TEACHER RETIREMENT SYSTEM OF TEXAS

ACTUARIAL VALUATION REPORT
FOR THE YEAR ENDING AUGUST 31, 2016

November 7, 2016

Board of Trustees
Teacher Retirement System of Texas
1000 Red River Street
Austin, TX   78701-2698

Subject: **Actuary's Certification of the Actuarial Valuation as of August 31, 2016**

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

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the Texas statutes and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries. Mr. White and Mr. Newton are Enrolled Actuaries, members of the American Academy of Actuaries and are qualified to give a Statement of Opinion. All are experienced in performing valuations for large public retirement systems.

Actuarial Valuations

The primary purpose of the valuation report is to determine the adequacy of the statutory contribution rates through measuring the resulting funding period, to describe the current financial condition of the System, and to analyze changes in the System's condition.   In addition, the report provides various summaries of the data. This report may not be appropriate for other purposes. The information required by the System in connection with Governmental Accounting Standards Board Statement No. 67 (GASB No. 67) will be provided under separate cover.

Valuations are prepared annually, as of August 31 of each year, the last day of the System's plan and fiscal year.

Financing Objective of the Plan

The employee, employer, and State contribution rates are established by Law that, over time, are intended to remain level as a percent of payroll and provide assets to cover benefits when due. The actuarially determined employer contribution rates determined in this actuarial valuation are intended

to provide for the normal cost plus the level percentage of payroll required to amortize the unfunded actuarial accrued liability over a period not in excess of 30 years.

Progress Toward Realization of Financing Objective

The actuarial accrued liability, the unfunded actuarial accrued liability (UAAL), and the calculation of the resulting funding period illustrate the progress toward the realization of financing objectives. Based on this actuarial valuation as of August 31, 2016, the System's under-funded status has increased to $35.5 billion from $33.0 billion as of August 31, 2015. The System's UAAL was expected to increase from the prior year based on the deferral of investment losses from prior valuations and the scheduled future increased contributions not being effective for this fiscal year. For example, if the fiscal year 2017 contribution rates would have been effective during fiscal year 2016, the UAAL increase in this valuation would have been $0.2 billion less. In addition, the UAAL increased due to a loss on the actuarial value of assets and a loss due to demographic experience.

This valuation shows a normal cost equal to 9.93% of pay plus an addition to the normal cost of 0.12% of pay to cover the annual cost of administrative expenses. The State began contributing the current contribution rate of 6.80% in fiscal year 2014 and it is assumed the rate will remain at that level. In addition, covered employers whose employees are not participating in Social Security began contributing 1.50% of salary (capped at the minimum salary schedule) in fiscal year 2015. Combined these contributions were approximately 7.70% of total payroll. The member contribution rate increased beginning in fiscal year 2015 to 6.7% of pay and will continue to increase to 7.70% of pay in fiscal year 2017. Thereafter, AS a result, for FY2017 and thereafter, the System is expected to receive a total contribution rate of 15.40% of pay.

Hence, beginning in FY2017, there is expected to be 5.35% of pay available to amortize the UAAL (15.40% less normal cost of 9.93% less administrative expenses of 0.12%).   If payroll grows as expected, the contributions provided by this portion of the contribution rate are sufficient to amortize the current unfunded actuarial accrued liabilities of the System over a period of 33.6 years based on the smoothed asset value as the valuation date. Therefore, the financing objectives of the System are being met. However, the 33.6 amortization period is longer than the target of less than 30 years.

The actuarial valuation report as of August 31, 2016 reveals that the funded ratio (the ratio of actuarial assets to actuarial accrued liability) is 79.7%. This is the first time the funded ratio has been less than 80% since 1986. The funded status is one of many metrics used to show trends and develop future expectations about the health of the 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 System earned less than the assumed rate of return during fiscal year 2016 (7.3% on market value compared to an assumed 8.0%). Because of this shortfall and the continued recognition of the unfavorable investment performance from FY2015, the System is now deferring net investment losses of $4.8 billion and the funded status using the market value of assets is 76.9%. If there are no significant investment gains or other actuarial gains over the next several years, the funded status of the System would be expected to decrease towards this number. This $4.8 billion in net deferred losses compares to the last valuation when the System was deferring $4.9 billion in net deferred losses and had a 77.2% funded ratio based on the market value of assets.

The System's UAAL increased by $2.0 billion more than expected during the year. The continued recognition of the deferred investment losses from fiscal year 2015 and the current year's shortfall resulted in a loss on the actuarial value of assets of $1.5 billion. Therefore, the liabilities actually increased $0.5 billion more than expected. This $0.5 billion represents a loss of 0.26% of total liabilities and was due to the liabilities growing faster than expected due to a combination of salary increases being slightly larger than expected and fewer than expected retiree deaths during the year.

Based on the actuarial (smoothed) value of assets, the number of years needed to amortize the UAAL will decrease annually if all assumptions are met. Please note, this annual decrease in the funding period will only occur if the currently scheduled contribution levels remain in place over the funding period. Any decrease in the contribution rates will result in higher funding periods. It should be noted that with the $4.8 billion in deferred investment losses still to be recognized in the actuarial value of assets, future losses in the actuarial value of assets will result in an increase in the funding period in future valuations until the losses are fully recognized.

In addition, due to the current funding policy which utilizes level percentage of payroll amortization, the amortization payments will not be sufficient to cover all of the interest charges on the UAAL until the funding period reaches approximately 20 years. Table 11a provides a 10 year projection of various valuation results, including the UAAL, and that projection shows the UAAL is expected to increase to $39.1 billion in 2026. Extending the projection further would show the UAAL starts to decrease in 2028 and is fully amortized 20 years after that.

Please note these expectations are based on the current benefit provisions, assumptions, and contribution rates. Any additional benefit enhancements (ad hoc COLAs) granted without additional funding would increase the ultimate UAAL and extend the period before the funding status begins to improve. Thus, we continue to advise against any future benefit enhancements without additional sources of funding.

Plan Provisions

The plan provisions used in the actuarial valuation are described in Table 21 of the valuation report. There have been no changes to the benefit and contribution provisions of the System since the prior valuation.

Disclosure of Pension Information

Beginning with fiscal year 2014, the System began reporting financial information in accordance with Governmental Accounting Standards Board (GASB) Statement No. 67. The disclosure information for GASB No. 67 is provided in a separate report and is not contained herein.

This report should not be relied on for any purpose other than the purpose described above. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

Actuarial Methods and Assumptions

The actuarial methods and assumptions have been selected by the Board of Trustees of the Teacher Retirement System of Texas based upon our analysis and recommendations. These assumptions and methods are detailed in Table 22 of the valuation report. The Board of Trustees has sole authority to determine the actuarial assumptions used for the plan. The actuarial methods and assumptions are primarily based on a study of actual experience for the four year period ending August 31, 2014 and adopted on September 24, 2015. There have been no changes in the actuarial assumptions or methods since the prior valuation.

The results of the actuarial valuation are dependent on 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. Section D provides illustrative results based on future investment experience deviating from the assumptions. Based on the scope of this engagement, we have not performed analysis on the potential range of future measurements based on other factors. The actuarial calculations are intended to provide information for rational decision making.

In our opinion, the actuarial assumptions used are appropriate for purposes of the valuation and are internally consistent and reasonably related to the experience of the System and to reasonable expectations.

Data

Member data for retired, active and inactive members was supplied as of August 31, 2016 by the TRS staff. The staff also supplied asset information as of August 31, 2016. We did not audit this data, but we did apply a number of tests to the data and concluded that it was reasonable and consistent with the prior year's data. GRS is not responsible for the accuracy or completeness of the information provided to us by TRS.

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The following schedules in the Actuarial Section of the TRS CAFR were prepared by GRS:

- Actuarial Present Value of Future Benefits
- Schedule of Retirees and Beneficiaries Added to and Removed from Rolls
- Schedule of Funding Progress
- Post-Retirement Mortality
- Rates of Retirement
- Probability of Decrement due to Withdrawal
- Active Mortality

All other schedules shown in the actuarial section were prepared by TRS staff based upon our work. For further information please see the full actuarial valuation report.

This document and the PowerPoint presentation of the actuarial valuation results presented to the TRS Board on December 1, 2016 comprise the full actuarial report.

Respectfully submitted,
Gabriel, Roeder, Smith & Company
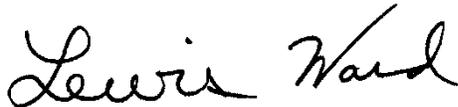
Lewis Ward
Consultant
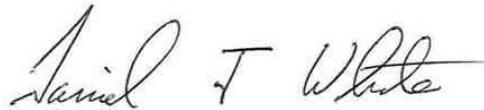
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SECTION A
EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The System slightly underperformed its targeted return of 8.0% on the market value of assets. Additionally, the System was still deferring investment losses of $4.9 billion from the prior year. The combined impact was a loss on the actuarial value of assets of $1.5 billion. As a result, the System is still deferring $4.8 billion in net deferred losses to be recognized in future valuations, unless they are offset by future gains.

In addition to the impact of the investment performance, the liabilities of the System are slightly higher than expected due to adverse demographic experience. Therefore, overall the System's UAAL is larger than expected. The actuarial valuation of the Teacher Retirement System of Texas (TRS) as of August 31, 2016 indicates that the System's unfunded actuarial accrued liability (UAAL) has increased from $33.0 billion in 2015 to $35.5 billion in 2016.

The System did have some good news in that the payroll on which the System receives contributions increased faster than expected due to a 2.3% increase in the number of active members. This helped to offset the impact of the investment and liability experience on the funding period. The net impact is a funding period of 33.6 years as of August 31, 2016 compared to 33.3 years as of August 31, 2015.

The financial outlook of the System is similar to last year. Without offsetting future actuarial gains, the funding period is expected to increase in the short term as the deferred investment losses are recognized, and then begin to decrease in the future.

While benefit enhancements cannot be considered while the System's funding period exceeds 31 years, we will continue to recommend caution with regards to any unfunded benefit enhancements (including ad hoc COLAs) even when the funding period declines to below 31 years in the future. As noted earlier, the nominal dollar amount of the UAAL is still expected to increase for the next decade. The key results of this valuation as of August 31, 2016, may be summarized as follows.

EXECUTIVE SUMMARY

Item	2016	2015
Membership		
• Number of		
- Active members[#]	847,673	828,945
- Service retirees	370,761	355,384
- Disabled retirees	9,650	9,495
- Beneficiaries	13,503	12,859
- Inactive, vested	95,078	91,268
- Inactive, nonvested	167,275	161,292
- Total	1,503,940	1,459,243
• Projected Payroll for Contributions	$ 42.376 billion	$ 39.620 billion
Statutory contribution rates		
• Combined State/Employers *	7.700%	7.700%
• Member **	7.700%	7.700%
Actuarial Information		
• Normal cost %	9.93%	9.91%
• Unfunded actuarial accrued liability (UAAL)	$ 35.453 billion	$ 32.968 billion
• UAAL as % of pay	83.7%	83.2%
• Funded ratio	79.7%	80.2%
• Funding period (years)	33.6	33.3
• Actuarially Determined Employer Contribution (ADEC) (30 Year Amortization based on the Actuarial Value of Assets) ***	7.94%	7.92%

\# Includes members in DROP

* The State contribution rate for FY2015 was set at 6.80% of pay. Beginning in fiscal year 2015, covered employers whose employees are not participating in Social Security began contributing 1.50% of the minimum salary schedule. Combined it is expected that these contributions will be approximately 7.70% of total payroll.

** The member contribution rate increased in fiscal year 2015 to 6.70% of pay and will continue to increase each year until the rate reaches 7.70% of pay in fiscal year 2017 (7.20% of pay in fiscal year 2016).

*** Aggregate contribution rate for State and local employers.

EXECUTIVE SUMMARY

Item	2016	2015
Assets		
• Market value	$ 134.009 billion	$ 128.539 billion
• Actuarial value	138.786 billion	133.485 billion
• Estimated yield on market value	7.3%	-0.3%
• Estimated yield on actuarial value	6.9%	7.0%
• Ratio of actuarial to market value	103.6%	103.8%
• Employee contributions, including service purchases	$ 2,981.1 million	$ 2,626.1 million
• State contributions	1,699.6 million	1,612.7 million
• Employer contributions	1,483.4 million	1,378.0 million
• Benefit, refund, and expense payments	10,200.0 million	9,746.6 million
• Net external cash flow	(4,036.0) million	(4,129.8) million
Gains/(losses)		
• Asset experience	$ (1,503.5) million	$ (1,236.6) million
• Assumption changes/Legislative changes	0.0 million	(682.1) million
• Liability experience	(455.8) million	1,501.1 million
• Total	$ (1,959.3) million	$ (417.6) million
Actuarial Information based on Market Value of Assets		
• Unfunded actuarial accrued liability (UAAL)	$ 40.230 billion	$ 37.914 billion
• UAAL as % of pay	94.9%	95.7%
• Funded ratio	76.9%	77.2%
• Funding period (years)	53.5	56.4
• Actuarially Determined Employer Contribution (ADEC)	8.70%	8.76%

Item	UAAL ($ Millions)	Funding Period
(1)	(2)	(3)
1. 2015 Valuation	$32,968	33
2. Restated 2015 Valuation with Legislative changes (if applicable)	32,968	33
3. Expected 2016 UAAL using actual contributions*	33,493	32
4. 2016 UAAL using expected assets and actual liabilities	33,949	34
5. 2016 UAAL using actual assets and liabilities, expected payroll	35,453	38
6. 2016 UAAL using actual payroll	35,453	34

* The funding period for this entry uses the expected UAAL and expected payroll.
   The expected payroll is the prior year's valuation payroll, rolled forward at the 2.5% payroll growth rate.

SECTION B
INTRODUCTION

INTRODUCTION

The valuation of the Teacher Retirement System of Texas (TRS) as of August 31, 2016, reflects the following contribution rates: (a) a member contribution rate of 7.70%, and (b) a State/Employer combined contribution rate of 7.70%. For purposes of determining the funding period, it was assumed that these contribution rates (both member and State/employer) would remain in place indefinitely.

In preparing this valuation, Gabriel, Roeder, Smith & Company (GRS) has relied on employee data and asset information provided by the staff of the Teacher Retirement System. While not verifying the data at their source, GRS has performed such tests for consistency and reasonableness as has been deemed necessary to be satisfied with the appropriateness of using the data supplied.

Section A contains an executive summary of the most significant valuation results. The basic results of the valuation are covered in Section C. Section D discusses the sensitivity of the funded status to future investment performance. Section E discusses the changes in the necessary disclosure items required by the Governmental Accounting Standards Board (GASB). Section F provides analysis and discussion of changes in assets. Section G produces a determination of actuarial gains and losses for the year and an analysis of the change in the funding period since the prior year's valuation. Section H summarizes the findings of the valuation, and Section I provides the tables supporting the report.

There have been no changes in the benefit provisions of TRS since the prior valuation. Please see Table 21 of this report for a summary of the major benefit provisions of the System.

There have been no changes to the actuarial assumptions or methods since the prior valuation. The current actuarial assumptions were adopted by the Board of Trustees on September 24, 2015 and were effective with the August 31, 2015 valuation. For a detailed description of the actuarial assumptions and methods please see Table 22 of this report.

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SECTION C
FUNDED STATUS OF THE SYSTEM

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FUNDED STATUS OF THE SYSTEM

Table 3 in Section I details the normal cost of the Retirement System by its various components. This normal cost is developed based on the valuation method known as the entry-age-normal actuarial cost method. The normal cost to pay for the benefits earned under the Retirement System is 9.93% of pay, this amount being inclusive of the amount contributed by the employees. The normal cost rate reflects the ultimate member contribution rate of 7.70% that begins in fiscal year 2017. In addition, to the cost of benefits we add an addition to the normal cost to cover annual administrative expenses. It is estimated that administrative expense will be approximately 0.12% of payroll. Thus, the total normal cost is 10.05% of pay and the net employer normal cost is 2.35% of pay based on the member contribution rate of 7.70%.

The State's contribution rate increased to 6.8% in fiscal year 2014. Beginning in fiscal year 2015, covered employers whose employees are not participating in Social Security began contributing 1.50% of the minimum salary schedule. Combined with the State contribution, it is expected that these aggregate contributions will be approximately 7.70% of total payroll. Since the total State\employer contribution rate is 7.70%, this allows 5.35% of pay contributed by the State to be available to amortize any unfunded actuarial accrued liabilities beginning in FY2017.

As stated above, the funding period for the System is determined under the entry-age-normal actuarial cost method based on a level percentage of pay. The key points of this method are as follows:

1. The "normal cost" for the System is deemed to be equal to the average cost of benefits for newly hired participants.

2. The "actuarial accrued liability" for benefits payable in the future to present active members is calculated as the present value of benefits payable in the future to present active members less the present value of future normal costs.

3. Funding of the unfunded actuarial accrued liability (UAAL) is a function of the rate of future growth in total covered payroll and the contributions established in state statute.

Table 5 develops the funding period under the above approach not only for the current valuation, but also for the valuation as of August 31, 2015. As shown in Item A3 of Table 5, the normal cost for the System consists of the entire 7.70% of pay contributed by the members plus 2.35% of pay from the State/employers. As developed in Item A4, the 7.70% of pay contributed by the State/employers is 5.35% of pay more than the State's share of the normal cost. From an actuarial perspective, the contribution rate in excess of the System's normal cost should be sufficient to amortize the UAAL over a reasonable period of time. The ultimate contribution rate in excess of the System's normal cost (5.35%) is sufficient to amortize the System's UAAL over a period of 33.6 years (assuming all actuarial assumptions are exactly met).

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Table 2 provides an overall summary of key actuarial data for the 2016 valuation, with comparative data for 2015. This information is summarized from the other tables, which supply more detail. Its value is in providing in one convenient place key comparative valuation results.

Table 7 offers a comparative view of the unfunded actuarial accrued liability (UAAL). It compares the UAAL with three items: the covered payroll for the year, the total actuarial value of assets at the end of the year, and the total actuarial liabilities (or, equivalently, the total present value of future benefits) as of the valuation date.

The UAAL as shown in Item B4 of Table 5 is $35.5 billion for 2016, an increase from $33.0 billion in 2015. As indicated in the table, the UAAL equals the difference between the total actuarial accrued liability (Item B2d) and current actuarial assets (Item B3). The excess contributions above the normal cost will be used to help reduce the UAAL. As a result of unfavorable investment experience from the recent past, the System is now deferring $4.8 billion in net investment losses (the difference between the market value of assets and the actuarial value of assets).

In determining the number of years that will be required to amortize the UAAL, an assumption is made concerning future growth of the payroll of the System. Our current assumption is 2.50% per year. There is no provision for membership growth in the payroll growth assumption.

As shown in Item B6 of Table 5 and using the assumed rate of increase in covered payroll of 2.50%, the period to fund the UAAL is 33.6 years. The funding periods using alternate payroll growth assumptions are also shown. An analysis of the change in the UAAL and the funding period since the 2015 valuation is provided in Section G.

The actuarial value of assets is developed in Table 4. It should be remembered that the intent of the actuarial asset valuation method is to smooth out year-to-year fluctuations in market rates of return. The current asset method determines the expected actuarial value of assets and then recognizes at least 20% of the difference between that expected actuarial value of assets and the actual market value of assets. As shown in Item 8 of Table 4, if the current year's difference between expected and actual investment income is of the opposite sign from the remaining deferred excesses/shortfalls, then this year's difference is directly offset against any prior year bases of the opposite sign (starting with the oldest base and working forward). However, because this year the signs are the same, there is no offsetting of one base against another.

Any remaining bases are then recognized over the remaining number of years. This is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable and finite amount of time.

The actuarial value of assets is $138.8 billion as shown in Item 9 of Table 4.

Under the asset smoothing methodology, as may be seen by looking at the difference between Items 6 and 9 of Table 4, the AVA methodology is deferring net investment losses. The actuarial asset

yield for 2016 is 6.9%, which is less than the assumed rate of 8.0%. The market return for fiscal year 2016 was 7.3%.

As noted above, the System has a funding period of 33.6 years. The System has an unfunded liability of $35.5 billion, and $4.8 billion in net deferred investment losses. Without offsetting actuarial gains, the funding period is expected to increase over the next several years.

SECTION D
SENSITIVITY TO INVESTMENT PERFORMANCE

Table 11b provides several additional risk metrics that can help relate the size of the investment risk to the System, the Sponsor, and the membership. As shown on Table 11b, the assets are currently 3.3 times as large as the covered payroll (source of funding). Based on this ratio, a 10% decrease in the asset levels that was never recovered by future gains would increase the 30-year contribution requirement by 2.2% of payroll (from the current 7.94% employer ADEC to 10.14%) and decrease the funded ratio by 8% (from 79.7% to 71.7%). Table 11b also shows how these metrics have changed over time. As a System matures and/or achieves higher funded ratios, these risk metrics will actually show proportionately higher investment risk.

The following exhibit projects the actuarial status of the System as of August 31, 2016 based on varying actual investment returns over the next few years. All other assumptions are assumed to be met, including the continuation of the new statutory member and employer contribution rates.

	Based on an 4.0% Actual Investment Return on Market		Based on an 8.0% Actual Investment Return on Market		Based on an 12.0% Actual Investment Return on Market	
	Funded Ratio Measured By:					
August 31,	Actuarial Value of Assets	Market Value of Assets	Actuarial Value of Assets	Market Value of Assets	Actuarial Value of Assets	Market Value of Assets
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2016	79.7%	76.9%	79.7%	76.9%	79.7%	76.9%
2017	78.5%	74.2%	79.1%	77.1%	80.0%	80.0%
2018	77.0%	71.8%	78.8%	77.6%	81.1%	83.5%
2019	74.9%	69.4%	78.4%	78.0%	83.0%	87.3%
2020	72.7%	66.9%	78.6%	78.4%	85.5%	91.4%
2021	70.1%	64.4%	78.9%	78.8%	88.8%	95.7%

The future liability is calculated by rolling forward the liabilities as of August 31, 2016, taking into account interest and benefit payments for the year, including mortality incidence and anticipated cost of living increases (none in this case). The 8.0% scenario above coincides with the actuarial investment return assumption of 8.0%. The 4.0% and 12.0% scenarios were selected because there is statistically a high probability of the return for a five-year period being within +/- 4% of the expected return.

The scenarios above are for illustration purposes only and are in no way to be used as expected investment performance. There are no other deviations from the expected taken into consideration besides the asset performance. Careful consideration of this projection should be taken into account before any benefit enhancement is adopted. Note that under the 8% return scenario, the funded ratio based on actuarial assets and market assets will have converged by FY2021 and are both expected to trend upward.

GRS

SECTION E
GASB DISCLOSURE

GASB DISCLOSURE

The System prepares its financial accounting and disclosure information in accordance with Governmental Accounting Standards Board (GASB) Statement No. 67.

We provide a separate accounting report with the required disclosures under this accounting standard.

SECTION F
CHANGE IN ASSETS DURING THE YEAR

CHANGE IN ASSETS DURING THE YEAR

This section provides an analysis of the change in the Plan Net Assets during the year and an estimate of the yield on mean assets of the total System. Table 8a shows a rearrangement of some of the tables included in the annual financial statements of the System. Table 8b shows the estimated yield on a market value basis and on the actuarial asset valuation method.

To determine estimated yield on "mean assets", the traditional insurance company formula for yield rates is used. The estimated yield is derived by dividing the appropriate income by the corresponding mean assets. This is a "dollar weighted" rate of return, and will differ slightly from the "time weighted" return shown in the System's CAFR.

As indicated by Item A4 of Table 8b, the estimated yield on mean market value is 7.3%, following an -0.3% return in 2015. The actuarial asset yield (Item B4) is 6.9%, compared to 7.0% in 2015, and compared to the 8% assumption rate. This difference in the estimated yield on market value and actuarial value illustrates the smoothing effect of the asset valuation method.

As mentioned in Section C, the investment results on an actuarial value basis are unfavorable for the 2015/2016 plan year. On an actuarial value basis the System is below its 8% assumption rate by 1.1%. As a result, the System had an actuarial investment loss of $1.5 billion. It should also be noted that the asset valuation method is still deferring $4.8 billion in unrecognized net losses into future years. Absent future favorable investment experience, these deferred losses will be recognized over future actuarial valuations.

SECTION G
ACTUARIAL GAINS (LOSSES) AND THE FUNDING PERIOD

ACTUARIAL GAINS (LOSSES) AND THE FUNDING PERIOD

Section C has noted that the unfunded actuarial accrued liability (UAAL) has increased from $33.0 billion in 2015 to $35.5 billion in 2016. As such, the System's funding period has changed from 33.3 in 2015 to 33.9 years in 2016. The purpose of this section is to determine the source of the gains and losses and the impact of those gains and losses on the funding period.

An important factor was the fact that the scheduled higher contribution rates were still being phased into and thus the System did not receive an actuarially appropriate contribution during the year. This shortfall increased the UAAL by approximately $0.2 billion. Section F has discussed the change in assets for the year. Tables 4 takes the information contained in Table 8 and develops the actuarial assets for this valuation, based on the investment return assumption of 8%. Table 8b develops the estimated yield for the year based on two measures of asset values

As shown in Table 4, the expected value of actuarial assets as of August 31, 2016 is $140.3 billion (expected if the fund would have earned 8% on the actuarial value), and the actual value of actuarial assets as of the valuation date is $138.8 billion. Thus the asset loss for the year is the difference between the actual value and the expected value, or $1.5 billion (as shown in Item 10). Item 11 indicates that this gain represents 0.9% of this year's actuarial assets. This asset loss for the year is a direct reflection of the estimated yield for the year based on the value of actuarial assets, namely 6.9% (as shown in Item B4 of Table 8b).

Table 9 develops the total actuarial gain (loss) for the year and separates it between the asset gain (loss) and the liability gain (loss). The items in Table 9 that are used to develop the expected UAAL as of August 31, 2016 are derived from Table 5 and Table 8. The total actuarial loss for the year is seen to be $2.0 billion.

In addition to the $1.5 billion asset loss for the year there was a net liability experience loss was $0.5 billion. The most significant source of liability losses came from salary increases being slightly larger than expected and retiree mortality experience during the fiscal year. It should be noted that the $0.5 billion represents approximately 0.26% of the total liability, so this magnitude of variance is well within normal patterns.

Table 10 traces the changes in the UAAL and the funding period from the valuation as of August 31, 2015, to August 31, 2016. Item 4 of Table 10 shows the funding status if there had been no actuarial gains or losses in the areas of assets, liabilities, and reflecting the actual State contributions for the 2015/2016 plan year. The UAAL would have increased during the year to $33.5 billion. Item 5 of Table 10 illustrates that the liability experience loss increased the UAAL to $33.9 billion and that the prior years' investment experience, as shown in Items 6 and 7, increased the UAAL to $35.5 billion. Item 8 shows the impact on the funding period of the covered compensation growing at a faster rate than the prior year's assumed rate of 2.5%, which helped bring the funding period back down to 33.6 years.

SECTION H
SUMMARY AND CLOSING COMMENTS

SUMMARY AND CLOSING COMMENTS

The results of the actuarial valuation of the Teacher Retirement System as of August 31, 2016 are mixed. There was both a liability experience loss and an actuarial loss on the actuarial value of assets which increased the UAAL by $2 billion more than expected. However, due to the significant increase in payroll the funding period only increased by 0.3 years when compared to last year.

The System's funded status is 79.7% on actuarial basis, and the funded status using the market value of assets is 76.9%. If there are no significant investment gains or other actuarial gains over the next several years, the funded status of the System would be expected to gradually decrease in the short-term and then begin increasing once the current deferred investment losses are fully recognized.

It is important to understand that while the negotiation process by the Legislature included an ad hoc COLA paid to retirees in September of 2013, the legislation also included substantial increases in contribution rates. This should be the model used in any future year that a COLA is considered. In past negotiations, there were times that COLAs and retroactive benefit enhancements were granted without additional funding sources and that eventually deteriorated the financial health of the System.

Thus, we continue to urge caution in granting future unfunded additional liabilities without additional funding. As of now, based on the current benefit levels, the dollar amount of the unfunded actuarial accrued liability is expected to increase for more than a decade before it is projected to begin decreasing. Adding additional unfunded liabilities will only increase the amount further and place more risk on future generations.

SECTION I
ACTUARIAL TABLES

ACTUARIAL TABLES

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS

	August 31,	
	2016	2015
	(1)	(2)
A. Present Value of Benefits Presently Being Paid:		
1. Service retirement benefits	$ 84,731,139,810	$ 80,335,545,136
2. Disability retirement benefits	1,141,195,638	1,113,095,219
3. Death benefits	867,637,073	851,515,997
4. Present survivor benefits	256,188,158	243,282,654
5. Total present value of benefits presently being paid	$ 86,996,160,679	$ 82,543,439,006
B. Present Value of Benefits Payable In the Future		
To Present Active Members:		
1. Service retirement benefits	$ 102,594,460,159	$ 98,467,131,191
2. Disability retirement benefits	1,305,439,740	1,203,603,679
3. Termination benefits	8,518,349,795	7,863,244,733
4. Death and survivor benefits	1,846,700,055	1,758,578,113
5. Total active member liabilities	$ 114,264,949,749	$ 109,292,557,716
C. Present Value of Benefits Payable In the Future To		
Present Inactive Members:		
1. Inactive vested participants	$ 4,333,837,796	$ 4,084,868,043
2. Refunds of contributions to inactive nonvested members	413,997,543	400,439,304
3. Future survivor benefits payable on behalf of present annuitants	1,401,763,178	1,341,025,218
4. Total inactive liabilities	$ 6,149,598,517	$ 5,826,332,565
D. Total Actuarial Present Value of Future Benefits:	$ 207,410,708,945	$ 197,662,329,287

SUMMARY OF COST ITEMS

	Valuation as of August 31, 2016		Valuation as of August 31, 2015	
	Cost Item	Cost as % of Pay	Cost Item	Cost as % of Pay
	(1)	(2)	(3)	(4)
1. Participants				
a. Active contributing members				
1. Not in DROP	847,631		828,851	
2. In DROP	42		94	
b. Active subtotal	847,673		828,945	
c. Inactive members w/deferred benefits	95,078		91,268	
d. Retired members and beneficiaries	393,914		377,738	
e. Subtotal, members	1,336,665		1,297,951	
f. Inactive nonvested members due refunds	167,275		161,292	
g. Total membership	1,503,940		1,459,243	
2. Average for Active Members				
a. Average age	44.5		44.6	
b. Average years of service	10.2		10.3	
c. Average pay	$ 46,343		$ 44,787	
3. Present Value of Future Pay	$ 349,071,274,166		$ 328,790,637,605	
4. Normal Cost Rate				
a. Gross normal cost	9.93%		9.91%	
b. Less employee contribution rate*	(7.70%)		(7.70%)	
c. Administrative Expenses	0.12%		0.12%	
d. State normal cost	2.35%		2.33%	
5. Present Value of Future Benefits				
a. Retired members - in pay or deferred	$ 86,996,160,679		$ 82,543,439,006	
b. Retired members - future survivor benefits	1,401,763,178		1,341,025,218	
c. Vested inactive members	4,333,837,796		4,084,868,043	
d. Active members	114,264,949,749		109,292,557,716	
e. Inactive nonvested members	413,997,543		400,439,304	
f. Total	$ 207,410,708,945	489.5%	$ 197,662,329,287	498.9%
6. Present Value of Future Normal Costs (employee plus employer)	$ 33,171,982,143	78.3%	$ 31,209,404,783	78.8%
7. Actuarial Accrued Liability	$ 174,238,726,802	411.2%	$ 166,452,924,504	420.1%
8. Actuarial Value of Assets	$ 138,786,120,728	327.5%	$ 133,485,187,642	336.9%
9. Unfunded Actuarial Accrued Liability	$ 35,452,606,074	83.7%	$ 32,967,736,862	83.2%
10. Projected Payroll for Contributions	$ 42,375,840,262		$ 39,620,491,179	
11. Employer Contribution Rate **	7.700%		7.700%	
12. Funding Period	33.6 years		33.3 years	
13. Estimated Yield on Actuarial Assets	6.9%		7.0%	
14. Funded Ratio - Smoothed Basis	79.7%		80.2%	
15. Actuarially Determined Employer Contribution (ADEC)***	7.94%		7.92%	

*   The member contribution rate began increasing in fiscal year 2015 to 6.70% of pay and will continue to increase each year until the rate reaches 7.70% of pay in fiscal year 2017 (7.20% of pay in fiscal year 2016).

**   The State contribution rate for FY2014 was set at 6.80% of pay. Beginning in fiscal year 2015, covered employers whose employees are not participating in Social Security began contributing 1.50% of pay. Combined it is expected that these contributions will be approximately 7.70% of total payroll.

*** Aggregate contribution rate for State and local employers.

ANALYSIS OF NORMAL COST BY COMPONENT

Benefit Component	8/31/2016 Cost as % of Pay	8/31/2015 Cost as % of Pay
(1)	(2)	(3)
1. Normal Cost		
a. Retirement Benefits	6.98%	6.96%
b. Disability Benefits	0.24%	0.24%
c. Death Benefits (including survivor benefits)	0.26%	0.26%
d. Termination benefits	2.45%	2.45%
e. Total	9.93%	9.91%
2. Employee Contribution Rate*	(7.70%)	(7.70%)
3. Administrative Expenses	0.12%	0.12%
4. State Normal Cost (Item 1e - Item 2 + Item 3)	2.35%	2.33%

*Employee contribution rate increased to 7.20% in fiscal year 2016 and to 7.70% in fiscal year 2017

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	Year Ending August 31, 2016
1. Actuarial value of assets at beginning of year	$ 133,485,187,642
2. Net new investments	
a. Contributions	$ 6,164,030,328
b. Benefits and refunds paid	$ (9,844,969,946)
c. Administrative Expenses	$ (44,402,710)
d. Subtotal	$ (3,725,342,328)
3. Assumed investment return rate for fiscal year	8.00%
4. Assumed investment return for fiscal year (Item 1 + Item 2 / 2) x Item 3	$ 10,529,801,318
5. Expected Actuarial Value at end of year (1+ 2 + 4)	$ 140,289,646,632
6. Market value of assets at end of year	$ 134,008,637,473
7. Excess/(Shortfall) (6 - 5)	$ (6,281,009,159)

8. Development of amounts to be recognized as of August 31, 2016:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income (1)	Offsetting of Gains/(Losses) (2)	Net Deferrals Remaining (3) = (1) + (2)	Years Remaining (4)	Recognized for this valuation (5) = (3) / (4)	Remaining after this valuation (6) = (3) - (5)
2012	$ 0	$ 0	$ 0	1	$ 0	$ 0
2013	0	0	0	2	0	0
2014	0	0	0	3	0	0
2015	(4,946,481,430)	0	(4,946,481,430)	4	(1,236,620,358)	(3,709,861,072)
2016	(1,334,527,729)	0	(1,334,527,729)	5	(266,905,546)	(1,067,622,183)
Total	$ (6,281,009,159)	$ 0	$ (6,281,009,159)		$ (1,503,525,904)	$ (4,777,483,255)

9. Actuarial value of plan net assets, end of year	$ 138,786,120,728
10. Asset gain (loss) for year (Item 9 - Item 5)	$ (1,503,525,904)
11. Asset gain (loss) as % of actual actuarial assets	(1.08%)
12. Ratio of actuarial value to market value	103.6%

Notes: Remaining deferrals in Column (1) for prior years are from last year's report column (6). The number in the current year is the difference between the remaining deferrals for prior years and the total Excess/(Shortfall) return shown in Item 7.
Column 2 is a direct offset of the current year's excess/(shortfall) return against prior years' excess/(shortfall) of the opposite type.

DEVELOPMENT OF YEARS TO FUND THE UNFUNDED
ACTUARIAL ACCRUED LIABILITY

		As of August 31, 2016	As of August 31, 2015
		(1)	(2)
A.	Basic Data		
1.	Projected Payroll for Contributions	$ 42,375,840,262	$ 39,620,491,179
2.	Present value of future pay	$ 349,071,274,166	$ 328,790,637,605
3.	Normal cost rate of benefits		
	a. Total normal cost rate	9.93%	9.91%
	b. Less employee contribution rate	(7.70%)	(7.70%)
	c. Administrative Expenses	0.12%	0.12%
	d. State normal cost rate	2.35%	2.33%
4.	State contribution rate for funding unfunded actuarial accrued liability		
	a. Total State/employer contribution rate**	7.700%	7.700%
	b. Less State normal cost rate	(2.350%)	(2.330%)
	c. State contribution rate available	5.350%	5.370%
5.	Actuarial accrued liability for present active members		
	a. Present value of benefits payable in the future to present members	$ 114,264,949,749	$ 109,292,557,716
	b. Less present value of future normal costs	(33,171,982,143)	(31,209,404,783)
	c. Actuarial accrued liability	$ 81,092,967,606	$ 78,083,152,933
B.	Development of Funding Period		
1.	Normal cost		
	a. Employee normal cost (Item A3b x Item A1)	$ 3,262,939,700	$ 3,050,777,821
	b. State normal cost (Item A3c x Item A1)	995,832,246	923,157,444
	c. Total normal cost	$ 4,258,771,946	$ 3,973,935,265
2.	Total actuarial accrued liability		
	a. Present value of benefits presently being paid	$ 86,996,160,679	$ 82,543,439,006
	b. Actuarial accrued liability for present active members (Item A5c)	81,092,967,606	78,083,152,933
	c. Present value of benefits for inactive members	$ 6,149,598,517	$ 5,826,332,565
	d. Total	$ 174,238,726,802	$ 166,452,924,504
3.	Current actuarial assets	138,786,120,728	133,485,187,642
4.	Unfunded actuarial accrued liability (UAAL) (Item B2d - Item B3)	$ 35,452,606,074	$ 32,967,736,862
5.	Amount of State contribution available to fund unfunded actuarial accrued liability (Item A4c x Item A1)	$ 2,267,107,454	$ 2,127,620,376
6.	Years to fund unfunded actuarial accrued liability	33.6 years	33.3 years

Rate of Increase in Covered Payroll		
0.00%	Never	Never
2.00%	40.7	40.2
2.50%	33.6	33.3
3.00%	29.4	29.2
4.00%	24.4	24.3

7.	Actuarially Determined Employer Contribution Rate (ADEC) (Normal cost + 30-year amortization of UAAL)***	7.94%	7.92%

** The State contribution rate for FY2014 was set at 6.80% of pay. Beginning in fiscal year 2015, covered employers whose employees are not participating in Social Security will begin contributing 1.50% of pay. Combined it is expected that these contributions will be approximately 7.70% of total payroll.

*** Aggregate contribution rate from State and local employers.

GROWTH OF COVERED PAYROLL AND ACTIVE MEMBERS

Year Ending August 31,	Total Annualized Salaries		Active Members			Average Salary		
	Amount in $ Millions	Percent Increase	Number	Percent Increase	Compound Increase Between Year Indicated and 08-31-2016	Average Salary	Percent Increase	Compound Increase Between Year Indicated and 08-31-2016
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1996	15,983	7.4%	652,197	4.2%	1.3%	24,506	3.0%	3.2%
1997	17,044	6.6%	678,749	4.1%	1.2%	25,112	2.5%	3.3%
1998	18,325	7.5%	705,447	3.9%	1.0%	25,977	3.4%	3.3%
1999	19,529	6.6%	736,058	4.3%	0.8%	26,533	2.1%	3.3%
2000	21,920	12.2%	766,906	4.2%	0.6%	28,583	7.7%	3.1%
2001	23,365	6.6%	797,339	4.0%	0.4%	29,303	2.5%	3.1%
2002	24,818	6.2%	745,923	(6.4%)	0.9%	33,272	13.5%	2.4%
2003	25,756	3.8%	754,715	1.2%	0.9%	34,127	2.6%	2.4%
2004	25,485	(1.1%)	729,411	(3.4%)	1.3%	34,939	2.4%	2.4%
2005	25,957	1.9%	715,495	(1.9%)	1.6%	36,278	3.8%	2.3%
2006	28,397	9.4%	761,658	6.5%	1.1%	37,284	2.8%	2.2%
2007	31,114	9.6%	777,789	2.1%	1.0%	40,003	7.3%	1.6%
2008	33,238	6.8%	801,455	3.0%	0.7%	41,472	3.7%	1.4%
2009	35,097	5.6%	817,537	2.0%	0.5%	42,930	3.5%	1.1%
2010	36,629	4.4%	834,060	2.0%	0.3%	43,916	2.3%	0.9%
2011	36,797	0.5%	828,919	(0.6%)	0.4%	44,392	1.1%	0.9%
2012	36,310	(1.3%)	815,155	(1.7%)	1.0%	44,543	0.3%	1.0%
2013	37,104	2.2%	831,302	2.0%	0.7%	44,634	0.2%	1.3%
2014	39,195	5.6%	857,342	3.1%	(0.6%)	45,717	2.4%	0.7%
2015	37,122	(5.3%)	828,851	(3.3%)	2.3%	44,787	(2.0%)	3.5%
2016	39,281	5.8%	847,631	2.3%	--	46,343	3.5%	--

Note: Beginning August 31, 2002, the definition of active member was changed.
　　　Beginning August 31, 2005, the method of determining new entrant errors was changed.
　　　Beginning August 31, 2015, the definition of active member was changed.

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RELATIVE SIZE OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

Year Ending August 31,	Unfunded Actuarial Accrued Liability in $ Millions	Relative to Projected Payroll		Relative to Actuarial Value of Assets		Relative to Total Actuarial Liabilities (Present Value of Future Benefits)	
		Projected Payroll In $ Millions	Percent of Projected Payroll	Assets in $ Millions	Percent of Assets	Actuarial Liabilities in $ Millions	Percent of Actuarial Liabilities
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1969	$ 1,312	$ 1,299	101.0%	$ 1,364	96.2%	$ 3,960	33.1%
1970	1,444	1,528	94.5%	1,534	94.1%	4,384	32.9%
1971	1,632	1,758	92.8%	1,726	94.6%	5,100	32.0%
1972	1,720	1,904	90.5%	1,937	88.8%	5,551	31.0%
1973	1,633	2,079	78.5%	2,171	75.2%	5,733	28.5%
1974	1,739	2,246	77.4%	2,394	72.6%	6,207	28.0%
1975	1,998	2,583	77.4%	2,764	72.3%	7,143	28.0%
1976	2,445	2,875	85.0%	3,103	78.8%	8,067	30.3%
1977	2,879	3,246	88.7%	3,531	81.5%	9,626	29.9%
1978	2,422	3,636	66.6%	4,016	60.3%	9,858	24.6%
1979	3,322	3,928	84.6%	4,529	73.3%	12,336	26.9%
1980	2,785	4,378	63.6%	5,342	52.1%	12,181	22.9%
1981	3,300	4,970	66.4%	6,386	51.7%	13,890	23.8%
1982	3,864	5,616	68.8%	7,373	52.4%	16,135	23.9%
1983	4,549	6,378	71.3%	8,586	53.0%	20,277	22.4%
1984	4,849	6,652	72.9%	9,851	49.2%	22,456	21.6%
1985	6,474	7,547	85.8%	12,096	53.5%	29,618	21.9%
1986	5,365	8,237	65.1%	14,939	35.9%	32,273	16.6%
1987	4,096	8,646	47.4%	18,055	22.7%	34,801	11.8%
1988	3,890	9,166	42.4%	20,096	19.4%	37,332	10.4%
1989	3,489	9,764	35.7%	23,302	15.0%	41,084	8.5%
1990	3,343	10,446	32.0%	26,111	12.8%	45,685	7.3%
1991	3,429	11,181	30.7%	28,860	11.9%	49,515	6.9%
1992	3,441	11,959	28.8%	31,201	11.0%	53,123	6.5%

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RELATIVE SIZE OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

Year Ending August 31,	Unfunded Actuarial Accrued Liability in $ Millions	Relative to Projected Payroll		Relative to Actuarial Value of Assets		Relative to Total Actuarial Liabilities (Present Value of Future Benefits)	
		Projected Payroll In $ Millions	Percent of Projected Payroll	Assets in $ Millions	Percent of Assets	Actuarial Liabilities in $ Millions	Percent of Actuarial Liabilities
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1993	$ 3,440	$ 13,391	25.7%	$ 35,179	9.8%	$ 59,210	5.8%
1994	825	14,167	5.8%	38,843	2.1%	58,351	1.4%
1995	1,956	14,888	13.1%	43,442	4.5%	65,259	3.0%
1996	1,813	15,983	11.3%	47,487	3.8%	68,948	2.6%
1997	146	17,044	0.9%	53,760	0.3%	74,677	0.2%
1998	(2,463)	18,325	(13.4%)	60,357	(4.1%)	79,603	(3.1%)
1999	(2,190)	19,529	(11.2%)	69,435	(3.2%)	91,563	(2.4%)
2000	(5,446)	21,920	(24.8%)	79,328	(6.9%)	100,414	(5.4%)
2001	(2,135)	23,365	(9.1%)	86,352	(2.5%)	113,663	(1.9%)
2002	3,287	24,818	13.2%	86,035	3.8%	118,100	2.8%
2003	5,230	25,756	20.3%	89,033	5.9%	123,677	4.2%
2004	7,953	25,485	31.2%	88,784	9.0%	121,267	6.6%
2005	13,196	25,957	50.8%	89,299	14.8%	124,556	10.6%
2006	13,694	28,397	48.2%	94,218	14.5%	131,906	10.4%
2007	12,545	31,114	40.3%	103,419	12.1%	142,190	8.8%
2008	11,523	33,238	34.7%	110,233	10.5%	150,999	7.6%
2009	21,646	35,097	61.7%	106,384	20.3%	158,899	13.6%
2010	22,899	36,629	62.5%	111,293	20.6%	166,445	13.8%
2011	24,062	36,797	65.4%	115,253	20.9%	173,204	13.9%
2012	26,101	36,310	73.6%	118,326	22.1%	177,901	14.7%
2013	28,936	37,104	79.3%	121,730	23.8%	184,332	15.7%
2014	31,638	38,522	82.1%	128,398	24.6%	195,893	16.2%
2015	32,968	39,620	83.2%	133,485	24.7%	197,662	16.7%
2016	35,453	42,376	83.7%	138,786	25.5%	207,411	17.1%

CHANGE IN PLAN NET ASSETS

		Year Ending August 31, 2016	Year Ending August 31, 2015
		(1)	(2)
I.	Revenue for the Year		
A.	Contribution and fees		
1.	Member contributions	$ 2,943,669,320	$ 2,576,024,311
2.	State contributions - State of Texas	1,696,007,980	1,610,471,996
3.	State contributions - 415 Excess Plan	3,574,146	2,216,586
4.	State contributions - Employers	1,483,389,348	1,377,972,653
5.	State contributions - Legislative Appropriations	-	-
6.	Purchase of Service Credit-Refundable	18,818,999	23,508,475
7.	Purchase of Service Credit-Non-Refundable	18,570,535	26,580,631
8.	Total	$ 6,164,030,328	$ 5,616,774,652
B.	Income		
1.	Interest	$ -	$ 623,717,202
2.	Dividends	-	6,248,497,146
3.	Net appreciation in fair value of investments	9,338,243,204	(7,107,642,634)
4.	Income from Securities Lending	165,668,053	120,970,871
5.	Investment expenses	(310,630,697)	(298,301,685)
6.	Total	9,193,280,560	(412,759,100)
C.	Other Adjustments	$ 1,993,029	$ 3,733,133
D.	Total Revenue	$ 15,359,303,917	$ 5,207,748,685
II.	Expenditures for the Year		
A.	Refund of Contributions	$ 462,273,069	$ 475,400,534
B.	Benefit Payments		
1.	Service retirements	$ 8,633,505,859	$ 8,215,765,876
2.	DROP payments	5,166,851	9,643,121
3.	Partial Lump Sum Option payments	300,420,702	288,923,266
4.	415 Excess Plan payments	3,574,146	2,216,586
5.	Disability retirements	173,464,936	169,318,064
6.	Death and survivor benefits	266,564,383	251,461,132
7.	Total benefits	$ 9,382,696,877	$ 8,937,328,045
C.	Expenses		
1.	Gross expenses		
	a. Administrative expenses	$ 44,402,710	$ 35,556,979
2.	Miscellaneous reimbursements	-	-
3.	Total expenses	44,402,710	35,556,979
D.	Total Expenditures	$ 9,889,372,656	$ 9,448,285,558
III.	Net Increase in Plan Net Assets (Item I.D. - Item II.D.)	$ 5,469,931,261	$ (4,240,536,873)

ESTIMATION OF YIELDS

Item	Year Ending August 31, 2016	Year Ending August 31, 2015
(1)	(2)	(3)
A. Market value yield		
1. Beginning of year net market assets	$ 128,538,706,212	$ 132,779,243,085
2. Investment income (net of investment expenses)	9,195,273,589	(444,582,946)
3. End of year market assets	134,008,637,473	128,538,706,212
4. Estimated market value yield	7.3%	-0.3%
B. Actuarial value yield		
1. Beginning of year actuarial assets	$ 133,485,187,642	$ 128,397,777,855
2. Investment income	9,026,275,414	8,883,363,714
3. End of year actuarial assets	138,786,120,728	133,485,187,642
4. Estimated actuarial value yield	6.9%	7.0%

GAIN OR LOSS FOR THE YEAR

Item	Year Ending August 31, 2016	Year Ending August 31, 2015
(1)	(2)	(3)
A. CALCULATION OF TOTAL GAIN OR LOSS		
1. Unfunded actuarial accrued liability (UAAL),		
a. Previous year, before Assumption changes	$ 32,967,736,862	$ 31,637,822,971
b. Previous year, after Assumption changes	32,967,736,862	31,637,822,971
2. Normal cost for the year	4,133,425,989	4,060,228,444
3. Contributions for the year	(6,164,030,328)	(5,616,774,652)
4. Interest at 8%		
a. On UAAL	$ 2,637,418,949	$ 2,531,025,838
b. On normal cost	165,337,040	162,409,138
c. On contributions	(246,561,213)	(224,670,986)
d. Total	$ 2,556,194,776	$ 2,468,763,990
5. Expected UAAL (Sum of Items A1 through A4)	33,493,327,299	32,550,040,753
6. Actual UAAL	35,452,606,074	32,967,736,862
7. Gain (loss) for the year (Item A5 - Item A6)	$ (1,959,278,775)	$ (417,696,109)
B. SOURCE OF GAINS AND LOSSES		
1. Asset gain (loss) for the year (Table 4)	$ (1,503,525,904)	$ (1,236,620,358)
2. Asset gain (loss) as a % of actuarial assets	(1.08%)	(0.93%)
3. Total actuarial accrued liability gain (loss) for year (Item A7 - Item B1)	(455,752,871)	818,924,249
4. Analysis of actuarial accrued liability gain/(loss)		
a. Assumption/Legislative changes	0	(682,140,204)
b. Liability experience	(455,752,871)	1,501,064,453
c. Total	$ (455,752,871)	$ 818,924,249
5. Experience liability gain (loss) as % of total actuarial accrued liability (Item B4b as % of total actuarial accrued liability)	(0.26%)	0.90%

ANALYSIS OF CHANGE IN FUNDING PERIOD

Basis	UAAL ($ Millions)	Normal Cost Rate	Total Contribution Rate	Funding Period	Change in Funding Period
(1)	(2)	(3)	(4)	(5)	(6)
1. 2015 Valuation	32,968	10.03%	15.40%	33.3	-
2. Restated 2015 Valuation with Legislative changes (if applicable)	32,968	10.03%	15.40%	33.3	-
3. Expected 2016 UAAL using ultimate contribution levels	33,392	10.03%	15.40%	31.8	(1.5)
4. Expected 2016 UAAL using actual contributions	33,493	10.03%	15.40%	32.0	0.2
5. 2016 UAAL using expected assets and actual liabilities	33,949	10.05%	15.40%	33.5	1.5
6. 2016 UAAL recognizing past deferred asset gains/(losses)	35,186	10.05%	15.40%	37.2	3.7
7. 2016 UAAL using actual assets and liabilities, expected payroll	35,453	10.05%	15.40%	38.1	0.9
8. 2016 UAAL using actual payroll	35,453	10.05%	15.40%	33.6	(4.5)

3. The funding period for this entry uses the expected UAAL and expected payroll. The expected payroll is the prior year's valuation payroll, rolled forward at the 2.5% payroll growth rate.

4. This entry uses actual contributions based on actual payroll during FY2016

5. This entry uses expected assets and payroll growth, while incorporating the actual liabilities as of August 31, 2016

6. This entry recognizes deferred investment gains/(losses) as of August 31, 2015 from prior valuations.

7. This entry includes the current year investment results.

8. This entry incorporates known assets, liabilities, and payroll growth. The overall payroll growth does not affect the liabilities of the plan, but instead affects the calculation of the ARC because the payroll is the denominator in the calculation of the amortization payment. Higher than expected payroll growth leads to a decrease in the required amortization payment as a percentage of payroll

GRS

Near Term Outlook

Valuation as of August 31, (1)	Unfunded Actuarial Accrued Liability (UAAL, in Millions) (2)	Funded Ratio (3)	Funding Period (4)	Actuarial Value of Assets (AVA, in Millions) (5)	For Fiscal year Ending August 31, (6)	Projected Payroll for Contributions (in Millions) (7)	Employer Contributions (in Millions) (8)	Employee Contributions (in Millions) (9)	Benefit Payments and Refunds for Following FY (10)	External Cash Flow (11)
2016	$ 35,452	79.7%	33.6	$ 138,786	2017	$ 42,376	$ 3,263	$ 3,263	$ 10,297	$ (3,771)
2017	36,045	80.0%	32.5	143,903	2018	43,464	3,347	3,347	10,769	(4,076)
2018	36,569	80.5%	31.2	151,296	2019	44,719	3,443	3,443	11,263	(4,377)
2019	37,061	81.1%	30.1	158,866	2020	45,999	3,542	3,542	11,780	(4,696)
2020	37,517	81.6%	28.8	166,622	2021	47,321	3,644	3,644	12,321	(5,033)
2021	37,929	82.2%	27.7	174,581	2022	48,681	3,748	3,748	12,886	(5,389)
2022	38,292	82.7%	26.5	182,768	2023	50,078	3,856	3,856	13,477	(5,765)
2023	38,600	83.2%	25.4	191,204	2024	51,508	3,966	3,966	14,091	(6,159)
2024	38,848	83.7%	24.2	199,898	2025	52,971	4,079	4,079	14,727	(6,570)
2025	39,031	84.3%	23.1	208,853	2026	54,467	4,194	4,194	15,390	(7,002)
2026	39,140	84.8%	22.0	218,066	2027	55,995	4,312	4,312	16,082	(7,459)

Assumes statutory member and State contribution rates

Assumes 8.00% investment return on actuarial value of assets each year

Assumes all other assumptions exactly met

GRS

HISTORY OF RISK METRICS

Valuation As of August 31,	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Annual Projected Payroll	AVA as % of Projected Payroll (2) / (4)	AAL as % of Projected Payroll (3) / (4)	Change in ADEC if Assets Decrease 10%	Funded Ratio	Change in Funded Ratio if Assets Decrease 10%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)
2016	138,786	174,239	42,376	328%	411%	2.2%	79.7%	8.0%
2015	133,485	166,453	39,620	337%	420%	2.3%	80.2%	8.0%
2014	128,398	160,036	39,195	328%	408%	2.0%	80.2%	8.0%
2013	121,730	150,666	37,104	328%	406%	2.0%	80.8%	8.1%
2012	118,326	144,427	36,310	326%	398%	2.0%	81.9%	8.2%
2011	115,253	139,315	36,797	313%	379%	1.9%	82.7%	8.3%
2010	111,293	134,191	36,629	304%	366%	1.8%	82.9%	8.3%
2009	106,384	128,029	35,097	303%	365%	1.8%	83.1%	8.3%
2008	110,233	121,757	33,238	332%	366%	2.0%	90.5%	9.1%
2007	103,419	115,964	31,114	332%	373%	2.0%	89.2%	8.9%
2006	94,218	107,911	28,397	332%	380%	2.0%	87.3%	8.7%
2005	89,299	102,495	25,957	344%	395%	2.1%	87.1%	8.7%
2004	88,784	96,737	25,485	348%	380%	2.1%	91.8%	9.2%
2003	89,033	94,263	25,756	346%	366%	2.1%	94.5%	9.4%
2002	86,035	89,322	24,818	347%	360%	2.1%	96.3%	9.6%
2001	86,352	84,217	23,365	370%	360%	2.2%	102.5%	10.3%
2000	79,328	73,882	21,920	362%	337%	2.2%	107.4%	10.7%
1999	69,435	67,245	19,529	356%	344%	2.1%	103.3%	10.3%
1998	60,357	57,893	18,325	329%	316%	2.0%	104.3%	10.4%
1997	53,760	53,906	17,044	315%	316%	1.9%	99.7%	10.0%

HISTORY OF CASH FLOW

Year Ending August 31,	Contributions for the Year[1]	Expenditures During the Year		Transfer to Employees Retirement System			External Cash Flow for the Year[2]	Market Value of Assets	External Cash Flow as Percent of Market Value
		Benefit Payments	Refund of Contributions		Expenses[3]	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1991	$ 1,600,092,649	$ (1,185,833,198)	$ (133,870,775)	$ -	$ (21,115,074)	$ (1,340,819,047)	$ 259,273,602	$ 29,695,711,781	0.9%
1992	1,663,664,046	(1,361,265,788)	(130,032,827)	-	(22,150,155)	(1,513,448,770)	150,215,276	32,766,914,759	0.5%
1993	1,792,999,133	(1,446,714,384)	(122,114,590)	-	(25,779,705)	(1,594,608,679)	198,390,454	37,981,853,461	0.5%
1994	1,887,530,125	(1,604,046,513)	(133,227,183)	-	(25,975,865)	(1,763,249,561)	124,280,564	39,277,226,893	0.3%
1995	1,980,678,842	(1,731,747,042)	(146,099,978)	-	(25,896,749)	(1,903,743,769)	76,935,073	45,965,182,547	0.2%
1996	1,927,100,219	(2,105,423,164)	(162,257,383)	-	(25,457,726)	(2,293,138,273)	(366,038,054)	50,101,367,986	(0.7%)
1997	2,052,261,338	(2,217,173,754)	(166,125,695)	-	(24,468,347)	(2,407,767,796)	(355,506,458)	62,160,927,516	(0.6%)
1998	2,197,477,431	(2,503,386,682)	(183,430,398)	-	(26,803,767)	(2,713,620,847)	(516,143,416)	66,456,822,943	(0.8%)
1999	2,334,197,510	(2,639,947,187)	(206,354,473)	-	(29,146,859)	(2,875,448,519)	(541,251,009)	79,910,553,792	(0.7%)
2000	2,569,218,427	(3,360,116,181)	(214,999,991)	-	(31,133,307)	(3,606,249,479)	(1,037,031,052)	89,987,158,209	(1.2%)
2001	2,712,395,592	(3,667,711,511)	(214,434,792)	-	(32,641,273)	(3,914,787,576)	(1,202,391,984)	79,428,239,521	(1.5%)
2002	2,920,429,953	(4,366,038,505)	(186,421,065)	-	(37,518,541)	(4,589,978,111)	(1,669,548,158)	71,695,802,361	(2.3%)
2003	3,094,280,741	(4,753,849,401)	(186,082,670)	-	(38,030,992)	(4,977,963,063)	(1,883,682,322)	77,633,002,461	(2.4%)
2004	3,156,205,813	(5,486,849,698)	(220,396,709)	-	(41,092,036)	(5,748,338,443)	(2,592,132,630)	84,202,981,707	(3.1%)
2005	3,208,090,642	(5,387,605,428)	(243,382,014)	-	(42,488,318)	(5,673,475,760)	(2,465,385,118)	93,707,816,093	(2.6%)
2006	3,454,514,897	(5,582,306,639)	(265,487,479)	-	(45,543,800)	(5,893,337,918)	(2,438,823,021)	100,238,963,187	(2.4%)
2007	3,703,755,952	(5,807,036,778)	(277,932,219)	-	(48,444,678)	(6,133,413,675)	(2,429,657,723)	112,128,799,849	(2.2%)
2008	4,142,958,389	(6,454,687,449)	(275,482,331)	-	(55,452,812)	(6,785,622,592)	(2,642,664,203)	104,910,497,545	(2.5%)
2009	4,352,908,188	(6,343,563,704)	(266,695,076)	-	(97,300,965)	(6,707,559,745)	(2,354,651,557)	88,652,971,682	(2.7%)
2010	4,587,520,751	(6,669,304,862)	(265,186,589)	-	(141,911,262)	(7,076,402,713)	(2,488,881,962)	95,688,405,009	(2.6%)
2011	4,704,016,139	(7,175,255,376)	(399,040,901)	-	(275,521,878)	(7,849,818,155)	(3,145,802,016)	107,420,786,893	(2.9%)
2012	4,391,331,052	(7,726,105,535)	(452,217,315)	-	(249,825,059)	(8,428,147,909)	(4,036,816,857)	111,449,887,034	(3.6%)
2013	4,682,290,371	(8,077,729,314)	(466,805,558)	-	(282,545,932)	(8,827,080,804)	(4,144,790,433)	117,388,143,859	(3.5%)
2014	5,036,110,456	(8,550,916,357)	(490,764,166)	-	(292,157,107)	(9,333,837,630)	(4,297,727,174)	132,779,243,085	(3.2%)
2015	5,616,774,652	(8,937,328,045)	(475,400,534)	-	(333,858,664)	(9,746,587,243)	(4,129,812,591)	128,538,706,212	(3.2%)
2016	6,164,030,328	(9,382,696,877)	(462,273,069)	-	(355,033,407)	(10,200,003,353)	(4,035,973,025)	134,008,637,473	(3.0%)

[1] Column (2) includes employee and employer contributions, as well as any service purchase or account reinstatement receipts during the year

[2] Column (8) = Column (2) - Column (7)

[3] Column (6) includes both administrative and investment expenses

HISTORY OF CONTRIBUTION RATES

Fiscal Year	Actuarially Determined Employer Contribution Rate	Aggregate Employer Contribution Rate	Percentage Contributed	Member Contribution Rate	Total Contribution Rate (3) + (5)
(1)	(2)	(3)	(4)	(5)	(6)
1977/78		7.500%		6.650%	14.150%
1978/79		7.500%		6.650%	14.150%
1979/80		8.500%		6.650%	15.150%
1980/81		8.500%		6.650%	15.150%
1981/82		8.500%		6.650%	15.150%
1982/83		8.500%		6.650%	15.150%
1983/84		7.100%		6.000%	13.100%
1984/85		7.100%		6.000%	13.100%
1985/86		8.000%		6.400%	14.400%
1986/87		8.000%		6.400%	14.400%
1987/88		7.200%		6.400%	13.600%
1988/89		7.200%		6.400%	13.600%
1989/90		7.650%		6.400%	14.050%
1990/91		7.650%		6.400%	14.050%
1991/92		7.310%		6.400%	13.710%
1992/93		7.310%		6.400%	13.710%
1993/94		7.310%		6.400%	13.710%
1994/95		7.310%		6.400%	13.710%
1995/96		6.000%		6.400%	12.400%
1996/97	6.00%	6.000%	100%	6.400%	12.400%
1997/98	6.00%	6.000%	100%	6.400%	12.400%
1998/99	4.12%	6.000%	146%	6.400%	12.400%
1999/00	4.92%	6.000%	122%	6.400%	12.400%
2000/01	4.12%	6.000%	146%	6.400%	12.400%
2001/02	5.70%	6.000%	105%	6.400%	12.400%
2002/03	7.15%	6.000%	84%	6.400%	12.400%
2003/04	7.39%	6.000%	81%	6.400%	12.400%
2004/05	7.31%	6.000%	82%	6.400%	12.400%
2005/06	7.19%	6.000%	83%	6.400%	12.400%
2006/07	7.02%	6.000%	85%	6.400%	12.400%
2007/08	6.47%	6.580%	102%	6.400%	12.980%
2008/09	6.10%	6.580%	108%	6.400%	12.980%
2009/10	7.72%	6.644%	86%	6.400%	13.044%
2010/11	7.77%	6.644%	86%	6.400%	13.044%
2011/12	8.13%	6.000%	74%	6.400%	12.400%
2012/13	8.62%	6.400%	74%	6.400%	12.800%
2013/14	8.67%	6.800%	78%	6.400%	13.200%
2014/15	8.25%	7.700%	93%	6.700%	14.400%
2015/16	7.92%	7.700%	97%	7.200%	14.900%
2016/17	7.94%	7.700%	97%	7.700%	15.400%

Note: Aggregate employer contribution rate and total contribution rate for fiscal year 2016/2017 is estimated

SCHEDULE OF FUNDING PROGRESS

Valuation As of August 31, (1)	Actuarial Value of Assets (2)	Actuarial Accrued Liability (AAL) (3)	Unfunded AAL (UAAL) (3) - (2) (4)	Funding Ratio Assets as % of AAL (2) / (3) (5)	Projected Payroll (6)	UAAL as a % of Projected Payroll (4) / (6) (7)
2016	138,786	174,239	35,453	79.7%	42,376	83.7%
2015	133,485	166,453	32,968	80.2%	39,620	83.2%
2014	128,398	160,036	31,638	80.2%	38,522	82.1%
2013	121,730	150,666	28,936	80.8%	37,104	78.0%
2012	118,326	144,427	26,101	81.9%	36,310	71.9%
2011	115,253	139,315	24,062	82.7%	36,797	65.4%
2010	111,293	134,191	22,899	82.9%	36,629	62.5%
2009	106,384	128,029	21,646	83.1%	35,097	61.7%
2008	110,233	121,757	11,523	90.5%	33,238	34.7%
2007	103,419	115,964	12,545	89.2%	31,114	40.3%
2006	94,218	107,911	13,694	87.3%	28,397	48.2%
2005	89,299	102,495	13,196	87.1%	25,957	50.8%
2004	88,784	96,737	7,953	91.8%	25,485	31.2%
2003	89,033	94,263	5,230	94.5%	25,756	20.3%
2002	86,035	89,322	3,287	96.3%	24,818	13.2%
2001	86,352	84,217	(2,135)	102.5%	23,365	(9.1%)
2000	79,328	73,882	(5,446)	107.4%	21,920	(24.8%)
1999	69,435	67,245	(2,190)	103.3%	19,529	(11.2%)
1998	60,357	57,893	(2,463)	104.3%	18,325	(13.4%)
1997	53,760	53,906	146	99.7%	17,044	0.9%
1996	47,487	49,300	1,813	96.3%	15,983	11.3%
1995	43,442	45,398	1,956	95.7%	14,888	13.1%
1994	38,843	39,668	825	97.9%	14,167	5.8%
1993	35,179	38,619	3,440	91.1%	13,391	25.7%
1992	31,201	34,643	3,441	90.1%	11,959	28.8%
1991	28,860	32,289	3,429	89.4%	11,181	30.7%

STATISTICAL INFORMATION

	August 31,		
	2016	2015	2014
	(1)	(2)	(3)
A. Number			
1. Active Members			
a. Total active members	847,631	828,851	857,342
b. Average age	44.5	44.6	44.5
c. Average service	10.2	10.3	9.9
2. Inactive Vested Members			
a. Male members	19,435	18,613	18,128
b. Female members	75,643	72,655	63,995
c. Total inactive vested members	95,078	91,268	82,123
3. Inactive Nonvested Members	167,275	161,292	111,960
B. Annualized Salaries			
1. Active members			
a. Total active members	$ 39,281,469,186	$ 37,121,560,597	$ 39,195,084,110
b. Average annual salary	46,343	44,787	45,717
C. Accumulated Members Contributions			
1. Total Active Members	31,073,306,648	30,257,739,873	30,037,789,687
2. Inactive Vested Members			
a. Male members	$ 646,221,791	$ 612,399,314	$ 693,051,568
b. Female members	2,515,161,045	2,390,472,904	2,055,071,435
c. Total inactive vested members	$ 3,161,382,836	$ 3,002,872,218	$ 2,748,123,003
3. Inactive Nonvested Members	$ 413,997,543	$ 400,439,304	$ 371,647,155
D. Active Members in DROP (not included in above totals)			
1. Number	42	94	122
2. DROP Balance	$ 3,921,984	$ 9,090,375	$ 11,884,433

STATISTICAL INFORMATION

	August 31,		
	2016	2015	2014
	(1)	(2)	(3)
E. Persons Receiving Benefits			
1. Number			
a. Life annuities	368,720	353,459	339,556
b. Annuities certain	2,041	1,925	1,746
c. Disability annuities - less than 10 years of service	209	219	240
d. Disability annuities - 10 or more years of service	9,441	9,276	9,173
e. Incomplete data records	0	0	0
f. Survivor annuities			
1) Currently in pay	12,579	11,957	11,529
2) Deferred	924	902	938
3) Total	13,503	12,859	12,467
g. Total persons receiving benefits	393,914	377,738	363,182
2. Annual Annuities			
a. Life annuities *	$ 9,005,480,125	$ 8,534,558,536	$ 8,128,042,004
b. Annuities certain *	27,184,510	24,834,549	22,655,673
c. Disability annuities - less than 10 years of service	376,200	394,200	432,000
d. Disability annuities - 10 or more years of service	139,506,557	136,493,481	133,984,126
e. Survivor annuities			
1) Currently in pay	37,855,026	35,971,176	34,644,926
2) Deferred	2,762,960	2,697,800	2,721,700
3) Total	40,617,986	38,668,976	37,366,626
f. Total persons receiving benefits	$ 9,213,165,378	$ 8,734,949,742	$ 8,322,480,429
g. Average monthly annuities			
1) Life annuities *	$ 2,035	$ 2,012	$ 1,995
2) Annuities certain *	1,110	1,075	1,081
3) Disability annuities - 10 or more years of service	1,231	1,226	1,217
h. DROP Lump Sum payments during year	$ 5,166,851	$ 9,643,121	$ 14,974,505
i. Partial Lump Sum Option payments during year	$ 300,420,702	$ 288,923,266	$ 322,033,388

* Annual and average life annuity amounts represent values after Partial Lump Sum Option Elections.

STATEMENT OF PLAN NET ASSETS

		August 31, 2016	August 31, 2015
		(1)	(2)
A.	ASSETS		
	1. Current Assets		
	a. Cash and short term investments		
	1) Cash on hand and State Treasury	$ 458,335,305	$ 1,369,036,151
	2) Short term investments	3,227,475,810	3,373,618,577
	b. Accounts Receivable		
	1) Member contributions	11,379,634	27,510,368
	2) School districts	272,842,305	204,844,527
	3) Employees Retirement System	1,812,677	1,711,632
	4) State	58,916,173	128,204,905
	5) Sale of investments	943,213,488	1,364,937,789
	6) Interest and dividends	218,746,465	214,892,040
	7) Other	306,790	281,662
	c. Prepaid assets	69,608	66,819
	d. Total current assets	5,193,098,255	6,685,104,470
	2. Long Term Investments		
	a. Fixed income	$ 20,483,627,614	$ 21,563,259,009
	b. Alternative assets	52,161,932,462	48,251,848,136
	c. Equities	47,785,677,843	47,167,558,671
	d. Pooled investments	9,103,753,601	6,686,145,072
	e. Invested securities lending collateral	18,128,072,568	19,372,421,460
	f. Total long term investments	$ 147,663,064,088	$ 143,041,232,348
	3. Other Assets		
	a Non-depreciable assets	$ 46,086,073	$ 28,106,500
	b. Building and equipment after depreciation	23,398,980	25,618,506
	c. Deferred assets	0	0
	d. Total other assets	$ 69,485,053	$ 53,725,006
	4. Total Assets	$ 152,925,647,396	$ 149,780,061,824
B.	LIABILITIES		
	1. Current Liabilities		
	a. Accounts payable	$ 30,420,953	$ 33,427,181
	b. Benefits payable	138,541,977	760,271,035
	c. Due to Employees Retirement System	7,706,962	7,065,544
	d. Due to State's General Revenue Fund	0	0
	e. Investments purchased payable	615,627,310	1,053,105,752
	f. Other Liabilties	64,299	0
	g. Securities lending collateral	18,116,023,297	19,379,483,580
	h. Total current liabilities	$ 18,908,384,798	$ 21,233,353,092
	2. Deferred Credits	8,625,125	8,002,520
	3. Total Liabilities and Deferred credits	18,917,009,923	21,241,355,612
C.	NET ASSETS HELD IN TRUST	$ 134,008,637,473	$ 128,538,706,212
D.	ASSET ALLOCATION FOR CASH & LONG TERM INVESTMENTS		
	1. Cash	2.4%	3.2%
	2. Fixed Income	13.5%	14.6%
	3. Alternative Assets	34.5%	32.7%
	4. Equities	31.6%	31.9%
	5. Pooled investments	6.0%	4.5%
	6. Invested securities lending collateral	12.0%	13.1%
	7. Total	100.0%	100.0%

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DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND BY YEARS OF SERVICE
AS OF 08/31/2016

Years of Credited Service

Attained Age	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	Total
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.
Under 25	5	11,952	4,757	1,327	439	126							18,606
	$3,606	$26,991	$30,824	$24,478	$22,962	$25,381							$27,680
25-29	2	20,764	19,077	16,458	11,267	11,792	151						79,511
	$10,553	$32,718	$40,788	$43,715	$45,390	$45,992	$35,416						$40,699
30-34	3	14,456	12,711	11,457	9,876	42,497	10,829	185					102,014
	$8,955	$32,364	$39,502	$42,410	$45,305	$50,102	$51,607	$40,584					$45,081
35-39	3	11,856	10,144	8,752	7,299	29,556	34,564	8,049	93				110,316
	$6,230	$31,332	$38,508	$41,442	$43,842	$48,863	$55,058	$56,738	$49,560				$47,621
40-44	5	9,699	8,626	7,349	6,312	24,324	25,088	26,337	5,567	80			113,387
	$9,804	$30,593	$37,375	$39,670	$42,232	$46,770	$53,009	$59,616	$61,911	$49,423			$49,067
45-49	2	8,237	7,417	6,504	5,498	23,112	23,156	20,743	20,226	5,181	93		120,169
	$3,875	$29,294	$36,304	$37,952	$40,331	$43,749	$49,716	$55,180	$63,823	$64,224	$51,730		$49,218
50-54	2	6,505	5,646	5,142	4,368	18,462	20,414	18,487	14,333	14,270	3,739	95	111,463
	$20,587	$28,114	$34,737	$36,237	$37,310	$41,045	$45,803	$49,202	$56,928	$65,595	$66,484	$58,898	$47,881
55-59	2	4,935	4,300	3,886	3,319	14,198	16,536	17,426	14,043	8,636	7,055	2,024	96,360
	$10,015	$27,293	$33,485	$36,275	$36,182	$40,442	$44,852	$47,115	$52,342	$60,081	$69,459	$70,856	$47,364
60-64		2,662	2,510	2,398	2,173	9,114	11,053	11,823	8,594	5,933	3,016	3,037	62,313
		$26,546	$33,290	$34,015	$35,249	$39,952	$44,406	$47,050	$50,539	$55,740	$63,744	$74,269	$46,643
65 +		1,750	1,577	1,465	1,460	5,807	6,185	5,083	3,831	2,993	1,715	1,626	33,492
		$20,639	$25,058	$27,989	$28,189	$34,438	$41,475	$44,418	$48,137	$52,859	$55,669	$70,512	$41,587
Total	24	92,816	76,765	64,738	52,011	178,988	147,976	108,133	66,687	37,093	15,618	6,782	847,631
	$7,693	$26,731	$35,507	$39,487	$41,683	$45,593	$49,821	$52,635	$57,131	$61,481	$66,023	$72,135	$46,343

Note: Table includes contributing members but excludes members in DROP.

DISTRIBUTION OF LIFE ANNUITIES BY AGE

Age	Number	Annual Annuities	Monthly Average Annuity
(1)	(2)	(3)	(4)
Up to 35	462	$ 6,272,323	$ 1,131
35-40	354	5,357,454	1,261
40-44	487	7,386,135	1,264
45-49	764	10,773,620	1,175
50-54	5,320	181,574,050	2,844
55-59	26,241	878,951,090	2,791
60-64	62,300	1,813,288,224	2,425
65-69	93,294	2,316,010,595	2,069
70-74	70,344	1,546,897,022	1,833
75-79	48,201	980,039,294	1,694
80-84	32,624	670,234,013	1,712
85-89	19,006	398,293,880	1,746
90-94	7,148	146,556,009	1,709
95-99	1,884	37,973,441	1,680
100 & up	291	5,872,975	1,682
TOTAL	368,720	$ 9,005,480,125	$ 2,035

DISTRIBUTION OF DISABLED ANNUITIES BY AGE

Age	Number	Annual Annuities	Monthly Average Annuity
(1)	(2)	(3)	(4)
Up to 35	1	$ 10,650	$ 888
35-40	29	327,477	941
40-44	136	1,827,487	1,120
45-49	375	6,115,962	1,359
50-54	920	15,955,303	1,445
55-59	1,585	24,456,779	1,286
60-64	1,888	26,850,931	1,185
65-69	1,649	21,969,860	1,110
70-74	1,024	12,839,352	1,045
75-79	696	10,092,723	1,208
80-84	613	10,017,303	1,362
85-89	379	6,826,123	1,501
90-94	118	1,829,965	1,292
95 -99	27	380,332	1,174
100 & up	1	6,310	0
TOTAL	9,441	$ 139,506,557	$ 1,231

RETIREES, BENEFICIARIES, AND DISABLED PARTICIPANTS ADDED TO AND REMOVED FROM ROLLS

Valuation August 31,	Added to Rolls		Removed from Rolls		Rolls-End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2001					188,882	$ 3,703,642,072		$ 19,608
2002	19,678	$ 426,133,328	7,119	$ 100,259,400	201,441	4,029,516,000	8.8%	20,003
2003	23,061	477,035,602	7,025	125,196,802	217,477	4,381,354,800	8.7%	20,146
2004	30,288	640,407,566	7,138	108,483,938	240,627	4,913,278,428	12.1%	20,419
2005	15,153	292,452,315	7,271	127,291,874	248,509	5,078,438,869	3.4%	20,436
2006	15,810	324,292,542	7,175	120,623,840	257,144	5,282,107,571	4.0%	20,541
2007	15,861	336,348,640	7,698	131,295,705	265,307	5,487,160,506	3.9%	20,682
2008	17,727	391,920,863	7,806	135,160,090	275,228	5,743,921,279	4.7%	20,870
2009	17,326	392,452,923	7,940	136,537,511	284,614	5,999,836,691	4.5%	21,081
2010	20,076	473,512,423	8,199	142,187,645	296,491	6,331,161,469	5.5%	21,354
2011	24,688	620,038,676	8,499	147,985,004	312,680	6,803,215,141	7.5%	21,758
2012	27,915	697,134,389	8,848	155,597,838	331,747	7,344,751,692	8.0%	22,140
2013	25,825	743,998,946	9,344	165,231,795	348,228	7,923,518,843	7.9%	22,754
2014	24,429	573,876,713	9,475	174,915,127	363,182	8,322,480,429	5.0%	22,915
2015	25,134	604,436,264	10,578	191,966,951	377,738	8,734,949,742	5.0%	23,124
2016	27,018	673,313,552	10,842	195,097,916	393,914	9,213,165,378	5.5%	23,389

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SUMMARY OF THE BENEFIT PROVISIONS OF THE RETIREMENT SYSTEM AS OF AUGUST 31, 2016

The Teacher Retirement System of Texas makes retirement, disability, and death and survivor benefits to all employees of the public school system of Texas. The major provisions of the System may be summarized as follows:

A.   RETIREMENT BENEFITS

1.   Grandfather Criteria:

To be grandfathered, you must have met at least one of the following requirements as a member on or before August 31, 2005: (i) at least 50 years old, or (ii) age and years of service credit equal at least 70, or (iii) have at least 25 years of service credit.

2.   Normal Retirement Date:

(a)   end of month following age 65 and 5 years of creditable service,

(b)   (i) For members hired before August 31, 2007: end of month following attainment of "Rule of 80"

(ii)   For members hired on or after August 31, 2007 and who are vested as of August 31, 2014: end of month following attainment of "Rule of 80" with minimum age of 60.

(iii)   For members who are not vested as of August 31, 2014: end of month following attainment of "Rule of 80" with minimum age of 62.

2.   Standard Annuity:

The product of 2.3% of the member's average compensation multiplied by years of creditable service. The average compensation is calculated as the average of the highest five annual salaries (based on creditable compensation). Members who as of August 31, 2005, were either age 50, had 25 years of service, or whose age plus service totaled 70 have their standard annuity calculated using the average of their highest three annual salaries.

3.   Normal Retirement Benefits:

Greater of standard annuity, or $150 per month.

4.   Early Retirement:

(a)   after age 55 with 5 or more years of creditable service, or

(b)   after 30 years of creditable service, regardless of age.

(c)   For members hired after August 31, 2007, end of month following attainment of "Rule of 80".

5.   Early Retirement Benefits:

(a)   If a member was hired prior to September 1, 2007, has more than 30 years of service but does not meet the Rule of 80, and has maintained continuous membership until retirement, the early retirement benefit is equal to the normal retirement benefit earned to the date of retirement, reduced by 2% for each point the member is less than age 50.

(b)   If a member is grandfathered the early retirement benefit is equal to the normal retirement benefit earned to the date of retirement, reduced according to the following table:

Years of Service	AGE AT DATE OF RETIREMENT					
	55	56	57	58	59	60
20	90%	92%	94%	96%	98%	100%
21	92%	94%	96%	98%	100%	100%
22	94%	96%	98%	100%	100%	100%
23	96%	98%	100%	100%	100%	100%
24	98%	100%	100%	100%	100%	100%
25	100%	100%	100%	100%	100%	100%
26	100%	100%	100%	100%	100%	100%
27	100%	100%	100%	100%	100%	100%
28	100%	100%	100%	100%	100%	100%
29	100%	100%	100%	100%	100%	100%
30 or more	100%	100%	100%	100%	100%	100%

(c)   If the member was hired after August 31, 2007 and is vested as of August 31, 2014 and the member has met the "Rule of 80" or has 30 years of service the benefit is reduced 5% per year from age 60.

(d)   If the member is not vested as of August 31, 2014 and the member has met the "Rule of 80" or has 30 years of service the benefit is reduced 5% per year from age 62.

(e)   If the member does not meet any of the conditions (a) – (d) above, the early retirement benefit is equal to the normal retirement benefit earned to the date of retirement, reduced according to the following table:

AGE AT DATE OF RETIREMENT

55	56	57	58	59	60	61	62	63	64	65
47%	51%	55%	59%	63%	67%	73%	80%	87%	93%	100%

6. Normal Form of Benefit:

Straight life annuity payable monthly with benefits commencing at end of month following retirement with the last payment payable on behalf of the annuitant in the month of death.

7. Optional Forms:

Option 1 - joint and 100% survivor, benefit reverts to normal form following the death of the joint annuitant.

Option 2 - joint and 50% contingent survivor, benefit reverts to normal form following the death of the joint annuitant.

Option 3 - 5 years certain and life.

Option 4 - 10 years certain and life.

Option 5 - Joint and 75% contingent survivor, benefit reverts to normal form following the death of the joint annuitant.

8. Deferred Retirement Option Plan (DROP):

(a).   Eligibility:

       1)   Must be an active contributing member.

       2)   Must be eligible for a standard service retirement annuity that is not reduced for retirement at an early age.

       3)   Must have at least 25 years of creditable service.

       4)   Must have entered the DROP program before January 1, 2006.

(b).   Program Summary:

1)   Participation begins the 1st of the month following the member's application and TRS approval of the application. Participation may begin in any month.

2)   Participation may range from a minimum of one year to a maximum of five years, in 12-month increments. The member elects the period of participation at the outset.

3)   The amount of the member's standard annuity is established as of the date of participation in the DROP. This amount is also used in determining the monthly deposit to the DROP account. A member will not accumulate further retirement annuity benefits during DROP participation, i.e., no further credit will be achieved from years of service or compensation changes.

4)   Any special service credit that a member wishes to purchase must be paid in full prior to DROP participation.

5)   A separate DROP account will be established for each participating member. Each month, an amount equal to 60 percent of the calculated standard annuity will be deposited into the account. At retirement, the account plus interest at the rate of five percent per annum will be distributed.

6)   Member and employer contributions continue during DROP participation. Contributions are not deposited into the member's DROP account and will not be refunded.

7)   Three events terminate participation - death, retirement or expiration of the participation period.

8)   Upon retirement, participating members will receive their retirement annuity plus the balance in their DROP account including interest. DROP balances may be paid by TRS in a lump sum or on a time payout selected by the member.

10.   Partial Lump-Sum Option Program:

Members, eligible for unreduced retirement and either (1) grandfathered or (2) meeting the Rule of 90, and not participating in the DROP program, may select a partial lump-sum distribution not to exceed an amount equal to 36 months of a standard service retirement annuity. When this option is selected, the member's annuity will be actuarially reduced to reflect that distribution and will be computed so that no actuarial loss results to TRS.

The percentage shown in the following table will be applied to reduce the standard annuity when the partial lump-sum option is elected.

Age	Percentage of Standard Annuity		
	12 Months	24 Months	36 Months
45	91.66	83.32	74.98
46	91.62	83.23	74.85
47	91.57	83.13	74.70
48	91.51	83.03	74.54
49	91.46	82.92	74.37
50	91.40	82.79	74.19
51	91.33	82.66	73.99
52	91.26	82.52	73.78
53	91.18	82.37	73.55
54	91.10	82.20	73.31
55	91.01	82.03	73.04
56	90.92	81.84	72.75
57	90.81	81.63	72.44
58	90.70	81.41	72.11
59	90.58	81.17	71.75
60	90.46	80.91	71.37
61	90.32	80.64	70.95
62	90.24	80.48	70.71
63	90.01	80.03	70.04
64	89.85	79.69	69.54
65	89.67	79.34	69.01
66	89.48	78.96	68.44
67	89.28	78.56	67.84
68	89.06	78.13	67.19
69	88.84	77.67	66.51
70	88.59	77.18	65.77
71	88.32	76.65	64.97
72	88.03	76.07	64.10
73	87.72	75.43	63.15
74	87.37	74.74	62.12
75	87.00	74.00	61.00
76	86.59	73.19	59.78
77	86.15	72.31	58.46
78	85.68	71.35	57.03
79	85.16	70.31	55.47
80	84.59	69.18	53.78
81	83.98	67.96	51.94
82	83.32	66.64	49.96
83	82.61	65.21	47.82
84	81.83	63.67	45.50
85	81.00	62.00	42.99
86	80.09	60.18	40.27
87	79.09	58.19	37.28
88	78.00	56.00	34.00
89	76.81	53.62	30.43
90	75.52	51.04	26.56
91	74.13	48.26	22.39

10. <u>Minimum Annuity Payments</u>:

Total annuity payments shall in no case be less than the member's accumulated contributions at retirement. Upon the death of a retiree, the excess, if any, of accumulated contributions over total annuity payments received prior to death will be paid to the beneficiary.

B. DISABILITY BENEFITS

1. <u>Less than 10 years of creditable service</u>: $150.00 per month for the shorter of:

    (a)   disability, or

    (b)   number of months of creditable service as of date of disability retirement.

2. <u>At least 10 years of creditable service</u>: the greater of accrued retirement income or $6.50 per month per year of creditable service, payable for duration of disability; disability presumed continuous if it continues past age 60. The minimum disability payment made on behalf of a member will be no less than $150.00 per month.

C. DEATH BENEFITS

1. <u>Eligibility</u>: applicable if death occurs:

    (a)   in service,

    (b)   while absent from service for good cause,

    (c)   while not in service but eligible to retire,

    (d)   while not in service but would be eligible to retire without additional service before April 15 of the sixth school year after last creditable year of service, or

    (e)   while receiving a disability benefit, but only eligible for 2f, below.

2. <u>Benefit</u>: any one of the following, at the option of the beneficiary:

    (a)   a lump sum (not to exceed $80,000) equal to two times the rate of pay for the last year of service,

    (b)   a lump sum (not to exceed $80,000) equal to two times annual pay for the year preceding last year of service,

    (c)   60 monthly payments of accrued standard annuity,

    (d)   a life annuity payable under Option 1 as if the member had retired on the last day of the month preceding death,

(e)   a refund of accumulated contributions, or

(f)   the survivor benefits, if eligible.

Note: Items (c) and (d) available only if member has at least 5 years of creditable service.

3.   <u>Benefit if Absent from Service Without Good Cause</u>: return of accumulated contributions.

D.   SURVIVOR BENEFITS

1.   <u>Benefits</u>: (a) or (b) at the election of the beneficiary:

(a)   lump sum payment of $10,000, or

(b)   lump sum payment of $2,500 plus one of the following, if the designated beneficiary is eligible:

    (i)   if a spouse or dependent parent, $250 per month commencing at age 65,

    (ii)   if a spouse with children under age 18, $350 per month until youngest child reaches 18, then $250 per month commencing at spouse's age 65, or

    (iii)   if dependent children, $350 per month as long as at least two dependent children under 18, reducing to $250 per month when there is only one child under 18.

If benefits are payable under (i) or (ii) above and eligible spouse or dependent dies, payments will revert in accordance with (iii) above.

2.   <u>Eligibility</u>:

(a)   all employees eligible for a death benefit other than refund of accumulated contributions,

(b)   any retired member, in addition to any benefit provided by his or her option of payment, or

(c)   any disabled participant, in lieu of other death benefits (Item C2).

E.   VESTING OF BENEFITS

1.   <u>Vesting</u>: a member is fully vested after 5 years of creditable service.

2.   <u>Benefits upon Vesting</u>: a fully vested member is entitled to the following:

(a)   upon becoming inactive, not required to withdraw accumulated contributions within seven years,

(b)   may apply at age 65 for normal retirement benefit equal to accrued standard annuity, or

(c)   may apply for any other retirement benefits for which he or she is eligible upon satisfying age requirement (if applicable) if he or she satisfied the corresponding service requirement at time of last termination; benefit is based on his or her full accrued standard annuity.

F.   MEMBER CONTRIBUTIONS

6.70% of compensation per year for fiscal year 2015, 7.20% for fiscal year 2016, and 7.70% for years on and after 2017.

G.   STATE CONTRIBUTIONS

State will contribute 6.80% of member compensation for FY2015, and each year thereafter. Beginning in fiscal year 2015, covered employers whose employees are not participating in Social Security will begin contributing 1.50% of pay (capped at the minimum salary schedule). Combined it is expected that these contributions will be approximately 7.70% of total payroll.

H.   LEGISLATIVE CHANGES MADE BY THE 1991 STATE LEGISLATURE

1.   The minimum retirement benefit increased from $75 to $100 per month.

2.   The disability death benefit changed to the same as a service retirement death benefit.

3.   An ad hoc cost of living increase was approved for members who retired prior to May 1, 1989. The increase does not apply to a survivor benefit or to a disability benefit for a member who had less than 10 years of service at the time of retirement or death. The amount of the increase is five-tenths of one percent of each full six-month period between the latest effective date of retirement (or date of death) and August 1, 1991. The increase begins August 1991.

I. LEGISLATIVE CHANGES MADE BY THE 1993 STATE LEGISLATURE

1. Increase in survivor benefit by $50 per month.

2. Retroactive minimum benefit of $6.50 per year of service for members retired as of November 1, 1991.

3. An ad hoc cost of living increase approximating a 25% CPI catch-up. The actual percentage increase varies by year of retirement and has a minimum increase of 5%. The increase begins with the January, 1994 annuity check and covers all benefit recipients who began receiving benefits before August 31, 1991, except that it does not apply to survivor benefits or to a disability benefit for a member who had less than 10 years of service at the time of retirement or death.

4. ERS/TRS transfer provisions.

    (a) Service credit transfers allowed if the participant is a member of both ERS and TRS and has at least three years of service credit in the System from which the member is retiring.

    (b) A member may reinstate or purchase service credit in the other System prior to making the transfer if that member has at least three years of service credit in the current System.

    (c) TRS and ERS will jointly set rules for the assumptions used in computing asset transfer amounts. The transfer of funds between ERS and TRS takes place at the time of actual retirement.

J. LEGISLATIVE CHANGES MADE BY THE 1995 STATE LEGISLATURE

1. Unreduced benefits at retirement were expanded to include participants age 50 or older with 30 or more years of service.

2. Annuitants' benefits increased in an amount equal to the greater of:

    (a) A recalculation of benefits based on

        (i) January 1, 1995 law with all intervening ad hoc increases, plus

        (ii) A CPI catch-up increase.

    (b) A recalculation of benefits for retirees who retired before September 1, 1993, based on a 2% multiplier and a minimum annual salary of a classroom teacher

or full-time librarian as described by the Education Code. This annual salary is currently $17,000 based on current Education Code.

3. Treat all Option 1 and Option 2 benefits as including the pop-up feature.

4. The annuity payment in the month of death is payable on behalf of the annuitant.

5. The disability benefit payable when a member has less than ten years of service increased from $50 per month to $150 per month for both current and future disabled members. The minimum disability payment made on behalf of a member with ten or more years of service shall be no less than $150 per month.

6. The benefit increase reserve account in TRS was eliminated, resulting in the liability for all annuity benefits being included within the retired reserve account.

7. The maximum two-times-pay death benefit payable on behalf of a member would increase from $60,000 to $80,000.

K. LEGISLATIVE CHANGES MADE BY THE 1997 STATE LEGISLATURE

1. Driver's education pay is added to plan compensation for the determination of a member's best 3-year average compensation.

2. Disabled participants are allowed to select a Joint and Survivor annuity option after commencement of disability benefits, if they become married after date of disability.

3. Retirees are allowed to change the designated beneficiary for pension benefits payable after their death under certain conditions.

4. Adoption of "Rule of 80" criteria for unreduced standard retirement annuity (i.e., sum of member's age & credited service is greater than or equal to 80).

5. Elimination of $6.50 per month per year of service minimum standard retirement annuity benefit.

6. Addition of $50.00 to the minimum survivor benefit.

7. Creation of a Deferred Retirement Option Program (DROP), described in Item A8 above.

8. A CPI catch-up ad hoc cost-of-living increase for retired members.

L.   LEGISLATIVE CHANGES MADE BY THE 1999 STATE LEGISLATURE

1.   Increased multiplier from 2.0% to 2.2% effective September 1, 1999, and an equivalent 10% increase for all retirees.

2.   A CPI catch-up ad hoc cost-of-living increase for retired members.

3.   Established a partial lump-sum option at time of retirement.

4.   DROP participant enrolled on or before August 31, 1999, have a one-year window from September 1, 1999 to revoke DROP participation.

5.   For members entering DROP on or after September 1, 1999, the monthly DROP deposit will be reduced from 79% to 60% of the standard annuity.

9.   Provides a lump-sum death benefit of $160,000 for an active member employed by a school district who dies due to a physical assault during the performance of their regular duties.

10.   Allows a return to teaching after being retired at least 12 months without a reduction in the retirement benefit under certain circumstances.

M.   LEGISLATIVE CHANGES MADE BY THE 2001 STATE LEGISLATURE

1.   Increased multiplier from 2.2% to 2.3% effective September 1, 2001, and an equivalent 4.5% increase for all retirees.

2.   A 6% ad hoc increase for retired members.

3.   Increase in survivor benefits of $50 per month.

4.   Allows a return to work as a bus driver with no reduction in the monthly benefit if retired with an unreduced benefit.

5.   Permits purchase of up to 3 years of "air time" if the member has at least 7 years of actual membership service. Purchase price is the full actuarial cost of the purchased service.

N.   LEGISLATIVE CHANGES MADE BY THE 2003 STATE LEGISLATURE

1.   For employees hired on or after September 1, 2003, a 90-day waiting period is required for participation in TRS. Members may have the option to purchase this service. This provision is set to expire on September 1, 2005.

2.   Limits the collection of overpayments to the three years prior to the overpayment discovery, except in cases of fraud or knowledge by the participant that the payments were incorrect.

3.   Repealed the requirement that in order to reinstate service withdrawn after August 31, 2003, for the purposes of ERS/TRS transfer, the member must belong to the system from which the service is purchased.

4.   Retirees who are employed by a third-party entity are considered to be employees of the school for return to work purposes unless the retiree does not perform duties or provide services in behalf of the school

5.   Retirees may work as a substitute and on a half-time basis during a single calendar month as long as the total days worked do not exceed the number of days for one-half time employment for that month.

O.   LEGISLATIVE CHANGES MADE BY THE 2005 STATE LEGISLATURE

1.   Final average salary at retirement will be determined by the highest five years (instead of three years) of salary, subsidized early retirement will be eliminated, and partial lump sum option eligibility will require a combined age plus years of creditable service that equals at least 90 ("Rule of 90").

2.   Future members (those who establish TRS membership on or after September 1, 2007) will have the following eligibility requirements to qualify for an unreduced annuity at retirement: (i) age 65 with 5 years of service, or (ii) age 60 with at least 5 years of service and meets the Rule of 80 (combined age and years of service equal at least 80).

3.   Employers will be required to pay a monthly surcharge to the pension fund for each retiree working in a TRS-covered position and reported to TRS.

4.   The Deferred Retirement Option Plan (DROP) is being discontinued for new participation effective December 31, 2005.

P.   LEGISLATIVE CHANGES MADE BY THE 2007 STATE LEGISLATURE

    1.   The State contribution rate was increased to 6.58% for fiscal year 2008. In addition, the new law requires the State contribution rate to be at least equal to the member contribution rate.

    2.   The Legislature authorized TRS to make a one-time payment (13th check) in January 2008, if the August 31, 2007 actuarial valuation showed that the funding period would be less than 31 years with the payment. The payment is equal to the lesser of the member's December monthly payment or $2,400. To be eligible a retiree must have retired on or before December 31, 2006.

Q.   LEGISLATIVE CHANGES MADE BY THE 2009 STATE LEGISLATURE

    1.   The Legislature included funding for a one-time supplemental payment of $500 million for current retirees. This appropriation was contingent upon a ruling by the Attorney General's office that such a payment is permissible under State law. The Attorney General determined this payment was not permissible, and therefore the additional appropriation will be contributed to the Trust as additional contributions, increasing the State contribution rate to an effective 6.644% for the biennium.

R.   LEGISLATIVE CHANGES MADE BY THE 2013 STATE LEGISLATURE

    1.   The normal retirement eligibility for members who are not vested as of August 31, 2014 to the "Rule of 80" with minimum age 62 (was minimum age of 60).

    2.   For members who are not vested as of August 31, 2014, their early retirement benefit will be reduced from age 62 (was 60) if they meet the Rule of 80" but are not eligible for normal retirement.

    3.   The Legislature granted an ad hoc COLA for members in payment status since August 31, 2004. The payment is equal to the lesser of $100 or 3% of their monthly payment.

    4.   The member contribution rate will increase to 6.70% in fiscal year 2015, 7.20% in fiscal year 2016, and 7.70% for fiscal years on and after 2017.

    5.   The State's contribution rate increased to 6.80% in fiscal year 2014.

    6.   Covered employers whose employees are not participating in Social Security **whose positions are subject to the state statutory minimum salary schedule** will begin contributing 1.50% of pay in fiscal year 2015.

ACTUARIAL ASSUMPTIONS AND METHODS
(Adopted September 24, 2015)

The following assumptions were developed and recommended based on an experience study performed in 2015. All of the assumptions are based on a combination of anticipated future experience and market observations. We believe all of the assumptions are reasonable and appropriate for this measurement. Please see our report dated September 9, 2015 for more discussion about the selection of these assumptions.

ACTUARIAL ASSUMPTIONS

1. <u>Investment Return Rate</u> 8.00% per annum, compounded annually, composed of an assumed 2.50% inflation rate and a 5.50% real rate of return, net of investment expenses

2. <u>Mortality, Withdrawal, Disability Retirement, and Service Retirement Rates:</u>

   Rates and scales developed in the actuarial investigation as August 31, 2014, with values at specimen ages shown in the tables below:

   a. Active Mortality: RP-2014 Employee Mortality Tables for male and female multiplied by 90%, with full generational projection using Scale BB. Below are the samples rates for 2014 and 2044.

	2014 Mortality Rates			**2044 Mortality Rates**	
Age	**Male**	**Female**	**Age**	**Male**	**Female**
20	0.000365	0.000146	20	0.000334	0.000133
30	0.000407	0.000196	30	0.000372	0.000179
40	0.000565	0.000356	40	0.000516	0.000326
50	0.001517	0.000992	50	0.001387	0.000906
60	0.004219	0.002198	60	0.003417	0.001626
70	0.012469	0.005678	70	0.007923	0.003953
80	0.034930	0.016542	80	0.022196	0.011516
90	0.123749	0.092945	90	0.088804	0.066698

b. Rates of Termination (net of applying rehire assumption)

**Probability of Decrement
Due to Withdrawal**

Years of Service	Male	Female
1	0.149027	0.143098
2	0.119756	0.117329
3	0.096637	0.097896
4	0.072275	0.076765
5	0.062453	0.068443
6	0.055556	0.060368
7	0.047176	0.049631
8	0.041464	0.043108
9	0.036978	0.038477
10	0.033777	0.035264

The following table is used for all years after the first ten years of employment.

**Probability of Decrement Due to Withdrawal Based on
Years from Normal Retirement**

Years from NR	Male	Female	Years from NR	Male	Female
1	0.012140	0.009500	17	0.024208	0.027793
2	0.014373	0.012353	18	0.024547	0.028402
3	0.015865	0.014405	19	0.024873	0.028990
4	0.017017	0.016064	20	0.025185	0.029559
5	0.017968	0.017481	21	0.025487	0.030110
6	0.018783	0.018731	22	0.025777	0.030646
7	0.019502	0.019858	23	0.026058	0.031166
8	0.020147	0.020888	24	0.026329	0.031673
9	0.020733	0.021842	25	0.026592	0.032166
10	0.021273	0.022731	26	0.026848	0.032648
11	0.021772	0.023567	27	0.027096	0.033118
12	0.022239	0.024357	28	0.027337	0.033578
13	0.022676	0.025107	29	0.027571	0.034027
14	0.023090	0.025822	30	0.027800	0.034467
15	0.023481	0.026506	31	0.028023	0.034898
16	0.023853	0.027162	32	0.028241	0.035320

c. Rates of Disability Retirement

Probability of Decrement Due to Disability

	For Service >= 10		For Service < 10	
Age	**Male**	**Female**	**Male**	**Female**
20	0.000184	0.000276	0.000037	0.000055
30	0.000184	0.000276	0.000037	0.000055
40	0.000430	0.000469	0.000086	0.000094
50	0.001993	0.001817	0.000399	0.000363
60	0.003505	0.002754	0.000701	0.000551

d. Rates of Retirement

Age	Normal Retirement		Age	Early Retirement	
	Male	Female		Male	Female
50	0.1300	0.3000	45	0.0100	0.0100
51	0.1300	0.1200	46	0.0100	0.0100
52	0.1300	0.1300	47	0.0100	0.0200
53	0.1300	0.1400	48	0.0200	0.0300
54	0.1400	0.1500	49	0.0300	0.0400
55	0.1500	0.1600	50	0.0100	0.0100
56	0.1600	0.1700	51	0.0100	0.0100
57	0.1700	0.1800	52	0.0100	0.0100
58	0.1800	0.1900	53	0.0100	0.0100
59	0.1800	0.2000	54	0.0100	0.0100
60	0.2200	0.2100	55	0.0100	0.0100
61	0.2000	0.2200	56	0.0100	0.0100
62	0.2400	0.2300	57	0.0100	0.0100
63	0.2000	0.2300	58	0.0100	0.0100
64	0.2000	0.2300	59	0.0100	0.0200
65	0.2200	0.2300	60	0.0200	0.0200
66	0.2200	0.2300	61	0.0200	0.0200
67	0.2200	0.2300	62	0.0500	0.0400
68	0.2200	0.2300	63	0.0500	0.0500
69	0.2200	0.2300	64	0.0600	0.0600
70	0.2200	0.2300	65	0.0500	0.0500
71	0.2200	0.2300			
72	0.2200	0.2300			
73	0.2200	0.2300			
74	0.2200	0.2300			
75	1.0000	1.0000			

For members hired after August 31, 2007 and who are vested as of August 31, 2014, the retirement rates for members once they reach unreduced retirement eligibility at age 60 are

increased 10% for each year the member is beyond the Rule of 80 (i.e. if the member reached the Rule of 80 at age 58 then the probability of retirement at age 60 is 120% of the rate shown above).

For members hired after August 31, 2007 and who are not vested as of August 31, 2014, or, for members hired after August 31, 2014, the retirement rates for members once they reach unreduced retirement eligibility at age 62 are increased 10% for each year the member is beyond the Rule of 80 (i.e. if the member reached the Rule of 80 at age 58 then the probability of retirement at age 62 is 140% of the rate shown above).

The rates of retirement for normal retirement benefits for members who are not TRS-Care grandfathered as of August 31, 2014 are 85% of the rates described above prior to age 62 and an increased rate at age 62 by adding 5%.

3. Rates of Salary Increase

Inflation rate of 2.50%, plus productivity component of 1.00%, plus step-rate/promotional component as shown:

Years of Service	Merit, Promotion, Longevity		General		Total
1	6.00	%	3.50	%	9.50
2	2.50		3.50		6.00
3	1.90		3.50		5.40
4	1.70		3.50		5.20
5	1.50		3.50		5.00
6	1.40		3.50		4.90
7	1.20		3.50		4.70
8	1.00		3.50		4.50
9	1.00		3.50		4.50
10	1.00		3.50		4.50
11	1.00		3.50		4.50
12	1.00		3.50		4.50
13	0.80		3.50		4.30
14	0.70		3.50		4.20
15	0.60		3.50		4.10
16	0.50		3.50		4.00
17	0.50		3.50		4.00
18	0.40		3.50		3.90
19	0.30		3.50		3.80
20	0.30		3.50		3.80
21	0.20		3.50		3.70
22	0.20		3.50		3.70
23	0.10		3.50		3.60
24	0.10		3.50		3.60
25 & up	0.00		3.50		3.50

4. Post-retirement Mortality: The 2015 TRS of Texas Healthy Pensioner Mortality Tables, with full generational projection using scale BB, used for service retirement annuitants, beneficiaries and survivors. These tables are developed based on the experience in the actuarial investigation as of August 31, 2014. Below are sample rates for 2014 and projected rates for 2044.

| | **2014 Mortality Rates** | | | **2044 Mortality Rates** | |
Age	Male	Female	Age	Male	Female
40	0.001938	0.001585	40	0.001771	0.001448
50	0.004247	0.002791	50	0.003881	0.002550
60	0.005584	0.003882	60	0.004523	0.002872
70	0.015547	0.009613	70	0.009879	0.006692
80	0.053691	0.035591	80	0.034118	0.024777
90	0.162983	0.133727	90	0.116958	0.095964
100	0.407509	0.284047	100	0.372385	0.259564
110	0.500000	0.467915	110	0.500000	0.467915

For disabled retirees, a three-year set forward of the above tables are used, with a minimum mortality rates of 0.0200 for female and 0.0400 for male.

| | **2014 Mortality Rates** | | | **2044 Mortality Rates** | |
Age	Male	Female	Age	Male	Female
40	0.040000	0.020000	40	0.040000	0.020000
50	0.040000	0.020000	50	0.040000	0.020000
60	0.040000	0.020000	60	0.040000	0.020000
70	0.040000	0.020000	70	0.040000	0.020000
80	0.076501	0.054133	80	0.048613	0.037685
90	0.218673	0.181404	90	0.156922	0.130177
100	0.500000	0.340356	100	0.456904	0.311020
110	1.000000	0.500000	110	1.000000	0.500000

HANDLING OF ACTIVE DATA WITH MISSING INFORMATION:

As of the close of each fiscal year there is a large number of records for whom no statistical data has been received. The only information TRS has is social security number and initial contributions. Any of these records that were in the prior year's data are treated as non-vested terminated members. The remaining records are treated as new entrants. These records are added to the count of active members, but have no liability.

There are other records provided by TRS that have missing gender and/or missing date of births. These records are handled as follows:

1.   80% of records with missing gender are assumed to be female. The overall male/female ratio of the active membership is used to set this assumption.

2.   Records with missing dates of birth are assigned a date of birth that produces an entry age equal to the average entry age for the overall active population, based on the member's actual service.

ASSUMPTION FOR DROP PARTICIPATION

Current active members are not eligible to participate in DROP, therefore no new DROP members are assumed.

BENEFIT ELECTION OF VESTED TERMINATING MEMBERS:

In determining the liabilities developed for future terminating vested members, it is assumed that the member elects either a refund or a deferred vested benefit, whichever is more valuable. The deferred benefit is assumed to commence at the earliest age the member is eligible for unreduced retirement.

ELECTION RATES FOR ACTIVE MEMBER DEATH BENEFITS:

It is assumed that the beneficiary will elect the death benefit option with the greatest value.

DECREMENT TIMING:

Retirement is assumed to occur at the end of the year. Termination from service is assumed to occur at the beginning of the year. All other decrements are assumed to occur mid-year.

BENEFIT ELECTION OPTIONS:

It is assumed that future healthy retirees will select the normal form of payment. For disabled members, 80% are assumed to select the normal form of payment and 20% to select the 100% joint and survivor option.

MARRIAGE ASSUMPTION:

While not implicitly used in the valuation, 100% of active members are assumed to be married when setting other benefit election and eligibility assumptions.

SPOUSAL AGE DIFFERENCE:

Husbands are assumed to be three years older than their wives.

CLASSIFICATION OF WHO ARE ACTIVE MEMBERS:

Members who contributed during the just-completed plan year but did not retire before August 31st are considered active.

AVERAGE SURVIVOR BENEFIT LIABILITY:

One of the options on the death of an active member, a disabled member, or a retired member is a survivor benefit. To determine the liability for this benefit the following average values are used.

	Males	Females
1. Active member	$62,200	$59,000
2. Disabled member	$13,000	$11,000
3. Retired member	$12,000	$12,000

ACTUARIAL VALUE OF ASSETS:

A. The actuarial value of assets is equal to the market value of assets less a five-year phase in of the excess (shortfall) between expected investment return and actual income. The actual calculation is based on the difference between actual market value and the expected actuarial value of assets each year, and recognizes the cumulative excess return (or shortfall) over a minimum rate of 20% per year. Each year a base is set up to reflect this difference. If the current year's base is of opposite sign to the deferred bases then it is offset dollar for dollar against the deferred bases. Any remaining bases are then recognized over the remaining period for the base (5 less the number of years between the bases year and the valuation year). This is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable amount of time.

B. Expected earnings are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted for receipts and disbursements during the year). Beginning in fiscal year 2016, the returns are computed net of investment expenses.

PAYROLL GROWTH FOR FUNDING OF UNFUNDED ACTUARIAL ACCRUED LIABILITY:

Total payroll is expected to grow at 2.50% per year. The total general wage increase assumption of 3.00% is made up of an inflation rate of 2.50% plus a 0.50% real wage growth. This value is used to increase the wages for each annual cohort of new entrants in an open group projection based on the current demographics and the current assumptions. Because of the larger than normal number of members either eligible to retire or expected to retire in the next 5-10 years, the projection anticipates that without population growth, the growth in overall payroll will be damped to below the general wage increase assumption.

ACTUARIAL COST METHOD:

The funding period required to amortize the unfunded actuarial accrued liability (UAAL) is determined using the Entry Age Actuarial Cost Method. This method assigns the plan's total unfunded liabilities (the actuarial present value of future benefits less the actuarial value of assets) to various periods. The unfunded actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are assigned to future years.

The normal cost is determined using the "ultimate entry age normal" method. Under this cost method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each participant during the entire period of his/her anticipated covered service, would be required to meet the cost of all benefits payable on his behalf based on the benefits provisions for new employees hired on or after August 31, 2016.

The actuarial accrued liability (AAL) for each member is the difference between their present value of future benefits (PVFB), based on the tier of benefits that apply to the member, and their present value of future normal costs determined using the normal cost rate described above. For inactive and retired members their AAL is equal to their PVFB.

The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

Since the State statutes governing the System establish the current employee and State contribution rates, the actuarial valuation determines the number of years required to amortize (or fund) the UAAL on a level percentage of payroll basis, taking into account the payroll growth assumption and the normal cost expressed as a percent of pay.

Because of this amortization procedure, any change in the unfunded actuarial accrued liability due to (i) actuarial gains and losses, (ii) changes in actuarial assumptions, or (iii) amendments, affects the funding period. The statutory goal is that the State contribution rate be sufficient to keep the funding period below 31 years.

PROJECTED PAYROLL FOR CONTRIBUTIONS:

The aggregate projected payroll for the fiscal year following the valuation date is calculated by increasing the actual payroll paid during the previous fiscal year by the payroll growth rate and multiplying by the ratio of current active members to the average number of active members during the previous fiscal year.

USE OF CELLED DATA:

For valuation purposes, every record in the census is valued individually.

For legislative purposes, the active valuation data is celled by benefit tier, gender, years of service, month and year of birth. The individual cell is valued using the sum of the salary and account balances of the members in the cell. Every year we test this approach against using the individual records and the results are consistently less than 0.02% different in total present value of benefits.

FUNDING OF UNFUNDED ACTUARIAL ACCRUED LIABILITY:

Funded by the excess of future State\employer contributions required by Law over the amount of such contributions required to fund the normal cost of benefits. Under the actuarial funding method and the benefit provisions for new hires, the ultimate normal cost for benefits provided by the System is 9.93% of payroll (7.70% by members plus 2.23% by the State). An additional 0.12% of payroll is used to pay for the administrative expenses of the System, leaving 5.35% of payroll less than the ultimate total contribution rate required by Law. It is intended that the excess amount of 5.35% of payroll will be used to amortize any unfunded actuarial accrued liabilities of the System, assuming that total payroll increases by 2.50% per year.

As of the valuation as of August 31, 2016, these excess contributions of 5.35% of pay are sufficient to amortize the UAAL, but not under a 30 year funding period.

CHANGES SINCE THE PRIOR VALUATION:

There have been no changes in the actuarial assumptions and methods since the prior valuation.

DEFINITION OF ACTUARIAL TERMS

H.B. 2206 as passed by the 1979 Legislature requires that any actuarial study of a public retirement system include "a complete definition of each actuarial term used in the study". In our report we have attempted to avoid the use of a multitude of complex actuarial terminology, but we realize that different users of our reports may have differing opinions as to what constitutes an "actuarial term". Accordingly, in keeping with the intent and the spirit of the law, we offer the following definitions of several terms contained in this report which might be considered actuarial in nature. Any qualified user of our report who believes that additional terms should be included is invited to communicate such terms either directly to us or through the Teacher Retirement System of Texas.

1. *Actuarial Accrued Liability* - for benefits payable in the future to present members, it will equal the present value of benefits payable in the future to them less the present value of future normal costs.

2. *Actuarial Assumptions* - assumptions as to future experience under the System. Current actuarial assumptions are detailed in Table 21 of the current annual valuation report. Assumptions include future fund earning rates, rates of future salary increases, and rates of death (both before and after retirement), disability, retirement, and withdrawal. Effective August 31, 1985, select and ultimate assumptions were adopted for retirement and withdrawal rates and the salary scale.

3. *Actuarial Gain or Actuarial Loss* - a measure of the difference between actual experience and assumed experience of the System. 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 liabilities emerge which may be the same as forecasted, or they may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the System'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.

4. *Actuarial Liabilities* - the actuarially determined present value of future benefits to be provided by the System. There are separate actuarially determined present values for retired members and non-retired members (either active or inactive). When applied to active members, it takes into account benefits which will be earned through future service and future salary increases.

5. *Actuarial Value of Present Assets* - the value of present System assets for valuation purposes. Prior to August 31, 1985, this value was the same as the book value of assets. Beginning August 31, 1985, through August 31, 1993, this value was calculated under the "market over book adjusted asset valuation method." Beginning August 31, 1993, this value is calculated

under a five-year phase in of the excess (shortfall) between expected and actual income return on the market value of assets.

6. *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.

7. *Decrements* - those types of activities by members of the System which cause them no longer to be members, i.e., death, retirement, disability, and withdrawal. It is a general term referring to any or all of these membership terminating events.

8. *Defined Benefits* - in a retirement plan, benefits which are defined by a specific formula applied to specific member compensation and/or specific years of service. The amount of the benefit is not a function of contributions or actual earnings on those contributions.

9. *Defined Contributions* - in a retirement plan, periodic contributions to the plan which are defined as a specific percent of compensation.

10. *Experience Study* - a periodic review and analysis of the actual experience of the System 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.

11. *Funding Period* - the number of years in the future that will be required to fund (i.e., pay off or eliminate) the unfunded actuarial accrued liability, based on the actuarial assumptions and assuming no future actuarial gains or losses.

12. *Future Benefits* - benefits specified in the law which will become payable at some time in the future when the member satisfies the requirement to receive such benefits.

13. *Future Contributions* - contributions to be made by the member or the State in the future, as required by the law.

14. *Normal Cost* - the actuarial cost to fund the benefits provided by the System were the funding to begin at date of hire. It is expressed as a percent of pay and is equal to the present value at hire of all possible benefits of the System divided by the present value of anticipated future compensation to be received by the new member. In the aggregate, it must be less than the total future contribution to the System if the unfunded actuarial accrued liability is to be amortized. Otherwise there must be a funding surplus sufficient in size to offset any contribution rate shortfall.

15. *Present Value* - the actuarially determined lump sum value as of the valuation date of a series of payments to be made in the future, where the lump sum value is equal to the sum of the discounted value of each future payment. The discounted value of each payment is the product of (a) the amount of the payment, (b) the probability that the payment will be made (based on the current actuarial assumptions as to future experience), and (c) the time value of money (based on the current assumed interest rate).

16. *Unfunded Actuarial Accrued Liability* - that portion of the actuarial accrued liability (including the present value of benefits presently being paid to retired members) that exceeds the value of current actuarial assets. A funding surplus exists if the actuarial accrued liability is less than the actuarial assets.