50%	19.50%		13.76%	23.26%
2020	9.50%	0.50%	9.50%	19.50%		14.16%	25.48%
2021	9.50%	0.50%	9.50%	19.50%	$510	14.12%	***

* 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.

** Prior to 2021, the Actuarially Sound Contribution Rate (ASC) was the rate determined as of the valuation date to fund the normal cost and amortize the UAAL over a 31 year period.

*** Beginning with the 2022-2023 biennium, the legislature will appropriate an amount each biennium that is expected to eliminate the unfunded liability by no later than 2054 in accordance with Section 815.407 of the Texas Government Code.

SECTION D

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY AND ACTUARIALLY DETERMINED CONTRIBUTION

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The actuarially sound contribution rate may be considered as a minimum contribution rate that complies with State statute. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Currently, this, and other Board funding policy objectives are not being met. Users of this report should be aware that even contributions made at the actuarially sound contribution rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Ratio of the market value of assets to total payroll	4.7	3.9	3.9	4.0	3.9	3.6	3.6	4.1	3.8	3.8
Ratio of actuarial accrued liability to payroll	6.2	6.0	5.7	5.7	5.5	5.2	5.1	5.3	5.4	5.3
Ratio of actives to retirees and beneficiaries	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.5	1.5
Ratio of net cash flow to market value of assets	-3.8%	-4.3%	-4.2%	-3.8%	-3.5%	-3.3%	-4.6%	-4.3%	-4.6%	-4.6%
Duration of the actuarial accrued liability*	12.0	12.1	11.6	11.7						

*Duration measure not available before 2018

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally

expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the actuarial accrued liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

SECTION E

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 (for all members hired before September 1, 2022):
    a. *Legislators*:
        i. *Fiscal year 2015:* 8.00% of compensation
        ii. *Fiscal year 2016 and beyond:* 9.50% of compensation
    b. *Non-legislators*:
        ii. *Fiscal year 2015:* 6.90% of compensation
        iii. *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 (for all members hired before September 1, 2022):
    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.
5. For all members hired on or after September 1, 2022: 6.00% of compensation.

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 and beyond**
Employer (agency appropriations)	0.50%	0.50%
State (statewide appropriations)	7.50%	9.50%

Additionally, Texas Government Code Section 815.407 provides for Legacy Payments that are actuarially determined State contributions necessary to eliminate the UAAL by no later than August 31, 2054. For the 2022-2023 biennium, the Legacy Payments were budgeted at $510 million annually.

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:
    a. *Elected class members other than district attorneys or criminal district attorneys*: The State base salary, excluding longevity pay, of a district judge, as adjusted from time to time.

b. *District attorneys and criminal district attorneys*: The State salary, excluding longevity pay, of a district judge of the same number of years of service credit as the member on the member's last day of service as a district or criminal district attorney, 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 and prior to September 1, 2022*: 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. Creditable Service in the Elected Class is not granted for unused sick and annual leave.

Cash Balance Benefit for Members hired on or after September 1, 2022

Member's hired on or after September 1, 2022 will be eligible for the cash balance benefit. Members eligible for the cash balance benefit will contribute 6% of compensation on an ongoing basis. The member's contribution balance will be accumulated each year with the member's contributions plus an Annual Interest Adjustment and, if applicable, a Gain Sharing Interest Adjustment. The Annual Interest Adjustment is equal to 4% of the member's accumulated account balance.

In years when the five-year average of ERS' total Trust Fund investment returns exceeds 4%, the member's accumulated account balance will also receive a Gain Sharing Interest Adjustment equal to 50% of the return in excess of 4%—up to 3% additional per year. The gain sharing amount will not be less than 0% nor greater than 3% in a given year.

At retirement, the member's accumulated account balance (contributions plus Annual Interest Adjustments plus Gain Sharing Interest Adjustments) will be matched by 150% from the State. The member will receive a cash balance annuity equal to this total amount annuitized over the life expectancy of the member as of the effective date of the member's retirement. The annuity factors will be based on 4% interest and mortality tables adopted by the ERS Board.

Members that leave active employment before retirement but leave their contributions on account with ERS will continue to receive Annual Interest Adjustments and Gain Sharing Interest Adjustments each year. The member can annuitize their accumulated account balance, along with the State match, once they are eligible to commence their annuity.

Once retired, the member's cash balance annuity will also be eligible for the Gain Sharing Interest Adjustment in the form of an increase in their benefit equal to the same percentage of gain-sharing interest credited to non-retired member's accounts.

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:*
        i. *Members hired prior to September 1, 2022*: 2.3% of AMC times years of Creditable Service, adjusted automatically based on the State base 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 base salary of a district judge unless the service is transferred back to the elected class.
        ii. *Members hired on or after September 1, 2022*: Cash balance benefit.
2. Employee Class:
    a. *Eligibility*:
        i. *Members hired prior to September 1, 2009*: Age 60 with five years of employee class service
        ii. M*embers hired on or after September 1, 2009 and prior to September 1, 2022*: 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
        vi. *Members hired on or after September 1, 2022*: Age 65 with 5 years of employee class service
    b. *Benefits:*
        i. *Members hired prior to September 1, 2022*: 2.3% of AMC times years of Creditable Service
        ii. *Members hired on or after September 1, 2022*: Cash balance benefit.
    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, but prior to September 1, 2022, reduced five percent for each year the member retires prior to age 62, with no maximum possible reduction.

iv. For members hired on or after September 1, 2022, none.

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 but prior to September 1, 2022, reduced five percent for each year the member retires prior to age 57, with no maximum possible reduction.

iv. For members hired on or after September 1, 2022, none.

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:

i. Members hired prior to September 1, 2022: 2.3% of AMC times years of Creditable Service, adjusted automatically based on the State base salary of a district judge.

ii. Members hired on or after September 1, 2022: Cash balance benefit. The ERS Board may also enter into agreements to provide additional disability benefits.

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:
        i. Members hired prior to September 1, 2022: 2.3% of AMC times years of Creditable Service
        ii. Members hired on or after September 1, 2022: Cash balance benefit. The ERS Board may also enter into agreements to provide additional disability benefits.
    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:*
        i. *Members hired prior to September 1, 2022*: 2.3% of AMC times years of Creditable Service, but not less than 18.4% of AMC, adjusted automatically based on the State base salary of a district judge.
        ii. *Members hired on or after September 1, 2022*: Cash balance benefit. The ERS Board may also enter into agreements to provide additional disability benefits.
2. Employee Class (Regular State Employees):
    a. *Eligibility*: Disability as a direct result of some risk or hazard inherent to employment
    b. *Benefits:*
        i. *Members hired prior to September 1, 2022*: 2.3% of AMC times years of Creditable Service, but not less than 35% of AMC
        ii. *Members hired on or after September 1, 2022:* Cash balance benefit. The ERS Board may also enter into agreements to provide additional disability benefits.
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 for Members hired prior to September 1, 2022:*

   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

c. *Benefits for Members hired on or after September 1, 2022*: Cash balance benefit. The ERS Board may also enter into agreements to provide additional disability benefits.

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:
   a. *Members hired prior to September 1, 2022*: 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:
      i. With 12 years of elected class service, the benefit is actuarially reduced from the member's age 50,
      ii. With 10 years of CPO/CO service, the benefit is actuarially reduced from the member's age 55,
      iii. 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
      iv. 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.
   b. *Members hired on or after September 1, 2022*: Cash balance benefit. The ERS Board may also enter into agreements to provide additional death benefits.

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. For members hired prior to September 1, 2022, 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 to members hired prior to September 1, 2022 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:*
        i. *Members hired prior to September 1, 2022*: Standard Service Retirement Annuity payable at age 60 (or 50 with 12 years of elected class service)
        ii. *Members hired on or after September 1, 2022*: Cash balance benefit.
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, but prior to September 1, 2022*: 10 years of employee class service
        iii. *Members hired on or after September 1, 2022*: Five years of employee class service
    b. *Benefits:*
        i. *Members hired prior to September 1, 2009*: Standard Service Retirement Annuity payable at age 60
        ii. *Members hired on or after September 1, 2009, but prior to September 1, 2022*: Standard Service Retirement Annuity payable at age 65
        iii. *Members hired on or after September 1, 2022:* Cash balance benefit.
        iv. *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 F

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 May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019.

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 7.00% 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 E 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.

IV. Actuarial Assumptions

Investment Return: 7.00% per year, net of investment-related expenses (composed of an assumed 2.30% inflation rate and a 4.70% 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
Elected Class: Legislators	0%	0%	0%
Elected Class: District Attorneys	2.30%	0%	See salary structure below
Elected Class: Other than Legislators and District Attorneys	2.30%	0%	0%
Employee Class	2.30%	included in Merit, Promotion and Longevity Increases	See sample rates
State Base Salary of a District Judge*	2.30%	0%	0%
Inactive members who transfer to TRS**	2.30%	0%	2.50%

* Retirees from the Elected Class are assumed to receive post-retirement increases in accordance with changes in the State base salary of a district judge.

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

*** Total liabilities for this valuation reflect the notable 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	6.50 %	4.95 %	4.45 %	4.00 %			
25	6.10	4.95	4.45	3.20	2.20 %		
30	5.60	4.95	4.45	2.70	2.20	1.70 %	
35	5.10	4.45	3.70	2.70	2.20	1.70	1.60 %
40	4.60	4.45	3.70	2.70	2.20	1.60	1.50
45	4.10	3.95	3.45	2.70	2.10	1.60	1.40
50	3.60	3.40	2.90	2.40	1.90	1.40	1.30
55	3.10	2.90	2.50	2.10	1.60	1.30	1.20
60+	2.60	2.40	2.00	1.70	1.30	1.10	1.00

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	6.45 %	4.45 %	2.95 %	1.95 %	1.70 %	1.45 %

District attorneys in the Elected Class are assumed to follow the judicial salary schedule of a district judge as prescribed in Section 659.012 of the Texas Government Code. The salary structure is illustrated below:

Annual Salary Increases for Merit, Promotion and Longevity Male and Female District Attorneys in the Elected Class			
	Years of Eligibility Service as a District Attorney		
Age	Less than 4	4 or more, but less than 8	8 or more
All	State base salary of a district judge	110% of base salary	120% of base salary

Payroll Growth: 2.70% per year, compounded annually. No increase for the first year due to no budgeted across-the-board increases as of September 1, 2022.

New Entrant Wage Growth: 2.70% per year, compounded annually (for increasing new hire salary in open group projection).

New Entrant Profile: The average new hire is determined based on a new entrant profile, which is created from the valuation data by determining the entry age and entry pay for anyone with greater than or equal to three but less than eight years of service as of the valuation date. Each group of new hires' salaries is assumed to grow at the New Entrant Wage Growth of 2.70% over the salaries of the previous year's group.

Post-Retirement Increases for Elected Class Members: If benefits are based on the State base salary of a district judge, the benefits are assumed to increase 2.30% 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.

Post-Retirement Increase in Accordance with Section 814.604: Section 814.604 of the Texas Government Code provides for a one-time limited group of retirees to receive a permanent monthly annuity increase once the funding period will remain under the 31-year requirement after the increase is reflected. This timing of this COLA is assumed to be in January, 2025.

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

2020 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scales published through 2019 by Retirement Plans Experience Committee of the Society of Actuaries ("Ultimate MP") and projected from the year 2020. 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	0.0585	0.0369
45	0.1028	0.0667
50	0.1771	0.1179
55	0.3052	0.2086
60	0.5260	0.3691
65	0.9066	0.6530
70	1.5627	1.1554
75	2.6933	2.0443
80	4.6421	3.6170
85	8.0010	6.3997
90	13.8587	11.3793

Active Members

Pub-2010 General Employees Active Member Mortality table for non-LECO members. Pub-2010 Public Safety Active Member Mortality table for LECO members. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2010.

Disability Retirees

2020 State Retirees of Texas (SRT) mortality table, set forward three years for males and females. Minimum rates at all ages of 3.0% and 2.5% for males and females, respectively. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2020.

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 prior to September 1, 2013:

- Eligibility A: Add 0.30 at age 60

Adjustments for members hired on or after September 1, 2013, but prior to September 1, 2022:

- 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

Adjustments for members hired on or after September 1, 2022:

- Eligibility A: rates prior to age 62 are multiplied by 75% for each year prior to 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 but prior to September 1, 2022:

- 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 80% 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 0.06 times the number of years the age at 1st eligibility was before age 62

Adjustments for members hired on or after September 1, 2022:

- 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 80% 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

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	26.45
1	22.10
2	17.66
3	14.35
4	11.91
5	10.13
6	8.82
7	7.83
8	7.03
9	6.35
10	5.70
11	5.08
12	4.49
13	3.94
14	3.53
15	3.34
16	2.88
17	1.15
18	1.15
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.

Cash Balance Assumptions for New Entrants:

Interest Crediting

Members account balances are assumed to earn 5.50% per year through the 4.00% Annual Interest Adjustments plus 1.50% from the Gain Sharing Interest Adjustments.

Annuity Factors for Annuitizing Cash Balance Benefits

Members account balances are annuitized using factors with a 4% discount rate and valuation mortality, including generational projections.

Post-retirement Annuity Increase

Cash balance annuity benefits increase 1.50% from the Gain Sharing Interest Adjustments.

Benefits

The actuarial valuation anticipates clarifications to the cash balance benefits that are currently described in State statute. Specifically, these include:

- Standard Non-Occupational Disability Annuity incorporates a minimum benefit equal to 25% of the members salary,
- Standard Occupational Disability Annuity incorporates a minimum benefit equal to 35% of the members salary, and

Census Data and Assets

- The valuation was based on members of ERS as of August 31, 2021 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.

Actuarial Model

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

SECTION G

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	57,657	79,069	103,893	335	32,498	136,726
Average Annual Salaries	$ 55,253	$ 49,472	$ 53,442	$ 75,658	$ 46,768	$ 51,910
Average Age	44.1	43.9	44.7	54.1	41.7	44.0
Average Entry Age	35.4	35.5	36.0	45.1	33.6	35.4
Average Service	8.7	8.4	8.7	9.0	8.1	8.6

Annuitants

Item	Number	Annual Annuities	Average Annuities	Average Age
Service Retirees*	108,948	$ 2,398,690,020	$ 22,017	69.7
Beneficiaries	9,279	$ 143,415,132	$ 15,456	74.6
Disability Retirees	2,067	$ 19,148,208	$ 9,264	68.3
Total	120,294	$ 2,561,253,360	$ 21,292	70.0

* Average Age and Service at Retirement for Service Retirees are 59.1 and 21.1, respectively

Inactive Members Assumed Eligible for Deferred Annuities

Item	Number	Annual Annuities	Average Annuities	Average Age
Vested Members who are not Active at TRS	11,946	$ 145,459,560	$ 12,176	50.9
Vested Members who are Active at TRS	2,921	$ 59,185,404	$ 20,262	51.6
Total	14,867	$ 204,644,964	$ 13,765	51.0
Non-vested Members who are Active at TRS	14,298	$ 46,698,396	$ 3,266	45.0

Non-vested Inactive Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Members who are not Active at TRS	115,885	$ 417,307,934	$ 3,601	40.9
Non-vested Members who are Active at TRS (this group assumed eligible for deferred annuities)	14,298	$ 72,114,319	$ 5,044	45.0
Total	130,183	$ 489,422,253	$ 3,759	41.4

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	7,494	68								7,562
	$ 31,434	$ 37,328								$ 31,487
25 - 29	10,836	2,201	16							13,053
	$ 41,179	$ 48,829	$ 45,070							$ 42,474
30 - 34	8,996	5,778	1,004	30						15,808
	$ 43,742	$ 54,642	$ 52,656	$ 54,182						$ 48,312
35 - 39	7,455	5,322	3,605	981	73					17,436
	$ 45,496	$ 55,379	$ 60,917	$ 62,540	$ 63,319					$ 52,734
40 - 44	6,372	4,369	3,261	2,277	1,240	60				17,579
	$ 45,612	$ 54,671	$ 61,025	$ 68,712	$ 66,003	$ 68,205				$ 55,230
45 - 49	5,604	3,877	2,884	2,147	2,745	1,226	49			18,532
	$ 45,431	$ 53,801	$ 57,249	$ 66,035	$ 68,391	$ 68,485	$ 71,270			$ 56,403
50 - 54	4,968	3,617	2,826	2,090	2,402	1,803	361	18		18,085
	$ 45,831	$ 52,886	$ 55,643	$ 62,134	$ 66,162	$ 75,438	$ 80,716	$ 70,872		$ 57,033
55 - 59	3,949	3,217	2,467	1,803	1,544	912	505	119	6	14,522
	$ 44,861	$ 51,474	$ 52,667	$ 59,332	$ 64,246	$ 69,923	$ 82,250	$ 80,297	$ 81,043	$ 54,689
60 - 64	2,193	2,378	1,916	1,266	783	530	308	157	36	9,567
	$ 45,072	$ 51,990	$ 53,539	$ 58,778	$ 63,784	$ 71,495	$ 78,451	$ 84,366	$ 69,432	$ 55,107
Over 64	923	1,304	965	519	371	252	129	71	48	4,582
	$ 46,723	$ 50,590	$ 55,803	$ 59,530	$ 61,326	$ 71,842	$ 70,744	$ 73,806	$ 76,656	$ 55,160
Total	58,790	32,131	18,944	11,113	9,158	4,783	1,352	365	90	136,726
	$ 42,635	$ 53,356	$ 57,058	$ 63,291	$ 66,064	$ 71,887	$ 79,479	$ 80,320	$ 74,059	$ 51,910

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	4,453	32								4,485
	$ 30,434	$ 35,049								$ 30,467
25 - 29	8,046	1,300	9							9,355
	$ 42,037	$ 47,757	$ 39,864							$ 42,830
30 - 34	6,976	4,206	576	21						11,779
	$ 44,893	$ 55,134	$ 53,044	$ 54,452						$ 48,966
35 - 39	5,865	4,187	2,646	599	48					13,345
	$ 47,158	$ 56,791	$ 61,416	$ 65,619	$ 61,681					$ 53,888
40 - 44	4,983	3,402	2,511	1,545	781	37				13,259
	$ 47,472	$ 56,695	$ 62,758	$ 70,174	$ 67,706	$ 67,185				$ 56,625
45 - 49	4,383	3,013	2,257	1,511	1,938	683	33			13,818
	$ 47,111	$ 55,739	$ 58,639	$ 68,459	$ 69,454	$ 70,162	$ 70,701			$ 57,539
50 - 54	3,889	2,857	2,185	1,537	2,043	1,487	298	17		14,313
	$ 47,498	$ 54,521	$ 57,460	$ 64,738	$ 66,229	$ 74,519	$ 77,769	$ 70,125		$ 58,410
55 - 59	3,137	2,538	1,930	1,438	1,395	816	462	105	6	11,827
	$ 46,332	$ 53,371	$ 53,924	$ 61,510	$ 64,508	$ 70,095	$ 81,331	$ 77,273	$ 81,043	$ 56,370
60 - 64	1,747	1,893	1,587	1,019	712	490	297	150	36	7,931
	$ 46,898	$ 53,961	$ 54,908	$ 60,788	$ 64,935	$ 72,136	$ 78,703	$ 83,549	$ 69,432	$ 57,136
Over 64	693	1,014	814	459	334	234	122	65	46	3,781
	$ 49,387	$ 52,520	$ 57,274	$ 60,057	$ 63,246	$ 72,884	$ 72,549	$ 75,728	$ 79,676	$ 57,468
Total	44,172	24,442	14,515	8,129	7,251	3,747	1,212	337	88	103,893
	$ 44,208	$ 54,837	$ 58,335	$ 65,171	$ 66,625	$ 72,275	$ 78,637	$ 79,408	$ 75,579	$ 53,442

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	3,041	36								3,077
	$ 32,900	$ 39,354								$ 32,975
25 - 29	2,790	901	7							3,698
	$ 38,707	$ 50,375	$ 51,762							$ 41,575
30 - 34	2,012	1,572	428	9						4,021
	$ 39,494	$ 53,325	$ 52,135	$ 53,550						$ 46,278
35 - 39	1,572	1,128	958	382	25					4,065
	$ 39,035	$ 50,020	$ 59,594	$ 57,713	$ 66,463					$ 48,853
40 - 44	1,373	956	744	730	459	23				4,285
	$ 38,293	$ 47,527	$ 55,178	$ 65,788	$ 63,106	$ 69,846				$ 50,796
45 - 49	1,205	842	619	634	806	543	16			4,665
	$ 38,825	$ 46,148	$ 51,790	$ 60,192	$ 65,910	$ 66,375	$ 72,445			$ 52,773
50 - 54	1,051	744	626	546	356	316	63	1		3,703
	$ 38,619	$ 45,542	$ 48,539	$ 54,650	$ 66,273	$ 79,765	$ 94,657	$ 83,571		$ 51,186
55 - 59	789	669	523	359	144	96	42	14		2,636
	$ 38,201	$ 44,267	$ 46,908	$ 49,377	$ 59,216	$ 68,461	$ 94,155	$ 102,975		$ 46,476
60 - 64	435	476	327	242	71	39	11	7		1,608
	$ 37,272	$ 43,455	$ 47,178	$ 49,014	$ 52,240	$ 65,083	$ 71,656	$ 101,889		$ 44,736
Over 64	218	278	142	50	29	14	5	4		740
	$ 38,538	$ 42,780	$ 45,924	$ 49,620	$ 49,526	$ 61,413	$ 52,136	$ 75,878		$ 43,455
Total	14,486	7,602	4,374	2,952	1,890	1,031	137	26		32,498
	$ 37,524	$ 48,332	$ 52,525	$ 57,799	$ 64,030	$ 70,634	$ 88,510	$ 97,768		$ 46,768

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	8									8
	$108,550									$108,550
35 - 39	18	7	1							26
	$ 67,927	$ 74,114	$ 7,200							$ 67,257
40 - 44	16	11	6	2						35
	$ 94,336	$ 49,782	$ 60,800	$ 7,200						$ 69,605
45 - 49	16	22	8	2	1					49
	$ 82,775	$ 81,235	$ 87,600	$ 87,600	$ 7,200					$ 81,526
50 - 54	28	16	15	7	3					69
	$ 85,086	$102,509	$ 87,493	$ 74,079	$ 7,200					$ 85,146
55 - 59	23	10	14	6	5		1			59
	$ 72,580	$ 51,890	$ 94,555	$132,740	#######		$ 7,200			$ 84,658
60 - 64	11	9	2	5		1				28
	$ 63,392	$ 88,756	$ 7,200	$121,690		$ 7,200				$ 75,934
Over 64	12	12	9	10	8	4	2	2	2	61
	$ 41,567	$ 68,454	$ 78,667	$ 84,894	$ 23,917	$ 47,400	$ 7,200	$ 7,200	$ 7,200	$ 54,120
Total	132	87	55	32	17	5	3	2	2	335
	$ 77,066	$ 76,240	$ 80,570	$ 92,562	$ 52,902	$ 39,360	$ 7,200	$ 7,200	$ 7,200	$ 75,658

Table F

Retired and Beneficiary Members – Excluding ERS Reimbursing TRS Annuitants

Distribution by Age and Category

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees			
Under 60	14,703	476,722,524	32,423
60 - 64	17,701	479,811,312	27,106
65 - 69	22,680	510,925,392	22,528
70 - 74	21,940	441,062,496	20,103
75 - 79	13,367	242,401,728	18,134
Over 79	12,779	219,618,576	17,186
Total	103,170	2,370,542,028	22,977
Beneficiaries			
Under 60	1,014	13,555,476	13,368
60 - 64	653	9,845,040	15,077
65 - 69	1,092	17,019,696	15,586
70 - 74	1,495	22,154,148	14,819
75 - 79	1,605	24,246,744	15,107
Over 79	3,326	56,072,304	16,859
Total	9,185	142,893,408	15,557
Disabled Retirees			
Under 60	362	3,045,828	8,414
60 - 64	323	2,966,712	9,185
65 - 69	330	3,497,316	10,598
70 - 74	425	4,529,208	10,657
75 - 79	240	2,389,512	9,956
Over 79	219	2,196,600	10,030
Total	1,899	18,625,176	9,808
Grand Total	114,254	2,532,060,612	22,162

Table G

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	417	3,008,160	7,214
60 - 64	758	4,415,676	5,825
65 - 69	1,510	8,775,840	5,812
70 - 74	1,602	7,009,428	4,375
75 - 79	934	3,597,888	3,852
Over 79	651	1,862,724	2,861
Total	5,872	28,669,716	4,882
Disabled Retirees			
Under 60	37	160,680	4,343
60 - 64	41	155,424	3,791
65 - 69	39	102,528	2,629
70 - 74	32	75,336	2,354
75 - 79	16	25,044	1,565
Over 79	3	4,020	1,340
Total	168	523,032	3,113
Grand Total	6,040	29,192,748	4,833

SECTION H

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

Law Enforcement and Custodial Officer Supplemental Retirement Fund of the Employees Retirement System of Texas

Annual Actuarial Valuation - Funding

As of August 31, 2021

P: 469.524.0000 | www.grsconsulting.com

November 29, 2021

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, 2021

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, 2021. 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.

Senate Bill 321 in the 2021 Legislative Session made significant changes to the benefit structure for new hires on or after September 1, 2022. However, the net employer cost of the new benefits is similar to the prior provisions and no additional funding was provided for, therefore the funding trajectory of the plan was largely unchanged by the legislation. The current financial outlook for LECOSRF continues to be very poor. It is important to understand that the currently scheduled 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 2050.

Plan Provisions

Our actuarial valuation as of August 31, 2021 reflects the benefit and contribution provisions set forth in Chapters 811 through 815 and Chapter 820 of the Texas Government Code with respect to the amounts payable from the Law Enforcement and Custodial Officer Supplemental Retirement Fund. The benefit provisions for new members hired on or after September 1, 2022 are described in more detail later in the report. The current plan provisions are outlined in Section E of this report.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019. Additionally, this actuarial valuation incorporates the notable 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 F of this report.

Data

This valuation was based upon information as of August 31, 2021, 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. Mr. Falls, Mr. Newton and Ms. Woolfrey are Enrolled Actuaries and Fellows of the Society of Actuaries, and all of the undersigned are 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
Senior Consultant & Actuary

Table of Contents

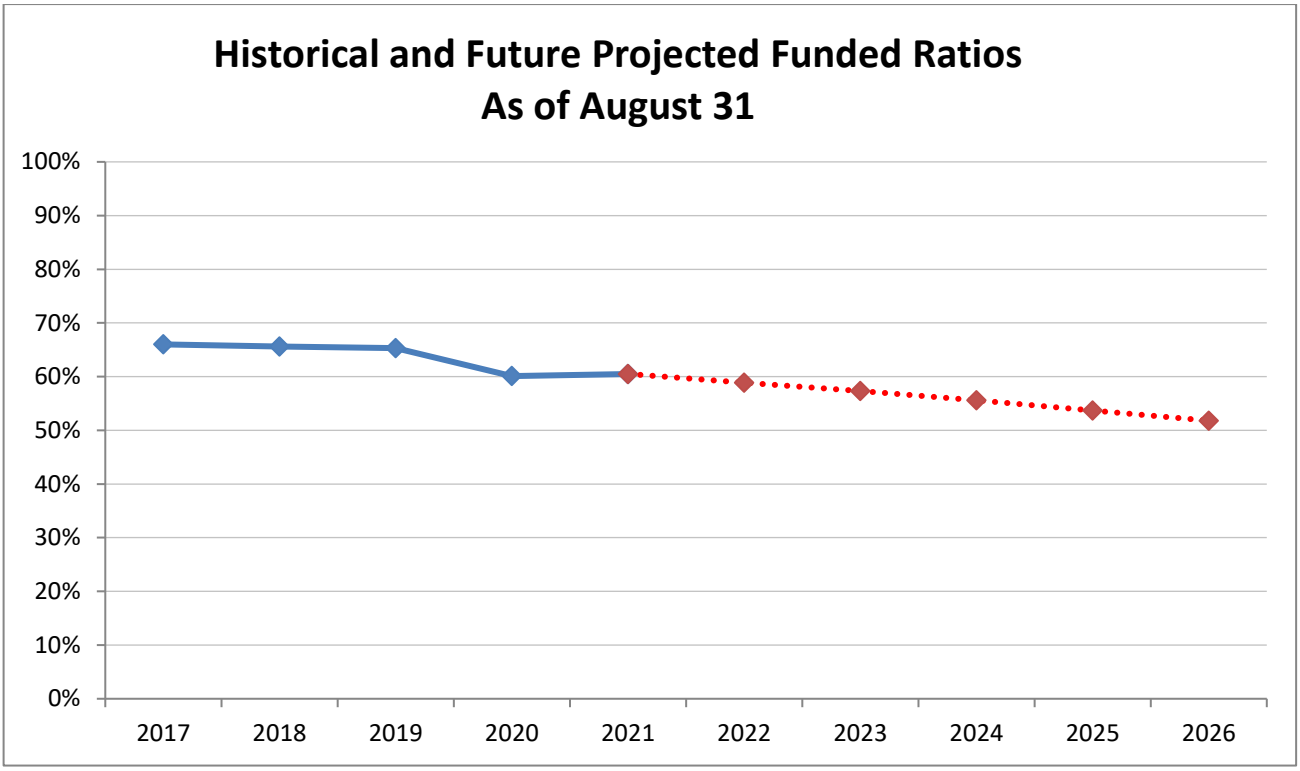
SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2021	2020
Membership		
• Number of		
- Active members	32,498	35,230
- Retirees and beneficiaries	15,343	14,697
- Inactive, vested	112	124
- Inactive, nonvested	29,514	25,387
- Total	77,467	75,438
• Valuation Payroll	$ 1,585,643,659	$ 1,629,386,809
Statutory contribution rates	FY 2022	FY 2021
• Members	0.50%	0.50%
• State	0.50%	0.50%
• Expected annual contributions from court fees	$15.0 million	$17.1 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 Employer Rate	3.97%	3.72%
- Net of Court Fees	3.25%	2.93%
Assets		
• Market value (MVA)	$ 1,116,041,411	$ 947,324,194
• Actuarial value (AVA)	$ 997,651,850	$ 968,062,761
• Return on market value (gross)	25.51%	6.85%
Return on market value (net)	25.46%	6.82%
• Return on actuarial value	10.0%	6.1%
Actuarial Information on AVA - smoothed		
• Normal cost %	1.97%	1.96%
• Total normal cost	$ 31,237,180	$ 31,935,981
• Actuarial accrued liability	$ 1,650,353,001	$ 1,609,587,060
• Unfunded actuarial accrued liability (UAAL)	$ 652,701,151	$ 641,524,299
• Funded ratio	60.5%	60.1%
• Funding period (years)	Never	Never
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 534,311,590	$ 662,262,866
• Funded ratio	67.6%	58.9%

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



August 31,	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Funded Ratio	66.0%	65.6%	65.3%	60.1%	60.5%	58.9%	57.3%	55.6%	53.7%	51.8%
UAAL (in millions)	$476	$500	$515	$642	$653	$699	$748	$801	$859	$921
ASC*	2.37%	2.49%	2.64%	2.93%	3.25%	3.55%	3.82%	4.07%	4.31%	4.55%

* Net employer rate

The projections beyond 2021 are based on the same assumptions, methods and provisions used for the August 31, 2021 valuation, which include the notable across-the-board pay increases budgeted by the State Legislature when they are granted and the assumptions adopted by the Board in May 2020. Additionally, the actuarial value of assets is expected to earn 7.0% per year.

It is important to understand that the currently scheduled 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 have money in the trust fund until the year 2050. After which, the funding would revert to a pay-as-you-go status. **When LECOSRF reverts to a pay-as-you-go status, the required Legislative appropriation for LECOSRF will immediately increase to 10 times the current State contribution rate, not including contributions from court fees, in order to ensure all retirees continue to receive their promised benefit.**

Given this outlook, we recommend the Legislature increase the contribution rates to LECOSRF.

SECTION B

DISCUSSION

Discussion

Introduction

This report presents the results of the August 31, 2021 actuarial valuation of the Law Enforcement and Custodial Officer Supplemental Retirement Fund (LECOSRF) of the Employees Retirement System (ERS) of Texas.

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 2050, 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

SB 321 created a new defined benefit structure for state employees who began work on or after September 1, 2022. The new structure is a cash balance retirement benefit with meaningful cost and risk sharing mechanisms. The overall average value provided by the State is not meaningfully different from the previous benefit structure. As no current members are in the new benefit structure and the value is similar, the change to the benefit structure had minimal impact to this valuation and forward-looking projections. However, the new structure is designed to mitigate unexpected future increases in the UAAL. The impact will be realized in the future if experience deviates from the assumptions. The current plan provisions are outlined in Section E of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of LECOSRF.

This actuarial valuation adjusts for any notable across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, regular State employees did not receive an across-the-board increase effective September 1, 2021 nor September 1, 2022. Additionally, commissioned law enforcement positions were assumed to receive the scheduled increases to State Salary Schedule C on September 1, 2021. There were no other changes to the assumptions.

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 F of this report.

Funding Adequacy

The ERS Board of Trustees approved the Pension Funding Priorities and Guidelines on May 23, 2018 and adopted updates in August 2020. For the Board, adoption of this policy is intended to:

- enhance communications and provide transparency to the Legislature and plan members and retirees regarding Board of Trustees' positions on plan funding strategy;
- provide policy guidance to current and future Boards;
- ensure that legislators, elected officials and other stakeholders have clear and accurate information about the Trust's funding goals and the needs of the Board in supporting sound fiduciary investment decisions in accordance with Texas Government Code Section 815.106; and
- identify a recommended plan for the state of Texas, as the plan sponsor, to achieve a 100% funded ratio while following funding best practices and sound actuarial principles, in accordance with Texas Government Code Section 802.2011.

The policy states that the main objective of ERS' retirement programs is to fully fund the long-term cost of benefits provided by statute, through disciplined and timely accumulation of contributions and prudent investment of assets to deliver earned benefits on a continuing basis. In support of this objective, the policy laid out a multi-level funding period goal to gradually achieve funding on sound actuarial principles:

1. Fund normal costs;
2. Avoid trust fund depletion of the pre-funded plans;
3. Meet current statutory standard of a 31-year funding period for unfunded liabilities, per Texas Government Code Sections 811.006 and 840.106; and
4. Match funding period to the average years of service at retirement once a 31-year funding period is achieved, and closed.

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, 2021, 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 $15.0 million for fiscal year 2022 and all subsequent years. 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 2022, the contribution from court fees is expected to be approximately 0.95% of payroll.

The unfunded actuarial accrued liability (UAAL) of LECOSRF increased from $642 million as of August 31, 2020 to $653 million as of August 31, 2021. Additionally, the LECOSRF funded ratio—actuarial value of assets divided by the actuarial accrued liability—increased from 60.1% to 60.5%, as of August 31, 2021. This increase was primarily due to gains on assets. 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 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. 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 7.00% per year, LECOSRF is projected to remain solvent until the year 2050, after which the funding would revert to a pay-as-you-go status. **As a result, the first and second levels of the Board's funding period goal are not currently being realized.**

The third level of the Board's funding period goal 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. Further, 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 expected to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. In this context, the Actuarially Sound Contribution (ASC) rate is the contribution rate that meets this standard. Based on the actuarial valuation as of August 31, 2021, the ASC employer rate for LECOSRF is 3.25% of payroll in addition to the expected annual contributions from court fees of $15.0 million. **Based on the current employer contribution rate of 0.50% of payroll, in addition to court fees, the third level of the Board's funding period goal is not currently being realized.**

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. We recommend that the Board seek a plan funding strategy that meets the fourth level of the Board's funding period goal or meets an ultimate goal of eliminating the UAAL by a certain date.

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 $947 million to $1,116 million as of August 31, 2021. Table 5 reconciles the changes in the fund during the year. Total contributions decreased from $31.2 million to $29.4 million. Employer contributions for fiscal year 2022 are anticipated to be approximately 1.45% of pay including expected court fees. Total contributions in subsequent years are expected to increase due to higher member contributions under the new cash balance structure; however, the total normal costs are also higher under the new provisions and no additional money to finance the UAAL is currently appropriated. The rate available to finance the UAAL is expected to be a declining percentage of pay since contributions from court fees are expected to remain level as a dollar amount while payroll increases.

Table 6 shows the development of the Actuarial Value of Assets (AVA). The current AVA method recognizes each year's gain or loss over a closed five year period and allows for direct offsetting of gains and losses. The AVA increased from $968 million to $998 million as of August 31, 2021.

When measured on a market value, the gross investment return for the fiscal year ending August 31, 2021 was 25.51% and the return net of investment expenses was 25.46% as reported by the ERS Master Trust Custodian. When measured on an actuarial value, the net investment return was 10.0%. Table 7 shows a history of return rates. The LECOSRF ten-year average gross market return, as reported by the ERS Master Trust Custodian, is 9.40%. The ten-year average return net of investment expenses is 9.32%.

Table 8 provides a history of the contributions paid into LECOSRF and the administrative expenses and benefit payments paid out of LECOSRF. LECOSRF paid administrative expenses and benefit payments, in excess of contributions received, of $57.4 million (or 6.1% of assets) in fiscal year 2020 and $64.1 million (or 5.7% of assets) in fiscal year 2021. ERS should continue to monitor this deficit as it could impact future liquidity needs. 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).

Data

This valuation was based upon information as of August 31, 2021, 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 G show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Table 1
Development of Employer Cost

	August 31, 2021	August 31, 2020
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	$ 1,519,867,666	$ 1,629,386,809
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	1,585,643,659	1,629,386,809
2. Total Normal Cost Rate		
a. Gross normal cost rate	1.89%	1.88%
b. Administrative expenses	0.08%	0.08%
c. Total (Item 2a + Item 2b)	1.97%	1.96%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	$ 866,434,870	$ 884,649,779
b. Less: present value of future normal costs	(202,420,116)	(213,558,314)
c. Actuarial accrued liability	$ 664,014,754	$ 671,091,465
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	$ 970,572,535	$ 920,353,836
b. Inactive members	15,765,712	18,141,759
c. Active members (Item 3c)	664,014,754	671,091,465
d. Total	$ 1,650,353,001	$ 1,609,587,060
5. Actuarial Value of Assets	$ 997,651,850	$ 968,062,761
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 652,701,151	$ 641,524,299
7. Expected Contribution from Court Fees		
a. Expected future contributions	$ 15,000,000	$ 17,100,000
b. Equivalent contribution rate for fiscal year	0.95%	1.05%
8. Employer Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	3.97%	3.72%
9. Contribution Equivalent of Court Fees over 31 years*	(0.72%)	(0.79%)
10. Initial Contribution Shortfall	3.25%	2.93%
11. Employer Payroll Contribution	(0.50%)	(0.50%)
12. Final Contribution Shortfall	2.75%	2.43%
13. Funding period based on statutory contribution rates, expected court fees, and Actuarial Value of Assets (years)	Never	Never

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

Table 2
Actuarial Present Value of Future Benefits

		August 31, 2021	August 31, 2020
1.	Active Members		
	a. Service Retirement	$ 844,082,263	$ 860,946,338
	b. Disability Benefits	4,493,877	4,629,103
	c. Death Before Retirement	4,064,587	4,163,566
	d. Termination	13,794,143	14,910,772
	e. Total	$ 866,434,870	$ 884,649,779
2.	Inactive Members	$ 15,765,712	$ 18,141,759
3.	Annuitants	$ 970,572,535	$ 920,353,836
4.	Total Actuarial Present Value of Future Benefits	$ 1,852,773,117	$ 1,823,145,374

Table 3
Analysis of Normal Cost

		August 31, 2021	August 31, 2020
1.	Gross Normal Cost Rate		
	a. Service Retirement	1.68%	1.67%
	b. Disability Benefits	0.02%	0.02%
	c. Death Before Retirement	0.01%	0.01%
	d. Termination	0.18%	0.18%
	e. Total	1.89%	1.88%
2.	Administrative Expenses	0.08%	0.08%
3.	Total Normal Cost	1.97%	1.96%
4.	Less: Member Rate	0.50%	0.50%
5.	Employer Normal Cost Rate	1.47%	1.46%

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
2018	37,167	-2.7%	1,684	-2.1%	45,321	0.7%	41.0	8.0
2019	36,296	-2.3%	1,644	-2.4%	45,305	0.0%	41.0	7.8
2020	35,230	-2.9%	1,629	-0.9%	46,250	2.1%	41.1	7.8
2021	32,498	-7.8%	1,520	-6.7%	46,768	1.1%	41.7	8.1

Table 5
Reconciliation of Plan Net Assets

	Year Ending August 31, 2021 (1)	Year Ending August 31, 2020 (2)
1. Market value of assets at beginning of year	$ 947,324,194	$ 943,622,645
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	$ 20,294,220	$ 22,293,664
ii. Member (including penalty interest)	9,077,532	8,949,911
iii. Total	$ 29,371,752	$ 31,243,575
b. Net investment income	$ 232,795,473	$ 61,096,949
c. Total revenue	$ 262,167,225	$ 92,340,524
3. Disbursements for the year		
a. Benefit payments and refunds	$ 91,669,301	$ 86,706,382
b. Net transfers from TRS	0	0
c. Administrative expenses	1,780,707	1,932,593
d. Total expenditures	$ 93,450,008	$ 88,638,975
4. Increase in net assets (Item 2c - Item 3d)	$ 168,717,217	$ 3,701,549
5. Market value of assets at end of year (Item 1 + Item 4)	$ 1,116,041,411	$ 947,324,194

Table 6
Development of Actuarial Value of Assets

		Year Ending August 31, 2021
1.	Market value of assets at beginning of year	$ 947,324,194
2.	Net new investments	
	a. Contributions for the year (Table 5)	$ 29,371,752
	b. Disbursements for the year (Table 5)	(93,450,008)
	c. Subtotal	$ (64,078,256)
3.	Market value of assets at end of year	$ 1,116,041,411
4.	Net earnings (Item 3 - Item 1 - Item 2)	$ 232,795,473
5.	Assumed investment return rate for fiscal year	7.00%
6.	Expected return	$ 64,069,955
7.	Excess return (Item 4 - Item 6)	$ 168,725,518

8. Development of amounts to be recognized as of August 31, 2021:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for this valuation	Remaining after this valuation
	(1)	(2)	(3) = (1) + (2)	(4)	(5) = (3) / (4)	(6) = (3) - (5)
2017	$ 0	$ 0	$ 0	1	$ 0	$ 0
2018	0	0	0	2	0	0
2019	(18,380,329)	18,380,329	0	3	0	0
2020	(2,358,238)	2,358,238	0	4	0	0
2021	168,725,518	(20,738,567)	147,986,951	5	29,597,390	118,389,561
Total	$ 147,986,951	$ 0	$ 147,986,951		$ 29,597,390	$ 118,389,561

9.	Actuarial value of assets as of August 31, 2021 (Item 3 - Item 8, Column 6)	$ 997,651,850
10.	Ratio of actuarial value to market value	89.4%

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%
2018	9.58%	9.54%	7.9%
2019	3.04%	3.00%	7.0%
2020	6.85%	6.82%	6.1%
2021	25.51%	25.46%	10.0%
Average Returns			
Last Five Years:	11.17%	11.13%	6.7%
Last Ten Years:	9.40%	9.32%	6.5%
Last Fifteen Years:	7.58%	7.48%	6.1%
Last Twenty Years:	7.38%	7.29%	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)	(4)	(5)	(6)	(7)	(8)
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%
2018	35.4	(75.6)	(1.9)	(77.5)	(42.1)	966.8	-4.4%
2019	35.0	(82.3)	(2.2)	(84.5)	(49.5)	943.6	-5.2%
2020	31.2	(86.7)	(1.9)	(88.6)	(57.4)	947.3	-6.1%
2021	29.4	(91.7)	(1.8)	(93.5)	(64.1)	1,116.0	-5.7%

Dollar amounts in millions

Column (7) = Column (2) + Column (5).

Table 9
Total Experience Gain or Loss

Item		Year Ending August 31, 2021	Year Ending August 31, 2020
(1)		(2)	(3)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 641,524,299	$ 514,505,451
2. Assumption/Method change (Gains)/Losses - demographic only		0	69,050,603
3. UAAL, previous year, after assumption changes (Item 1 + Item 2)		641,524,299	583,556,054
4. Normal cost for the year (excluding administrative expenses)		30,632,472	31,079,003
5. Actual administrative expenses		1,780,707	1,932,593
6. Contributions for the year (excluding service purchases)		(28,241,049)	(30,573,931)
7. Interest at 7.0%			
a. On UAAL		$ 44,906,701	$ 40,848,924
b. On normal cost and administrative expenses		1,134,461	1,155,406
c. On contributions		(988,437)	(1,070,088)
d. Total		$ 45,052,725	$ 40,934,242
8. Legislative actions*			
– Across-the-board pay increases budgeted for upcoming biennium by the State Legislature		$ 3,965,497	$ 0
9. Expected UAAL (Sum of Items 3 through 8)		694,714,651	626,927,961
10. Actual UAAL		652,701,151	641,524,299
11. Total (gain)/loss for the year (Item 10 - Item 9)		$ (42,013,500)	$ 14,596,338
B. Source of gains and losses	% of AAL		
12. Asset (Gain)/Loss for the year	1.71%	$ (28,145,691)	$ 8,431,834
13. Pay Increases (Less)/Greater than Expected	0.09%	(1,561,203)	7,219,509
14. Non-Retired Demographic (Gains)/Losses	0.58%	(9,538,025)	(6,015,570)
15. Post-Retirement Mortality (Gains)/Losses	0.15%	(2,457,086)	(1,459,622)
16. Other Demographic (Gains)/Losses	0.02%	(311,495)	6,420,188
17. Total (Sum of Items 12 through 16)	2.55%	$ (42,013,500)	$ 14,596,338

* 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%
2018	51.5	3%	762.7	45%	638.5	38%	953.1	100%	100%	22%
2019	54.7	3%	829.1	50%	598.8	36%	968.1	100%	100%	14%
2020	58.4	4%	920.4	56%	630.8	39%	968.1	100%	99%	0%
2021	61.9	4%	970.6	64%	617.9	41%	997.7	100%	96%	0%

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%
2018	0.50%	1.07%	0.50%	2.07%	2.09%	3.76%
2019	0.50%	1.04%	0.50%	2.04%	2.08%	3.91%
2020	0.50%	1.05%	0.50%	2.05%	1.96%	4.22%
2021	0.50%	0.95%	0.50%	1.95%	1.97%	4.47%

* 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 which is expected to go down over time.

** 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 member contributions and any expected contributions from court fees.

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

SECTION D

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY AND ACTUARIALLY DETERMINED CONTRIBUTION

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The actuarially sound contribution rate may be considered as a minimum contribution rate that complies with State statute. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Currently, this, and other Board funding policy objectives are not being met. Users of this report should be aware that even contributions made at the actuarially sound contribution rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Ratio of the market value of assets to total payroll	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Ratio of actuarial accrued liability to payroll	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7
Ratio of actives to retirees and beneficiaries	2.1	2.4	2.6	2.8	3.1	3.4	3.6	3.7	4.1	4.4
Ratio of net cash flow to market value of assets	-5.7%	-6.1%	-5.2%	-4.4%	-3.8%	-3.4%	-3.3%	-2.6%	-5.0%	-5.6%
Duration of the actuarial accrued liability*	12.9	13.0	12.5	12.8						

*Duration measure not available before 2018

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the actuarial accrued liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

SECTION E

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. For all members hired before September 1, 2022:
    a. 0.50% of compensation to LECOSRF in addition to contributions payable to ERS. Additional member contributions may be allowable for service purchases.
    b. Member contributions cease when a member's benefit accrual has reached 100% of Average Monthly Compensation.
    c. Member contributions accumulate interest at 2.00% per year.
2. For all members hired on or after September 1, 2022, 2.00% of compensation.

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 2022 and 2023 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 $15.0 million for fiscal year 2022.

State contributions after the 2023 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 and prior to September 1, 2022:* 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.

Cash Balance Benefit for Members hired on or after September 1, 2022

Member's hired on or after September 1, 2022 will be eligible for the cash balance benefit. Members eligible for the cash balance benefit will contribute 2% of compensation on an ongoing basis into LECOSRF for all attributable CPO/CO service. The member's contribution balance will be accumulated each year with the member's contributions plus an Annual Interest Adjustment and, if applicable, a Gain Sharing Interest Adjustment. The Annual Interest Adjustment is equal to 4% of the member's accumulated account balance.

In years when the five-year average of ERS' total Trust Fund investment returns exceeds 4%, the member's accumulated account balance will also receive a Gain Sharing Interest Adjustment equal to 50% of the return in excess of 4%—up to 3% additional per year. The gain sharing amount will not be less than 0% nor greater than 3% in a given year.

At retirement, the member's accumulated account balance (contributions plus Annual Interest Adjustments plus Gain Sharing Interest Adjustments) will be matched by 300% by the State in LECOSRF. The member will receive a cash balance annuity equal to this total amount annuitized over the life expectancy of the member as of the effective date of the member's retirement. The annuity factors will be based on 4% interest and mortality tables adopted by the ERS Board.

Once retired, the member's cash balance annuity will also be eligible for the Gain Sharing Interest Adjustment in the form of an increase in their benefit equal to the same percentage of gain-sharing interest credited to non-retired member's accounts.

Standard Service Retirement Annuity

1. Employee Class:
    a. *Eligibility*:
        i. Any age with 20 years of CPO/CO service
    b. *Benefits:*
        i. For members hired before September 1, 2022: 0.50% of AMC times years of CPO/CO Service
        ii. For members hired on or after September 1, 2022: Cash balance benefit.
    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, but prior to September 1, 2022, reduced five percent for each year the member retires prior to age 57, with no maximum possible reduction.
        iv. For members hired on or after September 1, 2022, none.

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. For members hired before September 1, 2022:
            1. Non-total with less than 20 years of CPO/CO Service: 15% of AMC payable from LECOSRF
            2. Non-total with 20 years of CPO/CO Service: Benefit defined in the Service Retirement Supplement Section
            3. 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)
        ii. For members hired on or after September 1, 2022: Cash balance benefit. The ERS Board may also enter into agreements to provide additional disability benefits.
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:

    a. For members hired before September 1, 2022: 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.

    b. For members hired on or after September 1, 2022: Cash balance benefit.

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. For members hired before September 1, 2022:

            1. 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.

            2. 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.

        ii. For members hired on or after September 1, 2022: Cash balance benefit.

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 F

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 May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019.

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 7.00% 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.

IV. Actuarial Assumptions

Investment Return: 7.00% per year, net of investment-related expenses (composed of an assumed 2.30% inflation rate and a 4.70% 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	2.30%	included in Merit, Promotion and Longevity Increases	See sample rates

* Total liabilities for this valuation reflect the notable 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	6.45 %	4.45 %	2.95 %	1.95 %	1.70 %	1.45 %

Payroll Growth: 2.70% per year, compounded annually. No increase for the first year due to no budgeted across-the-board increases as of September 1, 2022.

New Entrant Wage Growth: 2.70% per year, compounded annually (for increasing new hire salary in open group projection).

New Entrant Profile: The average new hire is determined based on a new entrant profile, which is created from the valuation data by determining the entry age and entry pay for anyone with greater than or equal to three but less than eight years of service as of the valuation date. Each group of new hires' salaries is assumed to grow at the New Entrant Wage Growth of 2.70% over the salaries of the previous year's group.

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

2020 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scales published through 2019 by Retirement Plans Experience Committee of the Society of Actuaries ("Ultimate MP") and projected from the year 2020. 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	0.0585	0.0369
45	0.1028	0.0667
50	0.1771	0.1179
55	0.3052	0.2086
60	0.5260	0.3691
65	0.9066	0.6530
70	1.5627	1.1554
75	2.6933	2.0443
80	4.6421	3.6170
85	8.0010	6.3997
90	13.8587	11.3793

Active Members

Pub-2010 Public Safety Active Member Mortality table. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2010.

Disability Retirees

2020 State Retirees of Texas (SRT) mortality table, set forward three years for males and females. Minimum rates at all ages of 3.0% and 2.5% for males and females, respectively. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2020.

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 prior to 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 and prior to September 1, 2022:

- 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 80% 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 0.06 times the number of years the age at 1st eligibility was before age 62

Adjustments for members hired on or after September 1, 2022:

- 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 80% 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

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	26.45
1	22.10
2	17.66
3	14.35
4	11.91
5	10.13
6	8.82
7	7.83
8	7.03
9	6.35
10	5.70
11	5.08
12	4.49
13	3.94
14	3.53
15	3.34
16	2.88
17	1.15
18	1.15
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.

Cash Balance Assumptions for New Entrants:

Interest Crediting

Members account balances are assumed to earn 5.50% per year through the 4.00% Annual Interest Adjustments plus 1.50% from the Gain Sharing Interest Adjustments.

Annuity Factors for Annuitizing Cash Balance Benefits

Members account balances are annuitized using factors with a 4% discount rate and valuation mortality, including generational projections.

Post-retirement Annuity Increase

Cash balance annuity benefits increase 1.50% from the Gain Sharing Interest Adjustments.

Census Data and Assets

- The valuation was based on members of LECOSRF as of August 31, 2021 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.

Actuarial Model

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

SECTION G

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	19,652	12,846	32,498
Average Annual Salaries	$ 50,467	$ 41,109	$ 46,768
Average Age	41.8	41.4	41.7
Average Entry Age	33.1	34.1	33.6
Average Service	8.7	7.3	8.1

Annuitants

Item	Number	Annual Annuities	Average Annuities	Average Age
Service Retirees*	14,409	$ 82,070,940	$ 5,696	63.4
Beneficiaries	855	$ 3,448,872	$ 4,034	73.2
Disability Retirees	79	$ 717,912	$ 9,087	69.7
Total	15,343	$ 86,237,724	$ 5,621	64.0

* Average Age and Service at Retirement for Service Retirees are 53.9 and 23.2, respectively

Inactive Members Assumed Eligible for Deferred Annuities

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits	112	$ 712,188	$ 6,359	48.1

Non-vested Inactive Members

Item	Number	Account Balances	Average Account Balances	Average Age
Non-vested Members	29,514	$ 8,764,166	$ 297	36.2

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	3,041	36								3,077
	$ 32,900	$ 39,354								$ 32,975
25 - 29	2,790	901	7							3,698
	$ 38,707	$ 50,375	$ 51,762							$ 41,575
30 - 34	2,012	1,572	428	9						4,021
	$ 39,494	$ 53,325	$ 52,135	$ 53,550						$ 46,278
35 - 39	1,572	1,128	958	382	25					4,065
	$ 39,035	$ 50,020	$ 59,594	$ 57,713	$ 66,463					$ 48,853
40 - 44	1,373	956	744	730	459	23				4,285
	$ 38,293	$ 47,527	$ 55,178	$ 65,788	$ 63,106	$ 69,846				$ 50,796
45 - 49	1,205	842	619	634	806	543	16			4,665
	$ 38,825	$ 46,148	$ 51,790	$ 60,192	$ 65,910	$ 66,375	$ 72,445			$ 52,773
50 - 54	1,051	744	626	546	356	316	63	1		3,703
	$ 38,619	$ 45,542	$ 48,539	$ 54,650	$ 66,273	$ 79,765	$ 94,657	$ 83,571		$ 51,186
55 - 59	789	669	523	359	144	96	42	14		2,636
	$ 38,201	$ 44,267	$ 46,908	$ 49,377	$ 59,216	$ 68,461	$ 94,155	$ 102,975		$ 46,476
60 - 64	435	476	327	242	71	39	11	7		1,608
	$ 37,272	$ 43,455	$ 47,178	$ 49,014	$ 52,240	$ 65,083	$ 71,656	$ 101,889		$ 44,736
Over 64	218	278	142	50	29	14	5	4		740
	$ 38,538	$ 42,780	$ 45,924	$ 49,620	$ 49,526	$ 61,413	$ 52,136	$ 75,878		$ 43,455
Total	14,486	7,602	4,374	2,952	1,890	1,031	137	26		32,498
	$ 37,524	$ 48,332	$ 52,525	$ 57,799	$ 64,030	$ 70,634	$ 88,510	$ 97,768		$ 46,768

Table C

Retired and Beneficiary Members

Distribution by Age and Category

Age Last Birthday	Number	Annual Benefit	Average Annual Benefit
Service Retirees			
Under 60	5,572	33,881,880	6,081
60 - 64	3,126	18,341,988	5,868
65 - 69	2,574	13,320,276	5,175
70 - 74	1,776	9,218,148	5,190
75 - 79	812	4,176,924	5,144
Over 79	549	3,131,724	5,704
Total	14,409	82,070,940	5,696
Beneficiaries			
Under 60	103	453,456	4,402
60 - 64	77	366,540	4,760
65 - 69	132	507,552	3,845
70 - 74	160	548,160	3,426
75 - 79	134	526,620	3,930
Over 79	249	1,046,544	4,203
Total	855	3,448,872	4,034
Disabled Retirees			
Under 60	15	129,936	8,662
60 - 64	16	122,076	7,630
65 - 69	9	39,288	4,365
70 - 74	12	149,472	12,456
75 - 79	12	104,952	8,746
Over 79	15	172,188	11,479
Total	79	717,912	9,087
Grand Total	15,343	86,237,724	5,621

SECTION H

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, 2021

P: 469.524.0000 | www.grsconsulting.com

November 23, 2021

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, 2021

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, 2021. 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.

The current financial outlook for JRS-2 is very poor. It is important to understand that the currently scheduled 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, JRS-2 is projected to remain solvent until the year 2076. Contributions must materially increase in the next legislative session to secure the benefits for current members.

Plan Provisions

Our actuarial valuation as of August 31, 2021 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 E of this report.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019. Additionally, this actuarial valuation incorporates the 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 F of this report.

Data

This valuation was based upon information as of August 31, 2021, 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. Mr. Falls, Mr. Newton and Ms. Woolfrey are Enrolled Actuaries and Fellows of the Society of Actuaries, and all of the undersigned are 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
Senior Consultant & Actuary

Table of Contents

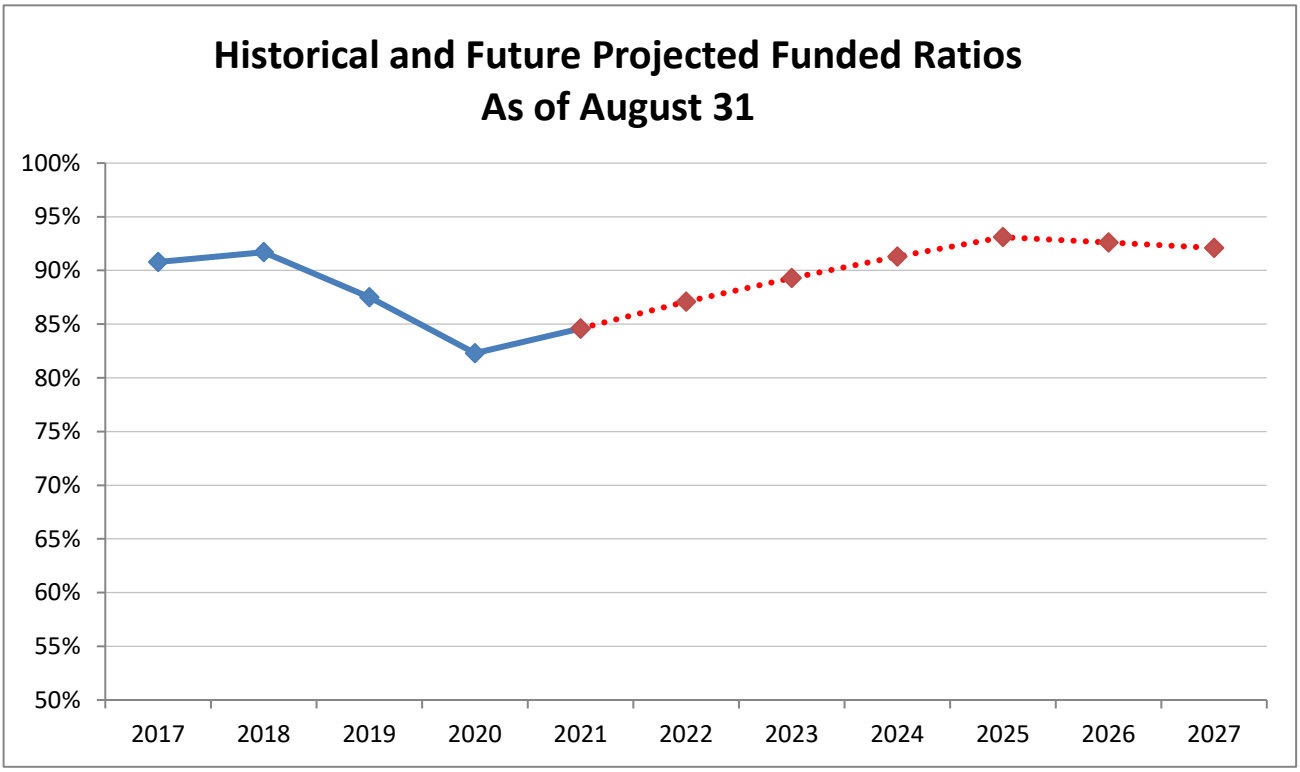
SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2021	2020
Membership		
• Number of		
- Active members	584	570
- Retirees and beneficiaries	528	484
- Inactive, vested	41	42
- Inactive, nonvested	151	145
- Total	1,304	1,241
• Valuation Payroll	$ 90,868,738	$ 89,810,664
Statutory contribution rates	FY 2022	FY 2021
• Members	9.39%	9.42%
• 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)	33.10%	33.29%
Assets		
• Market value (MVA)	$ 585,179,731	$ 477,331,237
• Actuarial value (AVA)	$ 523,026,487	$ 486,802,031
• Return on market value (gross)	25.51%	6.85%
• Return on market value (net)	25.46%	6.82%
• Return on actuarial value	10.1%	6.2%
Actuarial Information on AVA (smoothed)		
• Normal cost %	26.64%	26.26%
• Total normal cost	$ 24,207,432	$ 23,584,280
• Actuarial accrued liability	$ 618,047,495	$ 591,230,126
• Unfunded actuarial accrued liability (UAAL)	$ 95,021,008	$ 104,428,095
• Funded ratio	84.6%	82.3%
• Funding period (years)	Never	Never
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 32,867,764	$ 113,898,889
• Funded ratio	94.7%	80.7%

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



August 31,	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Funded Ratio	90.8%	91.7%	87.5%	82.3%	84.6%	87.1%	89.3%	91.3%	93.1%	92.6%
UAAL (in millions)	$42.8	$40.7	$66.8	$104.4	$95.0	$83.3	$71.8	$60.6	$49.8	$54.9
ASC	23.85%	23.84%	27.84%	33.29%	33.10%	32.19%	31.32%	30.50%	29.74%	29.98%

The projections beyond 2021 are based on the same assumptions, methods and provisions used for the August 31, 2021 valuation, which include the across-the-board pay increases budgeted by the State Legislature when they are granted and the assumptions adopted by the Board in May 2020. Additionally, the market value of assets is expected to earn 7.0% per year.

As shown, even though the funded status is expected to improve over the short term as the currently deferred investment gains are recognized, eventually the currently scheduled member and State contributions are not expected to accumulate sufficient assets in order to pay all of the currently scheduled benefits when due. Once the funded status turns over in 2026, the trend should continue downward. Based on current expectations and assumptions, JRS-2 is projected to have money in the trust fund until the year 2076. After which, the funding would revert to a pay-as-you-go status. **When JRS-2 reverts to a pay-as-you-go status, the required Legislative appropriation for JRS-2 will immediately more than triple (i.e., increase by approximately 3.5 times), and remain at that level, in order to ensure all retirees continue to receive their promised benefit.** Therefore, for the current benefit structure to be sustainable, the contribution levels will need to be increased.

SECTION B

DISCUSSION

Discussion

Introduction

This report presents the results of the August 31, 2021 actuarial valuation of the Judicial Retirement System of Texas, Plan 2 (JRS-2).

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 is less than the normal cost by 1.587% 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, JRS-2 is expected to remain solvent until 2076, 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 E of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of JRS-2.

This actuarial valuation adjusts for the across-the-board pay increases budgeted by the State Legislature for the current biennium. Specifically, judges were assumed to receive no increase in their pay schedule on September 1, 2022.

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 JRS-2 is outside the scope of this actuarial valuation.

The current actuarial assumptions and methods are outlined in Section F of this report.

Funding Adequacy

The ERS Board of Trustees approved the Pension Funding Priorities and Guidelines on May 23, 2018 and adopted updates in August, 2020. For the Board, adoption of this policy is intended to:

- Enhance communications and provide transparency to the Legislature and plan members and retirees regarding Board of Trustees' positions on plan funding strategy;
- Provide policy guidance to current and future Boards;
- Ensure that legislators, elected officials and other stakeholders have clear and accurate information about the Trust's funding goals and the needs of the Board in supporting sound fiduciary investment decisions in accordance with Texas Government Code Section 815.106; and
- Identify a recommended plan for the state of Texas, as the plan sponsor, to achieve a 100% funded ratio while following funding best practices and sound actuarial principles, in accordance with Texas Government Code Section 802.2011.

The policy states that the main objective of ERS' retirement programs is to fully fund the long-term cost of benefits provided by statute, through disciplined and timely accumulation of contributions and prudent investment of assets to deliver earned benefits on a continuing basis. In support of this objective, the policy laid out a multi-level funding period goal to gradually achieve funding on sound actuarial principles:

1. Fund normal costs,
2. Avoid trust fund depletion of the pre-funded plans;
3. Meet current statutory standard of a 31-year funding period for unfunded liabilities, per Texas Government Code Sections 811.006 and 840.106; and
4. Match funding period to the average years of service at retirement once a 31-year funding period is achieved, and closed.

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, 2021, members accruing benefits contribute 9.50% 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, 2021 is 9.39% of payroll. This State contribution rate is subject to future legislative appropriations.

The unfunded actuarial accrued liability (UAAL) of JRS-2 decreased from $104.4 million as of August 31, 2020 to $95.0 million as of August 31, 2021. Additionally, the JRS-2 funded ratio—actuarial value of assets divided by the actuarial accrued liability—increased from 82.3% to 84.6%, as of August 31, 2021. This increase in plan funding levels was primarily due to gains on assets and the lack of legislative pay increases as of September 1, 2021 and September 1, 2022. 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 26.64% of payroll. The total contribution rate is 25.053% of payroll for the current fiscal year. The total contribution rate for the current fiscal year is less than the normal cost by 1.587% of payroll and no payment will be available to amortize the unfunded liability. As a result, 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 7.00% per year, JRS-2 is projected to remain solvent until the year 2076, after which the funding would revert to a pay-as-you-go status. **As a result, the first and second levels of the Board's funding period goal are not currently being realized**.

The third level of the Board's funding period goal 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. Further, Section 840.106 of the Texas Government Code also 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 expected to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. In this context, the Actuarially Sound Contribution (ASC) rate is the contribution rate that meets this standard. Based on the actuarial valuation as of August 31, 2021, the ASC rate for JRS-2 is 33.10% of payroll. **Based on the total contribution rate of 25.053% of payroll, the third level of the Board's funding period goal is also not currently being realized.**

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. We recommend that the Board seek a plan funding strategy that meets the fourth level of the Board's funding period goal or meets an ultimate goal of eliminating the UAAL by a certain date.

System Assets

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

The total market value of assets increased from $477.3 million to $585.2 million as of August 31, 2021. Table 5 reconciles the changes in the fund during the year. Total contributions increased from $22.8 million in fiscal year 2020 to $23.1 million in fiscal year 2021.

Table 6 shows the development of the Actuarial Value of Assets (AVA). The current AVA method recognizes each year's gain or loss over a closed five-year period and allows for direct offsetting of gains and losses. The AVA increased from $487 million to $523 million as of August 31, 2021.

When measured on a market value, the gross investment return for the fiscal year ending August 31, 2021 was 25.51%, and the return net of investment expenses was 25.46% as reported by the ERS Master Trust Custodian. When measured on an actuarial value, the net investment return was 10.1%. Table 7 shows a history of return rates. The JRS-2 ten-year average gross market return, as reported by the ERS Master Trust Custodian, is 9.40%. The ten-year average return net of investment expenses is 9.32%.

Table 8 provides a history of the contributions paid into JRS-2 and the administrative expenses and benefit payments paid out of JRS-2. JRS-2 paid administrative expenses and benefit payments, in excess of contributions received, of $9.5 million (or 2.0% of assets) in fiscal year 2020 and $12.3 million (or 2.1% of assets) in fiscal year 2021. ERS should continue to monitor this deficit as it could impact future liquidity needs. 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).

Data

This valuation was based upon information as of August 31, 2021, 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 G show key census statistics for the various groups included in the valuation.

SECTION C

TABLES

Table 1
Development of Employer Cost

	August 31, 2021	August 31, 2020
1. Payroll		
a. Reported Payroll (August Payroll of Active Members)	$ 90,640,510	$ 89,515,281
b. Valuation Payroll (Expected Covered Payroll for Following Plan Year)	$ 90,868,738	$ 89,810,664
2. Total Normal Cost Rate		
a. Gross normal cost rate	26.31%	25.93%
b. Administrative expenses	0.33%	0.33%
c. Total (Item 2a + Item 2b)	26.64%	26.26%
3. Actuarial Accrued Liability for Active Members		
a. Present value of future benefits for active members	$ 375,239,516	$ 382,529,171
b. Less: present value of future normal costs	(147,578,643)	(140,075,029)
c. Actuarial accrued liability	$ 227,660,873	$ 242,454,142
4. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	$ 366,259,992	$ 324,704,726
b. Inactive members	24,126,630	24,071,258
c. Active members (Item 3c)	227,660,873	242,454,142
d. Total	$ 618,047,495	$ 591,230,126
5. Actuarial Value of Assets	$ 523,026,487	$ 486,802,031
6. Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 95,021,008	$ 104,428,095
7. Contribution Rate Needed to Fund Normal Cost Plus Amortize the UAAL Over 31 Years	33.10%	33.29%
8. Allocation of Contribution Rate		
a. Employer rate	15.663%	15.663%
b. Member rate	9.39%	9.42%
c. Total contribution rate	25.053%	25.083%
d. Total normal cost rate	26.64%	26.26%
e. Available contribution rate to amortize UAAL	-1.587%	-1.177%
f. Total contribution rate	25.053%	25.083%
9. Funding period based on statutory contribution rates and Actuarial Value of Assets (years)	Never	Never

Table 2
Actuarial Present Value of Future Benefits

		August 31, 2021	August 31, 2020
1.	Active Members		
	a. Service Retirement	$ 335,822,592	$ 344,914,059
	b. Disability Benefits	4,062,388	3,787,651
	c. Death Before Retirement	5,233,682	5,504,170
	d. Termination	30,120,854	28,323,291
	e. Total	$ 375,239,516	$ 382,529,171
2.	Inactive Members	$ 24,126,630	$ 24,071,258
3.	Annuitants	$ 366,259,992	$ 324,704,726
4.	Total Actuarial Present Value of Future Benefits	$ 765,626,138	$ 731,305,155

Table 3
Analysis of Normal Cost

		August 31, 2021	August 31, 2020
1.	Gross Normal Cost Rate		
	a. Service Retirement	21.43%	21.08%
	b. Disability Benefits	0.46%	0.45%
	c. Death Before Retirement	0.42%	0.44%
	d. Termination	4.00%	3.96%
	e. Total	26.31%	25.93%
2.	Administrative Expenses	0.33%	0.33%
3.	Total Normal Cost	26.64%	26.26%
4.	Less: Member Rate	9.39%	9.42%
5.	Employer Normal Cost Rate	17.25%	16.84%

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
2018	561	0.7%	80,072,000	0.9%	142,731	0.2%	57.8	10.4
2019	573	2.1%	81,710,000	2.0%	142,600	-0.1%	56.4	8.5
2020	570	-0.5%	89,810,664	9.9%	157,563	10.5%	56.9	9.1
2021	584	2.5%	90,868,738	1.2%	155,597	-1.2%	56.3	8.5

Table 5
Reconciliation of Plan Net Assets

	Year Ending August 31, 2021 (1)	Year Ending August 31, 2020 (2)
1. Market value of assets at beginning of year	$ 477,331,237	$ 456,192,249
2. Revenue for the year		
a. Contributions for the year		
i. State (including membership fees)	$ 14,321,889	$ 14,186,283
ii. Member (including penalty interest)	8,758,637	8,634,071
iii. Total	$ 23,080,526	$ 22,820,354
b. Net investment income	$ 120,145,153	$ 30,632,793
c. Total revenue	$ 143,225,679	$ 53,453,147
3. Disbursements for the year		
a. Benefit payments and refunds	$ 35,142,239	$ 32,040,794
b. Administrative expenses	234,946	273,365
c. Total expenditures	$ 35,377,185	$ 32,314,159
4. Increase in net assets (Item 2c - Item 3c)	$ 107,848,494	$ 21,138,988
5. Market value of assets at end of year (Item 1 + Item 4)	$ 585,179,731	$ 477,331,237

Table 6
Development of Actuarial Value of Assets

	Year Ending August 31, 2021
1. Market value of assets at beginning of year	$ 477,331,237
2. Net new investments	
a. Contributions for the year (Table 5)	$ 23,080,526
b. Disbursements for the year (Table 5)	(35,377,185)
c. Subtotal	(12,296,659)
3. Market value of assets at end of year	$ 585,179,731
4. Net earnings (Item 3 - Item 1 - Item 2)	$ 120,145,153
5. Assumed investment return rate for fiscal year	7.00%
6. Expected return	$ 32,982,804
7. Excess return (Item 4 - Item 6)	$ 87,162,349

8. Development of amounts to be recognized as of August 31, 2021:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for this valuation	Remaining after this valuation
	(1)	(2)	(3) = (1) + (2)	(4)	(5) = (3) / (4)	(6) = (3) - (5)
2017	$ 0	$ 0	$ 0	1	$ 0	$ 0
2018	0	0	0	2	0	0
2019	(8,696,089)	8,696,089	0	3	0	0
2020	(774,705)	774,705	0	4	0	0
2021	87,162,349	(9,470,794)	77,691,555	5	15,538,311	62,153,244
Total	$ 77,691,555	$ 0	$ 77,691,555		$ 15,538,311	$ 62,153,244

9. Actuarial value of assets as of August 31, 2021 (Item 3 - Item 8, Column 6)	$ 523,026,487
10. Ratio of actuarial value to market value	89.4%

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%
2018	9.58%	9.54%	7.9%
2019	3.04%	3.00%	7.0%
2020	6.85%	6.82%	6.2%
2021	25.51%	25.46%	10.1%
Average Returns			
Last Five Years:	10.37%	10.33%	8.0%
Last Ten Years:	9.00%	8.92%	7.9%
Last Fifteen Years:	7.32%	7.22%	7.1%
Last Twenty Years:	7.19%	7.10%	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)	(4)	(5)	(6)	(7)	(8)
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%
2018	18,500	(24,866)	(296)	(25,162)	(6,662)	453,380	-1.5%
2019	19,563	(29,220)	(363)	(29,583)	(10,020)	456,192	-2.2%
2020	22,820	(32,041)	(273)	(32,314)	(9,494)	477,331	-2.0%
2021	23,081	(35,142)	(235)	(35,377)	(12,296)	585,180	-2.1%

Dollar amounts in thousands

Column (6) = Column (2) + Column (5)

Table 9
Total Experience Gain or Loss

Item		Year Ending August 31, 2021	Year Ending August 31, 2020
(1)		(2)	(3)
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 104,428,095	$ 66,776,712
2. Assumption/Method changes - Liability Only		0	35,115,031
3. UAAL, previous year, after assumption changes (Item 1 + Item 2)		104,428,095	101,891,743
4. Normal cost for the year (excluding administrative expenses)		23,287,905	23,612,300
5. Actual administrative expenses		234,946	273,365
6. Contributions for the year (excluding service purchases)		(22,832,229)	(22,574,056)
7. Interest at 7.0%			
a. On UAAL		$ 7,309,967	$ 7,132,422
b. On normal cost and administrative expenses		823,300	835,998
c. On contributions		(799,128)	(790,092)
d. Total		$ 7,334,139	$ 7,178,328
8. Legislated pay changes (0% at September 1, 2021 and 2022)*		$ (9,711,676)	$ -
9. Expected UAAL (Sum of Items 3 through 8)		102,741,180	110,381,680
10. Actual UAAL		95,021,008	104,428,095
11. Total (gain)/loss for the year (Item 10 - Item 9)		$ (7,720,172)	$ (5,953,585)
B. Source of gains and losses	% of AAL		
11. Asset (Gain)/Loss for the year	2.41%	$ (14,875,356)	$ 3,904,007
12. Pay Increases (Less)/Greater than Expected	0.49%	3,050,355	(1,514,313)
13. Non-Retired Demographic (Gains)/Losses	0.41%	2,504,870	(5,391,926)
14. Post-Retirement Mortality (Gains)/Losses	0.02%	(93,502)	(734,697)
15. Other Demographic (Gains)/Losses	0.27%	1,693,461	(2,216,656)
16. Total (Sum of Items 12 through 16)	1.25%	$ (7,720,172)	$ (5,953,585)

* 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%
2018	78,283	98%	246,497	308%	162,992	204%	447,078	100%	100%	75%
2019	70,243	86%	308,069	377%	156,252	191%	467,787	100%	100%	57%
2020	79,309	89%	324,705	363%	187,217	209%	486,802	100%	100%	44%
2021	82,232	91%	366,260	404%	169,556	187%	523,026	100%	100%	44%

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%
2018	15.663%	7.46%	23.123%	20.83%	23.84%
2019	15.663%	9.39%	25.053%	23.14%	27.84%
2020	15.663%	9.42%	25.083%	26.26%	33.29%
2021	15.663%	9.39%	25.053%	26.64%	33.10%

* 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

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY AND ACTUARIALLY DETERMINED CONTRIBUTION

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The actuarially sound contribution rate may be considered as a minimum contribution rate that complies with State statute. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Currently, this, and other Board funding policy objectives are not being met. Users of this report should be aware that even contributions made at the actuarially sound contribution rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Ratio of the market value of assets to total payroll	6.4	5.3	5.0	5.7	5.3	4.9	4.5	4.6	4.1	4.3
Ratio of actuarial accrued liability to payroll	6.8	6.6	5.9	6.1	5.8	5.4	5.0	4.9	4.6	4.6
Ratio of actives to retirees and beneficiaries	1.1	1.2	1.2	1.4	1.5	1.7	1.7	2.1	2.1	2.5
Ratio of net cash flow to market value of assets	-2.1%	-2.0%	-2.2%	-1.5%	-1.2%	-0.9%	-0.4%	0.2%	-2.0%	-1.7%
Duration of the actuarial accrued liability*	9.7	9.9	9.5	9.7						

*Duration measure not available before 2018

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the actuarial accrued liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

SECTION E

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 years 2017 through 2019: 7.50%

e. Fiscal year 2020 and beyond: 9.50%

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 2022 and 2023, 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. The final judicial pay tier for benefit determination is based on service excluding service as a statutory county court judge. The Final Compensation for a visiting judge is based on the final salary received while holding judicial office.

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 2.30% 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 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 F

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 May 20, 2020 based on the experience investigation that covered the five-year period from September 1, 2014 through August 31, 2019.

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 7.00% per year, (b) there will be no liability gains/losses or changes in assumptions, (c) the number of active members will remain unchanged, (d) active members who leave employment will be replaced by new entrants each year, and (e) State contributions will remain the same percentage of payroll as the current fiscal year.

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

III. Actuarial Value of Assets

The actuarial value of assets is 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 has been applied since that time.

IV. Actuarial Assumptions

Investment Return: 7.00% per year, net of investment-related expenses (composed of an assumed 2.30% inflation rate and a 4.70% 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
2.30%	0.00%	See table below

Judges are assumed to follow the current statutory State judicial tiered salary schedule based on years of service and the type of judicial position held, as prescribed in Section 659.012 of the Texas Government Code, in addition to the inflation assumption. Each judicial position type has a defined State base salary with service based tiers, as follows:

Annual Salary Increases for Merit, Promotion and Longevity Male and Female Judges			
Age	Years of Eligibility Service*		
	Less than 4	4 or more, but less than 8	8 or more
All	State base salary	110% of base salary	120% of base salary

*Past service as a statutory county court judge is included in eligibility service for salary purposes. However, county court service is not applicable to JRS-2 benefits or retirement eligibility.

Payroll Growth: 2.30% 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

2020 State Retirees of Texas (SRT) mortality table. Generational mortality improvements in accordance with the ultimate rates from the scales published through 2019 by Retirement Plans Experience Committee of the Society of Actuaries ("Ultimate MP") and projected from the year 2020. Sample rates for the base mortality table included below.

Annual Mortality Rates per 100 Individuals		
Age	Males	Females
40	0.0585	0.0369
45	0.1028	0.0667
50	0.1771	0.1179
55	0.3052	0.2086
60	0.5260	0.3691
65	0.9066	0.6530
70	1.5627	1.1554
75	2.6933	2.0443
80	4.6421	3.6170
85	8.0010	6.3997
90	13.8587	11.3793

Active Members

Pub-2010 General Employees Active Member Mortality table. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2010.

Disability Retirees

2020 State Retirees of Texas (SRT) mortality table, set forward three years for males and females. Minimum rates at all ages of 3.0% and 2.5% for males and females, respectively. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2020.

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:

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

Participants who terminate with at least eight, but less than 12, years of service are assumed to attain the 12 years of eligibility service required for a vested benefit by means of accruing service as a visiting judge.

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, 2021 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.

Actuarial Model

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

SECTION G

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	332	252	584
Average Annual Salaries	$ 156,627	$ 154,241	$ 155,597
Average Age	58.7	53.2	56.3
Average Entry Age	49.1	46.1	47.8
Average Service	9.6	7.1	8.5

Inactive Members

Item	Number	Annual Annuities	Average Annuities	Average Age
Participants with Deferred Benefits*	41	$ 2,640,888	$ 64,412	60.4
Service Retirees**	475	$ 33,299,880	$ 70,105	71.0
Beneficiaries	50	$ 2,749,404	$ 54,988	74.7
Disability Retirees	3	$ 269,880	$ 89,960	66.3
Total	569	$ 38,960,052	$ 68,471	70.6

* Includes members with at least 8 years of service who are assumed to attain 12 years via service accrual as a visiting judge.

** Average Age and Service at Retirement for Service Retirees are 63.4 and 15.3, respectively

Non-vested Members

Item	Number	Account Balances	Average Account Balance	Average Age
Non-vested Participants	151	$ 3,787,509	$ 25,083	63.2

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									1
	$ 140,000									$ 140,000
35 - 39	22									22
	$ 142,545									$ 142,545
40 - 44	51	8	1							60
	$ 145,545	$ 156,375	$ 168,000							$ 147,363
45 - 49	47	17	9							73
	$ 145,766	$ 158,868	$ 168,000							$ 151,558
50 - 54	47	29	24	6						106
	$ 146,017	$ 165,124	$ 161,084	$ 176,400						$ 156,376
55 - 59	33	26	30	10	7	2				108
	$ 146,685	$ 165,254	$ 165,404	$ 171,360	$ 168,000	$ 170,500				$ 160,462
60 - 64	34	20	13	9	12	6				94
	$ 143,066	$ 164,860	$ 174,846	$ 172,067	$ 173,283	$ 176,900				$ 160,892
Over 64	29	18	25	19	13	10	6			120
	$ 129,124	$ 139,579	$ 163,488	$ 170,453	$ 175,154	$ 177,300	$ 170,800			$ 155,480
Total	264	118	102	44	32	18	6			584
	$ 143,417	$ 159,717	$ 165,376	$ 171,800	$ 172,888	$ 176,411	$ 170,800			$ 155,597

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	27	1,618,296	59,937
60 - 64	55	3,808,632	69,248
65 - 69	127	9,242,604	72,776
70 - 74	135	9,896,268	73,306
75 - 79	89	6,021,492	67,657
Over 79	42	2,712,588	64,585
Total	475	33,299,880	70,105
Beneficiaries			
Under 60	5	212,052	42,410
60 - 64	4	315,996	78,999
65 - 69	8	555,552	69,444
70 - 74	8	405,936	50,742
75 - 79	9	475,248	52,805
Over 79	16	784,620	49,039
Total	50	2,749,404	54,988
Disabled Retirees			
Under 60	0	0	0
60 - 64	1	110,880	110,880
65 - 69	1	75,000	75,000
70 - 74	1	84,000	84,000
75 - 79	0	0	0
Over 79	0	0	0
Total	3	269,880	89,960
Grand Total	528	36,319,164	68,786

SECTION H

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.

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