Texas Emergency Services Retirement System

Actuarial Valuation as of August 31, 2020

December 1, 2020

Rudd and Wisdom, Inc.

CONSULTING ACTUARIES

Mitchell L. Bilbe, F.S.A.
Evan L. Dial, F.S.A.
Philip S. Dial, F.S.A.
Charles V. Faerber, F.S.A., A.C.A.S.
Mark R. Fenlaw, F.S.A.
Brandon L. Fuller, F.S.A.
Shannon R. Hatfield, A.S.A.
Christopher S. Johnson, F.S.A.
Oliver B. Kiel, F.S.A.
Dustin J. Kim, A.S.A.
Edward A. Mire, F.S.A.
Rebecca B. Morris, A.S.A.
Amanda L. Murphy, F.S.A.
Michael J. Muth, F.S.A.
Khiem Ngo, F.S.A., A.C.A.S.
Timothy B. Seifert, A.S.A.
Chelsea E. Stewart, A.S.A.
Raymond W. Tilotta
Ronald W. Tobleman, F.S.A.
David G. Wilkes, F.S.A.

December 1, 2020

Board of Trustees
Texas Emergency Services
Retirement System
Post Office Box 12577
Austin, TX 78711

Re: Actuarial Valuation as of August 31, 2020

Dear Board Members:

Enclosed is the report of the actuarial valuation of the Texas Emergency Services Retirement System (TESRS or the System) as of August 31, 2020.

Adequate Contribution Arrangement with Expected State Contributions and without Part Two Contributions

In order to have an adequate contribution arrangement, the Texas Pension Review Board guidelines say that contributions to a public retirement system should be expected to both pay the current normal cost and amortize the existing unfunded actuarial accrued liability (UAAL) in 30 years or less. In Section 2 of the report, we have determined that without appropriations from the state, the System has an inadequate contribution arrangement because the UAAL will never be amortized but instead will increase every year.

The expected contributions from the state are appropriations equal to (1) the maximum annual contribution (one-third of all contributions to the System by governing bodies of participating departments in a year) as needed in accordance with state law governing the System, and (2) approximately $675,000 each year to pay for part of the System's administrative expenses. Based on this August 31, 2020 actuarial valuation, we project that with the expected Part One contributions from the governing bodies of participating departments and $675,000 each year from the state for administrative expenses, the maximum annual contributions from the state would be needed for 19 years in order for the System to have a 30-year amortization period for its UAAL. **This valuation also determined System that the board will not need to establish Part Two contributions in order for the System to have a 30-year amortization period. With these expected future contributions from the participating departments and from the state, the**

System has an adequate contribution arrangement to pay the normal cost and amortize the UAAL in 30 years.

Comparison to Prior Actuarial Valuation

The prior actuarial valuation as of August 31, 2018 determined that the System had an adequate contribution arrangement with a 30-year amortization period for the UAAL, relying on expected future maximum annual contributions from the state for 24 years. In this current August 31, 2020 actuarial valuation, the number of years of maximum annual state contributions needed has decreased from 24 years to 19 years, following a number of changes between the two actuarial valuations. Primarily as the result of (1) new assumptions and (2) a greater than expected number of active participants terminating before being vested, the actuarial condition of the System continues to have a contribution arrangement that is adequate without any Part Two contributions.

Key Provisions of State Law Regarding State Contributions to the System

Three subsections from the state law governing the System (Title 8, Government Code, Subtitle H) are relevant to our assessment of the System's contribution arrangement and our evaluation of future contributions from the state, and they read as follows:

> **Section 861.001(1)** "Actuarially sound pension system" means a system in which the amount of contributions is sufficient to cover the normal cost and amortize the unfunded actuarial accrued liability in a period that does not exceed 30 years.
>
> **Section 865.015** The state shall contribute the amount necessary to make the pension system actuarially sound each year, except that the state's contribution may not exceed one-third of the total of all contributions by governing bodies in a particular year.
>
> **Section 864.002(a)(2)** A service retirement annuity is payable in monthly installments based on a formula adopted by the state board by rule that allows the pension system, assuming maximum state contributions are provided under Section 865.015, to be maintained as actuarially sound.

Our interpretation of these three subsections is that the state law calls for the state to contribute the maximum amount, defined in Section 865.015, to the System each year as is necessary for the System to amortize its UAAL with the expected total contributions from the state and the governing bodies of the participating departments in a period that does not exceed 30 years. **With these expected future annual contributions from the state, the System has an adequate contribution arrangement.**

Board Rule about Participating Department Contributions

The board rule defining contributions by a participating department for each month a member performs emergency services for the department (Section 310.6) was amended in 2014 to allow the board to establish Part Two contributions that would be applied to reduce the UAAL if the expected future annual contributions from the state are not enough with the legacy Part One contributions to pay the normal cost and amortize the UAAL in 30 years. The provisions for Part Two contributions are more thoroughly described in item 13 of Section 5. Section 5 outlines the eligibility, benefit and contribution provisions of the System. This valuation determined that the Part Two contributions are not necessary for an adequate contribution arrangement.

Actuarial Assumptions

We reviewed the actuarial assumptions used in the prior valuation as of August 31, 2018 as a part of an experience study of the System for the six plans years ending August 31, 2018. The board of trustees received the July 23, 2020 report of that review prior to their August 18, 2020 meeting in which they adopted the actuarial assumptions we recommended. The key changes were (1) a reduction in the investment return assumption from 7.75% to 7.5%, (2) an increase in the assumed termination rates, (3) an increase in the assumed average age at which vested terminated members will begin their retirement benefit, and (4) a change to a new published mortality table projected generationally. All actuarial methods and assumptions are described in Section 4 of this report.

Actuarial Value of Assets vs. Market Value of Assets

The actuarial valuation was based on a method to determine the actuarial value of assets (AVA) that dampens the volatility of the changes in the market value of assets (MVA) from year to year. This method phases in over a five-year period the investment gains or losses that the System has had in each of the previous four fiscal years. The AVA used in this valuation was $125.37 million, while the MVA was $125.23 million. The $140,000 difference between the MVA and the AVA is the deferred net investment loss that will be recognized in the next two biennial actuarial valuations.

The theory behind the AVA method is to allow time for annual investment gains and losses in the MVA to partially offset each other and thereby dampen the volatility associated with the progression of the MVA over time. In practice, the timing and amounts of investment gains and losses can result in irregular effects on the AVA in a given year. However, as intended, the pattern of the AVA is smoother over time than the pattern of the market value of assets, as seen on page 16.

Variability in Future Actuarial Measurements

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 current economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; changes in economic or demographic assumptions; and changes in plan provisions.

Analysis of the potential range of such future measurements resulting from the possible sources of measurement variability is typically outside the scope of the biennial actuarial valuation. Sensitivity analysis could be performed in a subsequent report if desired by the board of trustees.

Summary

In our opinion, the Texas Emergency Services Retirement System has an adequate contribution arrangement, assuming that the state will appropriate (1) the maximum annual contribution in accordance with the state law governing the System and (2) approximately $675,000 each year to pay for part of the System's administrative expenses. These state contributions are necessary in addition to the legacy Part One contributions from the participating departments in order to have an adequate contribution arrangement. **With these expected appropriations from the state and the legacy Part One contributions from the participating departments, the System has an adequate contribution arrangement to pay the normal cost each year and amortize the UAAL in 30 years.** The actuarial valuation of the System reported herein has been performed both in accordance with appropriate actuarial methodology and standards of practice and in accordance with guidelines established by the Texas State Pension Review Board applicable to Texas public employee retirement systems.

Respectfully submitted,

RUDD AND WISDOM, INC.

Mark R. Fenlaw

Mark R. Fenlaw, F.S.A.

Rebecca B. Morris

Rebecca B. Morris, A.S.A.

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Enclosures
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Section 1

Certification of Actuarial Valuation as of August 31, 2020

At the request of the Board of Trustees of the Texas Emergency Services Retirement System, we have performed an actuarial valuation of the System as of August 31, 2020. The purpose of this report is to present the results of our valuation, including our assessment of the adequacy of the current contribution arrangement.

We have relied on and based our valuation on participant, retiree, and beneficiary data and asset information as of August 31, 2020 provided by Kevin Deiters, the Executive Director of the System. To the best of our knowledge, no material biases exist with respect to any imperfections in the data provided. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the data received for the August 31, 2018 actuarial valuation.

We have used the actuarial methods and assumptions described in Section 4 of this report. The actuarial valuation has been performed on the basis of the System eligibility, benefit, and contribution provisions described in Section 5.

All emergency services personnel known to be eligible active participants in the System as of the valuation date and all other individuals who either were receiving a monthly benefit as of the valuation date or were known to be eligible to later receive a vested deferred monthly benefit from the System have been included in the valuation. Further, all System benefits have been considered in the valuation.

To the best of our knowledge, the actuarial information supplied in this report is complete and accurate. In our opinion the assumptions used, both in the aggregate and individually, are reasonably related to the experience of the System and to reasonable expectations. The assumptions represent a reasonable estimate of anticipated experience of the System over the long-term future, and their selection complies with the applicable actuarial standards of practice.

We certify that we are members of the American Academy of Actuaries who meet Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report.

Mark R. Fenlaw

Mark R. Fenlaw, F.S.A.
Member, American Academy of Actuaries

Rebecca B. Morris

Rebecca B. Morris, A.S.A.
Member, American Academy of Actuaries

Section 2

Summary of Actuarial Valuations

	August 31, 2018	August 31, 2020
1. Actuarial Present Value of Future Benefits		
a. Active participants	$ 72,020,812	$ 72,959,758
b. Terminated Vested Participants	18,424,914	16,438,539
c. Retirees and Beneficiaries – Advance Funded	56,930,805	68,607,365
d. Retirees and Beneficiaries – Reimbursement Funded	1,634,268	1,458,453
e. Total	$ 149,010,799	$ 159,464,115
2. Actuarial Present Value of Future Normal Cost	$ 9,862,186	$ 7,565,119
3. Actuarial Present Value of Future Reimbursements for (1d)	$ 1,634,268	$ 1,458,453
4. Actuarial Accrued Liability [(1e) – (2) – (3)]	$ 137,514,345	$ 150,440,543
5. Actuarial Value of Assets	$ 114,668,709	$ 125,366,915
6. Unfunded Actuarial Accrued Liability (UAAL) [(4)-(5)]	$ 22,845,636	$ 25,073,628
Without State Appropriations		
7. Required Annual Contributions **without** Appropriations from State[1]		
a. Normal Cost Contributions	$ 3,102,482	$ 2,741,235
b. 30-Year UAAL Contributions	1,956,805	2,097,237
c. Total	$ 5,059,290	$ 4,838,472
8. Expected Annual Part One Contributions	$ 2,988,312	$ 3,053,388
9. Amount Available to Amortize UAAL [(8)-(7a)]	$ (114,170)	$ 312,153
10. Years to Amortize UAAL	infinity[2]	infinity[2]
With State Appropriations for 30-year Amortization Period		
11. Expected Annual Part One Contributions **with** Appropriations from State[1]		
a. Normal Cost Contributions	$ 2,331,087	$ 2,024,420
b. UAAL Contributions	657,225	1,028,968
c. Total	$ 2,988,312	$ 3,053,388
12. Appropriations from State for Administrative Expenses		
a. Annual Appropriation	$ 725,000	$ 675,000
b. Number of Years Required	every year	every year
13. Present Value of (11b) for 30 Years	$ 7,673,083	$ 12,301,886
14. Appropriations from State for UAAL Amortization		
a. Annual Appropriation Amounts	see page 9	see page 10
b. Present Value of Appropriations Necessary [(6)-(13)]	$ 15,172,553	$ 12,771,742
c. Present Value of Appropriations for up to 30 Years[3]	$ 15,172,553	$ 12,771,742
d. Years Required	24 years	19 years
15. Part Two Contributions Required for 30-Year UAAL Amortization Period as a Percent of Part One Contributions	0%	0%
16. Funded Ratio [(5) ÷ (4)]	83.4%	83.3%

[1] See page 8.
[2] "Infinity" means the UAAL will never be amortized but will increase every year.
[3] See page 9 and 10, respectively.

Summary of Contributions Development

	August 31, 2018	August 31, 2020
1. Normal Cost Due September 1		
a. Retirement	$ 1,170,538	$ 980,071
b. Disability	33,791	17,608
c. Death	135,144	108,504
d. Vested Termination	526,413	450,146
e. Total for Benefits	1,865,886	1,556,329
f. Loading for Administrative Expenses		
i. Total	1,050,000	1,025,000
ii. Paid by State	(725,000)	(675,000)
iii. Net Paid by System	325,000	350,000
g. Total		
i. Without State Appropriations [(e)+(fi)]	$ 2,915,886	$ 2,581,329
ii. With State Appropriations [(e)+(fiii)]	$ 2,190,886	$ 1,906,329
2. Periodic Payment Normal Cost[1]		
a. Without State Appropriations	$ 3,102,482	$ 2,741,235
b. With State Appropriations	$ 2,331,087	$ 2,024,420
3. UAAL Contributions Due September 1		
a. Without State Appropriations[2]	$ 1,839,115	$ 1,974,898
b. With State Appropriations[3]	$ 617,697	$ 968,945
4. Periodic Payment UAAL Contributions[1]		
a. Without State Appropriations	$ 1,956,805	$ 2,097,237
b. With State Appropriations	$ 657,225	$ 1,028,968
5. Expected Annual Part One Contributions[4]	$ 2,988,312	$ 3,053,388

[1] The amount due September 1 is adjusted to an equivalent annual amount contributed semiannually. The adjustment factor is 1.061947 for the August 31, 2020 valuation (based on 7.5% assumed return) and is 1.063993 for the August 31, 2018 valuation (based on 7.75% assumed return).

[2] The UAAL contributions without state appropriations are calculated so that the UAAL would be amortized with a level annual dollar amount over a period of 30 years.

[3] The UAAL contributions with state appropriations are equal to line (5) adjusted to an equivalent amount due September 1 minus line (1gii).

[4] The expected contributions are based on the known rates of contributions as of the valuation date and on the census of active participants as of the valuation date, assuming that number will remain constant in future years.

Present Value of State Appropriations for the Next 30 Years as of August 31, 2018

Fiscal Year Ending 8/31	Expected Contributions[1]	Maximum State Contribution[2]		Present Value of Column (2) as of 8/31/18[5]	Cumulative Present Value As of 8/31/18
		Assumed State Appropriations	Basis for Assumption		
	(1)	(2)	(3)	(4)	(5)
2019	$3,850,000	$1,329,224	Actually Paid[3]	$1,329,224	$1,329,224
2020	3,925,000	1,329,224	LAR base[4]	1,233,618	2,562,842
2021	4,000,000	1,329,224	LAR base[4]	1,144,890	3,707,732
2022	4,025,000	1,342,000	1/3 of (1)	1,072,755	4,780,487
2023	3,950,000	1,317,000	1/3 of (1)	977,050	5,757,537
2024	3,900,000	1,300,000	1/3 of (1)	895,070	6,652,607
2025	3,900,000	1,300,000	1/3 of (1)	830,691	7,483,298
2026	3,900,000	1,300,000	1/3 of (1)	770,943	8,254,241
2027	3,900,000	1,300,000	1/3 of (1)	715,493	8,969,734
2028	3,900,000	1,300,000	1/3 of (1)	664,030	9,633,764
2029	3,900,000	1,300,000	1/3 of (1)	616,269	10,250,033
2030	3,900,000	1,300,000	1/3 of (1)	571,944	10,821,977
2031	3,900,000	1,300,000	1/3 of (1)	530,806	11,352,783
2032	3,900,000	1,300,000	1/3 of (1)	492,628	11,845,411
2033	3,900,000	1,300,000	1/3 of (1)	457,195	12,302,606
2034	3,900,000	1,300,000	1/3 of (1)	424,311	12,726,917
2035	3,900,000	1,300,000	1/3 of (1)	393,792	13,120,709
2036	3,900,000	1,300,000	1/3 of (1)	365,468	13,486,177
2037	3,900,000	1,300,000	1/3 of (1)	339,182	13,825,359
2038	3,900,000	1,300,000	1/3 of (1)	314,785	14,140,144
2039	3,900,000	1,300,000	1/3 of (1)	292,145	14,432,289
2040	3,900,000	1,300,000	1/3 of (1)	271,132	14,703,421
2041	3,900,000	1,300,000	1/3 of (1)	251,630	14,955,051
2042	3,900,000	1,300,000	1/3 of (1)	233,532	15,188,583
2043	3,900,000	1,300,000	1/3 of (1)	216,735	15,405,318
2044	3,900,000	1,300,000	1/3 of (1)	201,146	15,606,464
2045	3,900,000	1,300,000	1/3 of (1)	186,679	15,793,143
2046	3,900,000	1,300,000	1/3 of (1)	173,252	15,966,395
2047	3,900,000	1,300,000	1/3 of (1)	160,790	16,127,185
2048	3,900,000	1,300,000	1/3 of (1)	149,225	16,276,410

[1] The expected contributions are based on the known rates of Part One contributions and active members as of the valuation date and on a conservative projection of (a) an increase in the number of departments and active members participating, (b) prior service contributions, and (c) reimbursement contributions.

[2] The maximum state contribution is "one-third of the total of all contributions by governing bodies in a particular year."

[3] This amount was paid in early September 2018.

[4] The amount in column (2) is the base amount in the formal Legislative Appropriation Request submitted to the Legislative Budget Board in August 2018.

[5] The present value is based on the assumption that each assumed appropriated amount is paid on the first day of the fiscal year, September 1, discounted at 7.75% per year.

Present Value of State Appropriations for the Next 30 Years as of August 31, 2020

Fiscal Year Ending 8/31	Expected Contributions[1]	Maximum State Contribution[2]		Present Value of Column (2) as of 8/31/16[5]	Cumulative Present Value As of 8/31/16
		Assumed State Appropriations	Basis for Assumption		
	(1)	(2)	(3)	(4)	(5)
2021	$3,607,995	$1,196,301	Actually Paid[3]	$1,196,301	$ 1,196,301
2022	3,693,765	1,262,764	LAR[4]	1,174,664	2,370,965
2023	3,607,816	1,262,764	LAR[4]	1,092,711	3,463,676
2024	3,600,000	1,200,000	1/3 of (1)	965,952	4,429,628
2025	3,600,000	1,200,000	1/3 of (1)	898,561	5,328,189
2026	3,600,000	1,200,000	1/3 of (1)	835,870	6,164,059
2027	3,600,000	1,200,000	1/3 of (1)	777,554	6,941,613
2028	3,600,000	1,200,000	1/3 of (1)	723,306	7,664,919
2029	3,600,000	1,200,000	1/3 of (1)	672,843	8,337,762
2030	3,600,000	1,200,000	1/3 of (1)	625,900	8,963,662
2031	3,600,000	1,200,000	1/3 of (1)	582,233	9,545,895
2032	3,600,000	1,200,000	1/3 of (1)	541,612	10,087,507
2033	3,600,000	1,200,000	1/3 of (1)	503,825	10,591,332
2034	3,600,000	1,200,000	1/3 of (1)	468,674	11,060,006
2035	3,600,000	1,200,000	1/3 of (1)	435,976	11,495,982
2036	3,600,000	1,200,000	1/3 of (1)	405,559	11,901,541
2037	3,600,000	1,200,000	1/3 of (1)	377,265	12,278,806
2038	3,600,000	1,200,000	1/3 of (1)	350,944	12,629,750
2039	3,600,000	1,200,000	1/3 of (1)	326,459	12,956,209
2040	3,600,000	1,200,000	1/3 of (1)	303,683	13,259,892
2041	3,600,000	1,200,000	1/3 of (1)	282,496	13,542,388
2042	3,600,000	1,200,000	1/3 of (1)	262,786	13,805,174
2043	3,600,000	1,200,000	1/3 of (1)	244,453	14,049,627
2044	3,600,000	1,200,000	1/3 of (1)	227,398	14,277,025
2045	3,600,000	1,200,000	1/3 of (1)	211,533	14,488,558
2046	3,600,000	1,200,000	1/3 of (1)	196,775	14,685,333
2047	3,600,000	1,200,000	1/3 of (1)	183,046	14,868,379
2048	3,600,000	1,200,000	1/3 of (1)	170,276	15,038,655
2049	3,600,000	1,200,000	1/3 of (1)	158,396	15,197,051
2050	3,600,000	1,200,000	1/3 of (1)	147,345	15,344,396

[1] The expected contributions are based on the Part One contributions in the fiscal year ending August 31, 2020 and on a conservative projection of (a) an increase in the number of departments and active members participating, (b) prior service contributions, and (c) reimbursement contributions.

[2] The maximum state contribution is "one-third of the total of all contributions by governing bodies in a particular year."

[3] This amount was paid in early September 2020.

[4] The amount in column (2) is the amount in the formal Legislative Appropriation Request (LAR) submitted to the Legislative Budget Board in September 2020.

[5] The present value is based on the assumption that each assumed appropriated amount is paid on the first day of the fiscal year, September 1, discounted at 7.5% per year.

Change in the Unfunded Actuarial Accrued Liability (UAAL) From August 31, 2018 Valuation to August 31, 2020 Valuation

1.	August 31, 2018 UAAL	$22,845,636[1]
2.	Normal cost for two years	4,381,772[2]
3.	Actual Part One contributions for two years	(6,699,967)[3]
4.	State appropriated contributions for UAAL	
	a. September 2018	(1,329,224)
	b. September 2019	(1,329,224)
5.	Expected 7.75% per year net increase on lines (1)-(4) during two years	3,543,801
6.	Expected August 31, 2020 UAAL	$21,412,794
7.	Experience (gains)/losses and other changes since August 31, 2018	
	a. Investment return on the actuarial value of assets	3,408,303[4]
	b. Increase due to changes in contribution rates	2,888,524[5]
	c. Demographic experience and data corrections	(2,568,173)[6]
	d. Effect of changes in actuarial assumptions	(67,820)[7]
8.	August 31, 2020 UAAL	$25,073,628

[1] From the August 31, 2018 actuarial valuation, line 6 on page 7.
[2] The annual normal cost from the August 31, 2018 actuarial valuation was $2,190,886 due on September 1, 2018 and 2019, line (1.g.ii.) on page 8.
[3] The Part One contributions amount was $3,248,400 in the year ending August 31, 2019. In the year ending August 31, 2020, the Part One contributions for that year totaled $3,451,567.
[4] This is the difference between the actuarial value of assets as of August 31, 2020 and the amount expected as of that date if the actuarial value of assets as of August 31, 2018, together with the cash flows of the following two years, had returned 7.75% per year net of investment expenses.
[5] Changes in contribution rates since September 1, 2018 increased the actuarial accrued liability.
[6] This amount includes the results of actual rates of termination, mortality, disability, and retirement different from the actuarial assumptions used in the August 31, 2018 actuarial valuation. In addition, there were a number of data corrections since the prior actuarial valuation due to a review of the data.
[7] See page 3 for a description of the key changes.

Determination of Part Two Contributions[1]

	August 31, 2018	August 31, 2020
1. Present value of state appropriations for UAAL amortization required to have a 30-year amortization period [line (14b) on page 7]	$15,172,553	$12,771,742
2. Present value of projected state appropriations for UAAL for up to 30 years [page 9 and 10, respectively]	$15,172,553	$12,771,742
3. Present value of Part Two contributions required to have a 30-year amortization period [(1) – (2)]	$ 0	$ 0
4. Annual amount of Part Two contributions		
a. Paid September 1 [(3) ÷ annuity factor[2]]	$ 0	$ 0
b. Paid periodically [(4a) x adjustment factor]	$ 0	$ 0
5. Expected annual Part One contributions paid as billed (semiannually) [line (11c) on page 7]	$ 2,988,312	$ 3,053,388
6. Part Two contributions as a percent of Part One contributions [(4b) ÷ (5)]	0%	0%

[1] The board may establish Part Two contributions that would be applied to reduce the UAAL if the expected future annual contributions from the state are not enough with the Part One contributions to pay the normal cost and amortize the UAAL in 30 years.

[2] The annuity factor would be determined for 29 equal payments beginning one year after the valuation date.

Section 3

System Investment Information
Summary of Assets as of August 31, 2020[1]

Investment Category	Market Value	August 31, 2020 Allocation[2]	Target Allocation[3]
1. Cash and equivalents	$ 551,606	0.45%	0
2. Fixed income securities			
a. Domestic core	27,114,987	22.04	20
b. Multisector non-core	10,997,739	8.94	10
3. Equities			
a. Domestic large cap	30,845,408	25.07	20
b. Domestic small/mid cap	16,158,321	13.14	10
c. International developed	16,981,338	13.80	15
d. International emerging	6,410,980	5.21	5
4. Global infrastructure	0	0.00	5
5. Real estate	5,013,727	4.08	10
6. Multi asset	8,946,899	7.27	5
7. Other			
a. Payables	(240,703)	N/A	N/A
b. Receivables	2,449,359	N/A	N/A
c. Miscellaneous assets	0	N/A	N/A
8. Total as of August 31, 2020	$ 125,229,661	100.00%	100%

[1] Based on the unaudited Annual Financial Report for the year ended August 31, 2020.
[2] Based on the assets in lines (1) through (6) ($123,021,005). All of the invested amounts except cash are from the August 31, 2020 preliminary report from the investment consultant. Cash is the balancing item.
[3] From the current "Texas Emergency Services Retirement System Investment Policy" adopted by the board of trustees.

Statement of Changes in Assets

			Year Ended August 31, 2020		Year Ended August 31, 2019
Additions					
1. Contributions					
a. Part One contributions			3,451,567		3,248,400
b. Prior service			88,660		4,446
c. Reimbursement contributions			215,013		227,663
d. State appropriation toward UAAL			1,329,224		1,329,224
			$ 5,084,464		$ 4,809,733
2. Net Investment Income					
a. Investment income			2,416,011		2,501,229
b. Net appreciation in fair value			10,183,063		(918,356)
c. Investment expenses			(409,838)		(446,072)
			$ 12,189,236		$ 1,136,801
3. Other additions			$ 2,575		$ 3,778
Total Additions			$ 17,276,275		$ 5,950,312
Deductions					
4. Benefits			$ 6,881,663		$ 6,431,924
5. Administrative expenses					
a. Total	1,000,052			943,083	
b. Paid by State	(679,625)			(716,277)	
c. Paid by System			320,427		226,806
Total Deductions			$ 7,202,090		$ 6,658,730
Net Increase in Assets			$ 10,074,185		$ (708,418)
Market Value of Assets (Fiduciary Net Position)					
Beginning of year			$ 115,155,476		$ 115,863,894
End of year			125,229,661		115,155,476
Rate of Return[1]					
Net of investment expenses			10.74%		1.00%
Gross			11.12%		1.39%

[1] Money-weighted rate of return calculated by Rudd and Wisdom, Inc., reflecting the timing of the contributions received and the benefits paid during the year.

Development of Actuarial Value of Assets as of August 31, 2020

Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Fiscal Years	2019-2020	2018-2019	2017-2018	2016-2017
1. Market Value of Assets as of Beginning of Year	$ 115,155,476	$ 115,863,894	$ 105,119,788	$ 93,964,008
2. Contributions and Other Additions	5,084,464	4,809,733	5,428,058	6,595,957
3. Benefit Payments and Administrative Expenses	(7,202,090)	(6,658,730)	(5,997,762)	(5,216,571)
4. Expected Investment Return *	8,797,085	8,869,487	8,070,434	7,341,594
5. Expected Market Value of Assets as of End of Year	$ 121,834,935	$ 122,884,384	$ 112,620,518	$ 102,684,988
6. Actual Market Value of Assets as of End of Year	125,229,661	115,155,476	115,863,894	105,119,788
7. Actuarial Investment Gain/(Loss) [(6) – (5)]	$ 3,394,726	$ (7,728,908)	$ 3,243,376	$ 2,434,800
8. Market Value Rate of Return Net of Investment Expenses (Calculated by Rudd and Wisdom, Inc.)*	10.74%	1.00%	10.86%	10.32%
9. Rate of Actuarial Investment Gain/(Loss)	2.99%	(6.75)%	3.11%	2.57%

* Based on a money-weighted rate of return net of investment expenses, reflecting the effect of the timing of the contributions received and the benefits paid during the year. The expected rate of return was 7.75%.

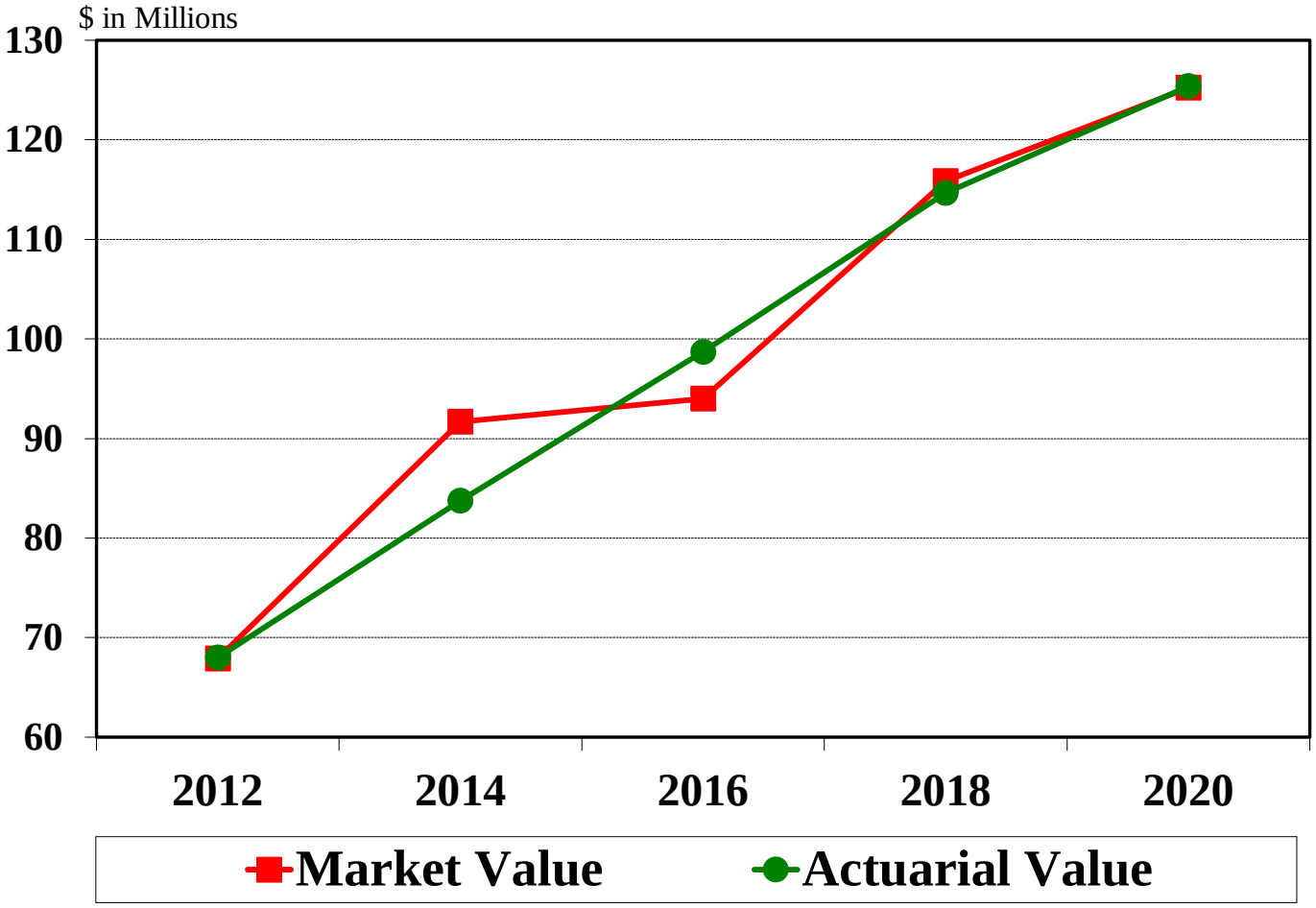
Deferred Gain/(Loss) to be Recognized in Future Years

Fiscal Year	Investment Gain/(Loss)	Deferral Percentage	Deferred Gain/(Loss) Amount as of August 31, 2020
2019 - 2020	$ 3,394,726	80%	$ 2,715,781
2018 - 2019	(7,728,908)	60	(4,637,345)
2017 - 2018	3,243,376	40	1,297,350
2016 - 2017	2,434,800	20	486,960
Total			$ (137,254)

Actuarial Value of Assets as August 31, 2020

10.	Market Value of Assets as of August 31, 2020	$ 125,229,661
11.	Deferred Gain/(Loss) to be Recognized in Future	(137,254)
12.	Preliminary Value (Item 10 – Item 11)	$ 125,366,915
13.	Corridor for Actuarial Value of Assets	
	a. 80% of Market Value as of August 31, 2020 (minimum)	$ 100,183,729
	b. 120% of Market Value as of August 31, 2020 (maximum)	$ 150,275,593
14.	Actuarial Value as of August 31, 2020	$ 125,366,915
15.	Write Up/(Down) of Assets (Item 14 – Item 10)	$ 137,254

Texas Emergency Services Retirement System
Historical Market Value and Actuarial Value of Assets
(Values as of August 31)



Section 4

Actuarial Methods and Assumptions

1. Actuarial Cost Method

The entry age actuarial cost method is used in determining the contribution requirements for the System. The actuarial cost method is the procedure by which the actuary annually identifies a series of annual contributions which, along with current assets and future investment earnings, will fund the expected benefits. The entry age cost method compares the excess of the present value of expected future benefits over the current value of assets. This difference represents the expected present value of current and future contributions that will be paid into the System. The contributions are divided into two components: an annual normal cost (or current cost) and an annual amortization cost for the unfunded actuarial accrued liability.

The System's normal cost is the current contribution in a series of annual contributions determined as a level dollar amount. The normal cost is the portion of the cost which is allocated to a plan year by the entry age actuarial cost method. The normal cost is determined as a level dollar amount for each active participant as the actuarial present value at entry of projected benefits divided by the actuarial present value at entry of anticipated future service. These individual normal cost contribution amounts are the level dollar amounts which, if contributed throughout a participant's qualified service career, would fund his projected qualified service benefits.

The System's current actuarial accrued liability is the excess of the present value of expected future benefits over the present value of all future remaining normal cost contributions. The unfunded actuarial accrued liability is the amount by which the actuarial accrued liability exceeds the current actuarial value of assets. The unfunded actuarial accrued liability is recalculated each time a valuation is performed. Experience gains and losses, which represent deviations of the unfunded actuarial accrued liability from its expected value based on the prior valuation, are determined at each valuation and are amortized as part of the newly calculated unfunded actuarial accrued liability.

Since the contributions are determined by the governing bodies of the participating departments and by the state law and Board rules governing the System, the unfunded actuarial accrued liability is expected to be amortized with level dollar contributions each year equal to the excess of the total contributions over the normal cost contributions.

2. Actuarial Value of Assets Method

All assets are valued at market value as determined by the System Board of Trustees, with an adjustment made to uniformly spread the recognition of actuarial gains or losses (as measured by actual market value investment return vs. assumed market value investment return) over a five-year period. The total adjustment amount shall be limited as necessary such that the actuarial value of assets shall not be less than 80% of market value nor greater than 120% of market value.

3. Maximum State Contributions Methodology

The state law governing the System calls for the state to "contribute the amount necessary to make the pension system actuarially sound each year, except that the state's contribution may not exceed one-third of the total of all contributions by governing bodies in a particular year." The state law defines "actuarially sound pension system" to be a system in which the amount of contributions is sufficient to pay the normal cost and amortize the UAAL in a period that does not exceed 30 years. The methodology for recognizing maximum state contributions is (1) to project the maximum state contributions equal to one-third of a conservative projection of total contributions to the System year by year, then (2) to calculate the present value of projected maximum state contributions for up to 30 years as is necessary for the System to have a 30-year amortization period, and then (3) to subtract this present value from the UAAL for determining the System's amortization period.

4. Reimbursement Funded Benefits Methodology

There are a number of participating departments in the System that previously had Texas Local Fire Fighters' Retirement Act (TLFFRA) plans that had been financed primarily or totally on a pay-as-you-go basis. When those departments entered the System, there evidently were no plan assets or insufficient plan assets to merge into the System to fully fund the present value of future benefits for their annuitants. The System's history was to agree to take over the administration and payment of those annuitants' monthly benefits in exchange for the agreement of the governing body of the department to reimburse the System for these benefits on a pay-as-you-go basis.

A separate account within the System had been used for a number of years to reflect both the payment of the annuities associated with former TLFFRA plans and the pay-as-you-go revenue from the governing bodies of the departments now participating in the System. The annuities paid through this separate account are sometimes referred to as "pass-throughs". This separate account and its activity had historically been excluded from the biennial actuarial valuations of the System. Beginning with the August 31, 2012 actuarial valuation, the board of trustees decided that it would be appropriate to reflect the actuarial present value of the future monthly benefits (PVFB) for the "pass-throughs" associated with former TLFFRA plans as a liability of the System in the biennial actuarial valuations.

The actuarial present value of the pay-as-you-go reimbursement payments is virtually identical to the PVFB for the "pass-throughs" at any point in time. Therefore, it was decided to also show the actuarial present value of the pay-as-you-go reimbursement payments equal to the PVFB for the "pass-throughs". Since these two actuarial present values offset each other, the System's funded ratio is unaffected and the present value of future appropriations from the state necessary to amortize the UAAL is unaffected.

5. Actuarial Assumptions

As a part of each actuarial valuation, we review the reasonableness of the actuarial assumptions used in the prior actuarial valuation. The investment return assumption is reviewed using the building block approach that includes several asset allocations, assumed real rates of return for each asset class, an assumed rate of investment-related expenses, and an assumed rate of inflation, with all assumptions for the long-term future. Our economic assumptions are influenced both by long-term historical experience and by future expectations of investment consultants and economists, but we select the economic assumptions and discuss them with the board of trustees before completing the actuarial valuation.

We review the termination, disability, and retirement assumptions in a more rigorous way periodically in experience studies, the most recent of which was completed in 2020. For the mortality assumptions, we use an appropriate published mortality table with projections for improvement beyond the valuation date. We are guided in our review and selection of assumptions by the relevant actuarial standards of practice. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate for the System for the long-term future.

a. Investment Return: Current and future System assets are assumed to yield an annual investment return of 7. 5% net of investment expenses, 4.5% net real rate of return plus 3.0% inflation.

b. Salary Increase Rates: Not applicable.

c. Termination: The active members are assumed to terminate their membership for causes other than death, disability or retirement in accordance with annual rates per 1,000 members shown below. The termination rates stop at the later of attaining age 55 or 10 years of qualified service.

Years of Service	Entry Age Group					
	20	25	30	35	40	45, 50, 55
0 - 4	250	250	200	200	170	150
5 - 9	120	130	130	130	100	100
10 - 14	80	90	100	100	90	0
15 - 19	80	80	90	90	0	0
20 - 24	70	70	70	0	0	0
25 - 29	70	70	0	0	0	0
30 - 34	70	0	0	0	0	0
35+	0	0	0	0	0	0

d. Mortality: The active, terminated members, retirees and surviving spouses of the System are assumed to exhibit mortality in accordance with the following:

i. Pre-retirement Mortality:

- off duty — PubS-2010 (public safety) below-median income mortality table for employees, projected for mortality improvement generationally using projection scale MP-2019
- on duty — additional annual mortality rate of 0.015% added to the base mortality table

ii. Post-retirement Mortality: PubS-2010 (public safety) below-median income mortality table for retirees, projected for mortality improvement generationally using projection scale MP-2019

iii. Post-disability Mortality: Same as for post-retirement mortality

e. Retirement: Active members eligible for early or normal retirement are assumed to retire based on rates that vary by age as shown below.

Age	Rate per Year
55	25%
56-64	14
65-69	20
70+	100

Terminated members entitled to deferred benefits are assumed to begin their benefits at age 58 or their age on the valuation date, if older.

f. Disability: Active members are assumed to become disabled as defined by the System provisions during the performance of emergency service duties based on rates that vary by age as illustrated below:

Age	Rate per Year
20	0.0020%
25	0.0024
30	0.0037
35	0.0050
40	0.0069
45	0.0087
50	0.0119
55	0.0173
60	0.0255
65	0.0279

g. Marital Status: 90% of all active male members and 50% of all active female members are assumed to be married at the time benefits commence. Males are assumed to be two years older than female spouses.

h. Administrative Expenses: The normal cost under the actuarial cost method is increased by an assumed amount to reflect the average annual administrative expenses expected to be incurred and paid by the System in the years following the valuation date. The assumed amount is based on input from the Executive Director and the CFO about some of the details of (1) the budgeted administrative expenses for the year following the valuation date and (2) the estimated administrative expenses for the second year following the valuation date, reduced by the amount appropriated by the State of Texas for the System to pay part of the administrative expenses for the year following the valuation date.

i. Contributions: The total annual Part One contributions to be paid by all governing bodies for the participating departments for qualified service as it is earned is assumed to be the total contributions based on the number of active members in the valuation in each department and known monthly contribution rates for each department as of the valuation date.

j. Pensioner Data: If the marital status field provided in the data was "married", "unknown", or was missing, then the annuity payment form was assumed to be a joint and two-thirds to spouse annuity. For all other marital status codes, the payment form was assumed to be a life annuity. Missing spouse date of birth was assumed to be two years from the retiree's date of birth, with females two years younger.

6. Changes in Methods and Assumptions Since the August 31, 2018 Valuation

a. There are no changes in methods.

b. All of the changes in assumptions are documented in the July 23, 2020 report of the six-year experience study and review of assumptions. The System Board of Trustees adopted all of the recommended assumptions during its August 18, 2020 meeting.

Section 5

Outline of Principal Eligibility, Benefit, and Contribution Provisions Reflected in the Actuarial Valuation as of August 31, 2020

1. Effective Date

The **Texas Statewide Emergency Services Retirement Act (TSESRA)** was established effective November 1, 1977 under Senate Bill No. 411 ("SB411"). It has been amended several times, with the most significant changes in a recodification by the 79th Legislature, Regular Session, 2005. In the recodification, the pension system was renamed the **Texas Emergency Services Retirement System** (System). In the 2013 Regular Session, the System was made a state agency with an Executive Director hired by the System Board of Trustees.

2. Fund

The **Texas Emergency Services Retirement Fund (Fund)** was created by TSESRA and is a trust fund for providing retirement, disability and death benefits to eligible members and their surviving spouses.

3. Eligibility Requirements

All emergency services personnel who provide services related to fire, rescue and emergency medical services and who serve without monetary remuneration while members in good standing of a participating department are eligible. In addition, auxiliary employees who receive limited compensation from a political subdivision of Texas and who are certified by the political subdivision as being regularly engaged in the performance of duties for a participating department are eligible.

4. Qualified Service

A member is credited with a year of qualified service for each year following the member's date of entry into the System in which the member is present for at least 20 hours of annual training and 25% of the department's emergencies in a calendar year. The participating department must conduct a minimum of 48 hours of training in a calendar year.

In addition, the governing body may purchase additional qualified service for a member who becomes covered by the System and who has service with the participating department before the department began participating in the System. These "buy-back" years of qualified service are determined as the number of years of service (satisfying the qualified service requirements mentioned above) from the member's date of entry in the department but not more than 15 years prior to the date the department began participating in the System. (The maximum was 10 years before the change to 15 years in 2020.)

5. Vesting of Benefits

A member became vested upon completing at least five years of qualified service through December 31, 2006. The vesting percent was determined in accordance with the table below. A member whose retirement benefit met a partial vesting requirement as it existed on December 31, 2006, retains the eligibility for that benefit as it existed on that date. Effective January 1, 2007, a member must have at least ten years of qualified service to become vested. The vesting percent is determined in accordance with the right half of the table below. The monthly benefit payable to the vested terminated member upon attainment of age 55 is computed in the same manner as for retirement except that the benefit and vesting percent are based upon the years of qualified service at the date of termination of service.

	Vesting Percent			
Years of Qualified Service	12/31/2006 and earlier	1/1/2007 and later	Years of Qualified Service	Vesting Percent
less than 5	0%	0%	10	50%
5	25%	0%	11	60%
6	30%	0%	12	70%
7	35%	0%	13	80%
8	40%	0%	14	90%
9	45%	0%	15 or more	100%

6. Retirement Benefits

A member is eligible to retire at age 55 or above. Early retirement requires the completion of at least five years of qualified service through December 31, 2006 and ten years thereafter, while normal retirement requires the completion of at least 15 years of qualified service. The only reduction for early retirement is the vesting percent. The monthly retirement benefit payable to the member is equal to the vesting percent multiplied by six times the governing body's average monthly contribution over the member's years of qualified service. For each year of qualified service in excess of 15 years, the monthly retirement benefit is increased at the rate of 6.2% compounded annually. (The rate was 7% per year before December 31, 2006.)

In addition, the governing body may have purchased prior service credit for service with the participating department before the department began participating in the System that is not buy-back service and that does not count as qualified service. There is a separate benefit formula for this prior service, referred to as accrued time, and the member is assumed to be 100% vested in the accrued time benefit. The maximum amount of accrued time is 20 years, and the monthly benefit is usually $1.25 per year of accrued time.

A member electing to retire and receive a monthly retirement benefit from the System may continue to serve as a volunteer fire fighter for his governing body. However, the

member is no longer considered an active member of the System; so he is not credited with any additional qualified service or contributions.

7. Disability Benefits

A member who becomes disabled **during the performance of emergency service duties** is considered 100% vested. A disability benefit is payable during each month that the member is unable to perform his duties for the member's participating department or the duties of any other occupation for which the member is reasonably suited by education, training, and experience.

The monthly disability benefit payable to the member is equal to at least $300. The monthly disability benefit increases $50 for every $12 in monthly contributions above the first $12 in monthly contributions being paid to the System by the governing body at the time of the disability. A member must elect between retirement or disability benefits if eligible for both.

A member whose service terminates as a result of becoming disabled while **not performing emergency service duties** shall not be eligible for a disability benefit. Instead, the member is eligible to receive an immediate or deferred benefit based on his age, years of qualified service and vesting percent. The monthly benefit payable to the member beginning on the later of the date of disability or the date the member attains age 55 is computed in the same manner as for retirement.

8. On-Duty Death Benefits Prior to Retirement

A member whose death **is the result of performance of emergency service duties** is considered 100% vested. A lump sum death benefit as well as a monthly death benefit are payable to the member's spouse (a lifetime benefit) and dependent children (payable until age 19 unless disabled) beginning in the month after the member's death.

The lump sum benefit is equal to $100,000.

The monthly death benefit is equal to 2/3 of the retirement benefit the member would have been entitled to receive based on the greater of 15 years or actual years of qualified service and is payable to the member' spouse and dependent children. An additional amount of 1/3 of the member's retirement pension is payable to the member's dependents as long as both the spouse and at least one dependent child survives.

9. Off-Duty Death Benefits Prior to Retirement

A member **eligible to retire** whose death is **not the result of performance of emergency service duties** shall be treated as if the member had retired on the date of death. The surviving spouse shall be entitled to a monthly benefit provided the member qualified by both age and service for retirement benefits at the time of death. The

monthly death benefit is equal to 2/3 of the member's retirement benefit and is payable to the member's spouse beginning in the month after the member's death.

Alternatively, the surviving spouse may elect to receive a lump sum death benefit. The lump sum benefit is equal to the greater of the sum contributed to the System on behalf of the member or the sum that would have been contributed to the System after 15 years if the member had not completed 15 years at the time of death. If there is no surviving spouse, the beneficiary would receive the lump sum death benefit.

If a member whose death is **not the result of performance of emergency service duties** was **not eligible to retire** at the time of death, his beneficiary shall receive a lump sum benefit. The amount of the lump sum benefit is the same as that described above for a member who dies while eligible to retire.

If a member whose death is not the result of performance of emergency service duties was under age 55 at the time of death but had a vested benefit, then the surviving spouse may elect, in lieu of the lump sum death benefit, a deferred monthly death benefit beginning the month after the decedent would have turned 55. The monthly benefit would be equal to 2/3 of the monthly retirement benefit to which the decedent would have been entitled on that date if he had lived to 55.

10. Death During Permanent Disability

If a member dies while receiving a disability benefit, his surviving spouse shall receive a monthly benefit equal to 2/3 of the monthly disability benefit which the disabled member was receiving at the time of death.

11. Death After Retirement

The surviving spouse of a retired member who dies shall receive a monthly benefit equal to 2/3 of the monthly benefit which the retiree was receiving at time of death.

12. Death While a Vested Terminated Participant

The surviving spouse of a deceased member who dies after terminating service with a vested benefit but before attaining age 55 is entitled to a monthly benefit, beginning on the date the decedent would have attained 55, that is 2/3 of the monthly benefit to which the decedent would have been entitled.

13. Contributions by Governing Bodies

Contributions are made by the governing body for the participating department. No contributions are required from the individuals who are members of the System. Each participating department shall make a contribution for each month a member performs emergency services for the department. The monthly contribution is composed of two parts. The Part One contribution directly impacts future retiree annuities and reflects a

minimum amount set by the state board. The Part Two contribution may be established by the System Board of Trustees to help amortize the UAAL if the expected future annual contributions from the state are not enough with the Part One contributions to provide an adequate contribution arrangement to pay the normal cost and amortize the UAAL in 30 years. If Part Two contributions are needed for the System to have an adequate contribution arrangement, the Part Two contributions are actuarially determined based on the most recent biennial actuarial valuation to be effective beginning on September 1 following the board's approval for the remainder of the 30-year amortization period. The Part Two portion, which is determined as a percent of the Part One portion (not to exceed 15%), may subsequently may be modified based on the then-most recent actuarial valuation.

A Part One contribution of at least the minimum amount per month of service is payable on behalf of each active member. The minimum monthly contribution rate per member for a department participating in the System on September 1, 2005 was increased from $12 to $36 in $4 annual increments, beginning September 1, 2006 and became $36 September 1, 2011. The minimum monthly contribution rate for a department that began participation in the System after September 1, 2005 is $36. Contributions higher than the minimum Part One contribution rate may be made at the discretion of the governing body in order to provide higher monthly benefits.

The total required contributions by the governing body are equal to the sum of the Part One and Part Two contributions and any special contributions made in order to purchase buy-back years of qualified service and other prior service benefits. The special contributions to purchase buy-back years of qualified service and other prior service benefits shall be determined before the second anniversary of a department's entry into the System. These special contributions (referred to as prior service contributions) shall be payable either in a lump sum or at least annually for a period not to exceed 10 years.

14. Contributions by State of Texas

The State shall contribute the amount necessary to make the System "actuarially sound" each year. However, the State's contribution may not exceed one-third of the total of all contributions by governing bodies in a particular year. The state law governing the System defines an "actuarially sound pension system" as one in which the amount of contributions is sufficient to cover the normal cost and to amortize the unfunded actuarial accrued liability in a period that does not exceed 30 years.

15. Minimum Benefit

Effective January 1, 2007, the TESRS Board of Trustees by board rule reduced the benefit formula for years of qualified service above 15 and eliminated partial vesting for members with less than 10 years of qualified service. The Board protected vested members by "grandfathering" accrued benefits as of December 31, 2006 for each vested

active member for retirement, termination or death. The System calculated the amount of every member's vested accrued benefit as of December 31, 2006 and keeps a record of this amount as each person's minimum benefit. Upon termination, death, or retirement, the System will pay the larger of the benefit under the new reduced benefit formula and the minimum benefit. Vested terminated members at the effective date of the changes were not affected.

Section 6

Summary of Participant Data

Distribution of Active Participants by Age and Service as of August 31, 2020

Current Age	Current Years of Qualified Service						Total	Percent of Total
	0-4	5-9	10-14	15-19	20-24	25 & Over		
Under 25	347	24	0	0	0	0	371	10.2%
25-29	303	133	9	0	0	0	445	12.2
30-34	264	142	90	12	0	0	508	14.0
35-39	185	140	102	53	2	0	482	13.3
40-44	129	117	87	50	26	2	411	11.3
45-49	81	95	73	78	53	20	400	11.0
50-54	59	58	87	59	59	63	385	10.6
55-59	39	43	53	42	42	57	276	7.6
60-64	31	26	33	25	23	52	190	5.2
65 & Over	21	37	34	23	16	35	166	4.6
Total	1,459	815	568	342	221	229	3,634	100.0%
Percent of Total	40.2%	22.4%	15.6%	9.4%	6.1%	6.3%	100.0%	

Summary of Participant Data (Continued)

	8/31/2014	8/31/2016	8/31/2018	08/31/2020
Active Participants				
Number	4,036	3,634	3,927	3,634
Average age	40.7	41.8	41.0	41.1
Average qualified service	8.7	9.5	8.5	9.0
Percent male	93%	93%	93%	92%
Terminated Vested Participants				
Number	2,161	2,200	1,927	1,787
Average age	49.7	51.0	51.0	51.9
Total annual deferred benefit	$2,202,984	$2,505,659	$2,442,582	$2,411,569
Average annual deferred benefit	$1,019	$1,139	$1,268	$1,350
Retirees and Beneficiaries (TESRS)				
Number				
Service retirees	2,122	2,223	2,677	2,960
Spouses	540	599	592	649
Disability retirees	9	10	10	8
Children	8	8	5	6
	2,679	2,840	3,284	3,623
Average age				
Service retirees	67.9	68.0	67.5	67.8
Spouses	76.2	77.4	77.1	76.8
Disability retirees	63.2	64.6	64.3	66.3
Total annual benefit	$4,024,974	$4,589,959	$5,709,153	$6,757,762
Average annual benefit	$1,502	$1,616	$1,738	$1,865
Retirees and Beneficiaries (TLFFRA)				
Number				
Service retirees	181	129	121	101
Spouses	213	198	128	113
	394	327	249	214
Average age				
Service retirees	80.7	81.6	81.4	80.9
Spouses	83.6	85.6	86.8	86.2
Total annual benefit	$337,581	$278,931	$234,430	$209,910
Average annual benefit	$857	$853	$941	$981

Summary of Participant Data (Continued)

Participant Data Reconciliation

	Active Participants	Current Payment Status	Terminated Vested Participants	Total
1. As of August 31, 2018	3,927	3,533	1,927	9,387
2. Change of status				
a. retirement	(137)	404	(267)	0
b. disability	0	0	0	0
c. death	(3)	(215)	(31)	(249)
d. survivor payment begins	0	85	0	85
e. nonvested termination	(866)	0	0	(866)
f. vested termination	(133)	0	133	0
g. completion of payment	0	(2)	0	(2)
h. data corrections	0	32	50	82
i. net changes	(1,139)	304	(115)	(950)
3. New participants (or return)	846	0	(25)	821
4. As of August 31, 2020	3,634	3,837	1,787	9,258

Section 7

Glossary of Actuarial Terms

Actuarial Accrued Liability — That portion, as determined by the particular actuarial cost method used, of the Actuarial Present Value of future pension plan benefits as of the Valuation Date that is not provided for by the Actuarial Present Value of future Normal Costs.

Actuarial Assumptions — Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, termination, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation; and other relevant items.

Actuarial Gain (Loss) — A measure of the difference between actual experience and that expected based on the Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with the particular actuarial cost method used.

Actuarial Present Value — The value of an amount or series of amounts payable or receivable at various times, determined as of a given date (the Valuation Date) by the application of the Actuarial Assumptions.

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 pension plan.

Actuarial Value of Assets — The value of cash, investments and other property belonging to a pension plan, as determined by a method and used by the actuary for the purpose of an Actuarial Valuation.

Entry Age Actuarial Cost Method — An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a Valuation Date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability. Under this method, Actuarial Gains (Losses), as they occur, reduce (increase) the Unfunded Actuarial Accrued Liability.

Fiscal Year — A 12-month period beginning September 1 and ending August 31.

Glossary of Actuarial Terms, (Continued)

Normal Cost — That portion of the Actuarial Present Value of pension plan benefits that is allocated to a valuation year by the actuarial cost method.

Prior Service Contributions — Contributions for a department for purchasing credit for service before that department began participating in the System.

Projected Benefits — Those pension plan benefit amounts that are expected to be paid at various future times according to the Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future qualified service.

Overfunded Actuarial Accrued Liability — The excess, if any, of the Actuarial Value of Assets over the Actuarial Accrued Liability.

Unfunded Actuarial Accrued Liability — The excess, if any, of the Actuarial Accrued Liability over the Actuarial Value of Assets.

Unfunded Actuarial Accrued Liability Contributions — The level annual dollar amount to amortize the Unfunded Actuarial Accrued Liability.

Valuation Date — The date upon which the Normal Cost, Actuarial Accrued Liability and Actuarial Value of Assets are determined. Generally, the Valuation Date will coincide with the ending of a Fiscal Year.

Years to Amortize the Unfunded Actuarial Accrued Liability — The period is determined in each Actuarial Valuation as the number of years, beginning with the Valuation Date, to amortize the Unfunded Actuarial Accrued Liability with a level annual dollar amount that is the difference between the expected Part One contributions and the Normal Cost. The determination may also reflect the present value of maximum state contributions as needed to have an amortization period of 30 years. If the Part One contributions and 30 years of the maximum state contributions are not adequate for a 30-year amortization period, then the actuarial valuation will include the determination of Part Two contributions required to have a 30-year amortization period.