

North Dakota Teachers' Fund for Retirement

Actuarial Valuation and Review
as of July 1, 2016

The logo for Segal Consulting is a large, dark blue, stylized arrow pointing to the right. The arrow has a white star-like symbol at its tip. The text "Segal Consulting" is written in white, sans-serif font across the middle of the arrow.

★ Segal Consulting



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October 19, 2016

Board of Trustees
North Dakota Teachers' Fund for Retirement
1930 Burnt Boat Drive P.O. Box 7100
Bismarck, ND 58507-7100

Dear Trustees:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the North Dakota Teachers' Fund for Retirement (TFFR) as of July 1, 2016.

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 also comply with the State Code, and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board (GASB). The undersigned are independent actuaries. Both are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and both are experienced in performing valuations for large public retirement systems. They both meet the Qualification Standards of the American Academy of Actuaries.

ACTUARIAL VALUATION

The primary purposes of the valuation report are to determine the adequacy of the current employer contribution rate, to describe the current financial condition of TFFR, and to analyze changes in TFFR's financial condition. In addition, the report provides information required by TFFR in connection with the Governmental Accounting Standards Board Statement No. 67 (GASB 67) and it provides various summaries of the data. Valuations are prepared annually, as of July 1 of each year, the first day of TFFR's plan and fiscal year.

FINANCING OBJECTIVES

The member and employer contribution rates are established by statute. Member and employer rates are 11.75% and 12.75%, respectively. The 11.75% member contribution rate and 12.75% employer contribution rate will remain in effect until TFFR is 100% funded on an actuarial basis. At that point, the employer and member contribution rates will revert to 7.75%. The rates are intended to be sufficient to pay TFFR's normal cost and to amortize TFFR's unfunded actuarial accrued liability (UAAL) over a period of 27 years beginning July 1, 2016, although at any given time the statutory rates may be insufficient.

PROGRESS TOWARD REALIZATION OF FINANCING OBJECTIVES

In order to determine the adequacy of the 12.75% statutory employer contribution rate, it is compared to the actuarially determined contribution (ADC). The ADC is equal to the sum of (a) the employer normal cost rate and (b) the level percentage of pay required to amortize the UAAL over the 30-year closed period that began July 1, 2013 (27 years remaining as of July 1, 2016). For this calculation, payroll is assumed to increase 3.25% per year. As of July 1, 2016, the ADC is 13.22%, compared to 13.04% last year. This is greater than the 12.75% rate currently required by law.

The increase in ADC is primarily driven by the actuarial loss on assets.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) increased from last year. The funded ratio at July 1, 2015, was 61.6%, while it is 62.1% as of July 1, 2016. Based on the market value of assets rather than the actuarial value of assets, the funded ratio decreased to 59.2%, compared to 62.1% last year.

The Plan has a net investment loss of \$105 million from previous years that has not yet been recognized in the actuarial value of assets because of the five-year smoothing. This unrecognized asset loss is due to market losses during FY 2015 and FY 2016 offset by market gains in FY 2013 and FY 2014. As these losses are recognized over the next four years, the funded ratio is expected to decline, assuming the plan earns 7.75% in the future.

REPORTING CONSEQUENCES

TFFR is required to disclose certain actuarial information in its Comprehensive Annual Financial Report (CAFR), including the Net Pension Liability (NPL), the sensitivity of the NPL to changes in the discount rate, a schedule of changes in NPL, and a comparison of actual contributions to the ADC. The State and the school districts need to comply with GASB 68, which also requires disclosure of certain actuarial information in their financial statements. This information will be provided in a separate report.

BENEFIT PROVISIONS

The actuarial valuation reflects the benefit and contribution provisions set forth in the North Dakota Century Code. These have not changed from the prior valuation.

ASSUMPTIONS AND METHODS

Actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the Plan's actuary. On April 30, 2015, the Board adopted new assumptions, effective for the July 1, 2015 valuation. In our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectation for the Plan.

Effective with the July 1, 2013, actuarial valuation, the Trustees adopted an Actuarial Funding Policy, which provides direction on how to calculate an actuarially determined contribution. The actuarially determined contribution is compared to statutory contribution rates as a measure of funding adequacy.


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.

DATA

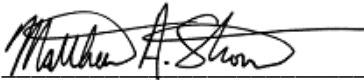
Member data for retired, active, and inactive participants was supplied as of July 1, 2016, by the staff of the Retirement Office. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was also supplied by the staff. That assistance is gratefully acknowledged.

Sincerely,

Segal Consulting, a member of the Segal Group, Inc.

By: 

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary



Matthew A. Strom, FSA, MAAA, EA
Vice President and Actuary

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SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Significant Issues in the Valuation Year

1. Changes were made effective with the July 1, 2016, actuarial valuation as a result of the independent review that Cavanaugh Macdonald Consulting performed in 2016. The changes had a minimal impact on the valuation, as shown in the reconciliation of the unfunded actuarial accrued liability and are as follows:
 - The calculation of the death benefit liability for deferred vested members was modified.
 - Dates of hire were adjusted for members who had a break in service.Additional information is included in this actuarial valuation report.
2. The employer statutory contribution rate for the fiscal year beginning July 1, 2016, under the North Dakota Century Code is equal to 12.75% of payroll for employers. Compared to the actuarially determined contribution of 13.22% of payroll, the contribution deficiency is 0.47% of payroll as of July 1, 2016.
3. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of July 1, 2016, is 62.1%, compared to 61.6% as of July 1, 2015. This ratio is a measure of funding status and its history is a measure of funded progress.
4. For the year ended June 30, 2016, Segal has determined that the asset return on a market value basis was 0.4%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 6.2%. This represents an experience loss when compared to the assumed rate of 7.75%. As of June 30, 2016, the actuarial value of assets (\$2.229 billion) represented 104.9% of the market value (\$2.124 billion).
5. The portion of deferred investment gains and losses recognized during the calculation of the July 1, 2016, actuarial value of assets contributed to a loss of \$33.6 million. The demographic and liability experience resulted in a \$7.6 million loss.
6. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 104.9% of the market value of assets as of June 30, 2016. 104.9% falls within the 20% corridor, so no further adjustment to the actuarial value of assets is necessary. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding market value. The actuarial asset method complies with these guidelines.
7. When measuring pension liability for GASB purposes, the same actuarial cost method (Entry Age Normal) is used to determine the funded status of the Plan, the actuarially determined contribution rate, and the effective amortization period. In addition, the GASB blended discount rate calculation results in the same discount rate (expected return on assets) as used for funding purposes (7.75%). This means that the Total Pension Liability (TPL) measure for financial reporting

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

shown in this report is determined on the same basis as the Actuarial Accrued Liability (AAL) measure for funding. We note that the same is true for the Normal Cost component of the annual plan cost for funding and financial reporting.

8. The Net Pension Liability (NPL) is equal to the difference between the TPL and the Plan Fiduciary Net Position. The Plan Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to the Unfunded Actuarial Accrued Liability on a market value basis. The NPL increased from \$1,307,855,182 as of June 30, 2015, to \$1,465,058,563 as of June 30, 2016.
9. The Fund's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets is -1.2% as of June 30, 2016, compared to -1.0% as of June 30, 2015. The decrease in net cash flow is primarily due to the asset loss. However, it is not unusual for a mature pension system to operate with minor negative cash flow as returns on investments generally exceed the net cash outflow and assets continue to rise.

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Summary of Key Valuation Results

	2016	2015
Demographic Data for Plan Year Beginning July 1:		
Number of retirees and beneficiaries	8,249	8,025
Number of inactive vested members	1,601	1,607
Number of inactive non-vested members	779	660
Number of active members	10,813	10,514
Total payroll supplied by System, annualized	\$627,002,353	\$589,783,780
Statutory Contributions (% of Payroll) for Plan Year Beginning July 1:		
Member	11.75%	11.75%
Employer	12.75%	12.75%
Actuarially determined contribution rate for year beginning July 1	13.22%	13.04%
Margin/(deficit)	-0.47%	-0.29%
Assets:		
Market value	\$2,124,335,288	\$2,141,920,800
Actuarial value	2,229,292,988	2,125,017,451
Return on market value as determined by Segal	0.4%	3.5%
Return on actuarial value	6.2%	10.7%
Ratio of actuarial value to market value	104.9%	99.2%
Net cash flow % relative to market value	-1.2%	-1.0%
Actuarial Information:		
Normal cost %	12.04%	11.63%
Normal cost	\$80,236,633	\$72,798,417
Actuarial accrued liability	3,589,393,851	3,449,775,982
Unfunded actuarial accrued liability	1,360,100,863	1,324,758,531
Funded ratio	62.1%	61.6%
Effective amortization period	29 years	29 years
GASB Information:		
Discount rate	7.75%	7.75%
Total pension liability	\$3,589,393,851	\$3,449,775,982
Plan fiduciary net position	2,124,335,288	2,141,920,800
Net pension liability	1,465,058,563	1,307,855,182
Plan fiduciary net position as a percentage of total pension liability	59.2%	62.1%

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Summary of Key Valuation Results (continued)

	2016	2015
Gains/(Losses):		
Asset experience	-\$33,588,108	\$51,873,093
Liability experience	-7,608,779	-3,623,699
Benefit changes	0	0
Assumption/method changes	<u>0</u>	<u>-171,324,647</u>
Total gain/(loss)	-\$41,196,887	-\$123,075,253

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for the Plan is based on data provided to the actuary by TFFR. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by TFFR, uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the Plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of TFFR. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the Plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the Plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- If TFFR is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. TFFR should look to their other advisors for expertise in these areas.
- The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

A. MEMBER DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retirees, and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A, B, C, D, and E.

A historical perspective of how the participant population has changed over the past ten valuations can be seen in this chart.

CHART 1
Member Population: 2007 – 2016

Year Ended June 30	Active Members	Inactive Vested Members	Inactive Non-vested Members	Retirees and Beneficiaries	Ratio of Actives to Retirees and Beneficiaries
2007	9,599	1,439	142	6,077	1.58
2008	9,561	1,459	229	6,317	1.51
2009	9,707	1,490	292	6,466	1.50
2010	9,907	1,472	331	6,672	1.48
2011	10,004	1,463	407	6,933	1.44
2012	10,014	1,483	468	7,151	1.40
2013	10,138	1,500	563	7,489	1.35
2014	10,305	1,509	661	7,747	1.33
2015	10,514	1,607	660	8,025	1.31
2016	10,813	1,601	779	8,249	1.31

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,813 active members with an average age of 42.3 and 12.1 average years of service. The 10,514 active members in the prior valuation had an average age of 42.5 and 12.4 average years of service.

Inactive Members

In this year's valuation, there were 1,601 participants with a vested right to a deferred or immediate vested benefit.

In addition, there were 779 participants entitled to a return of their employee contributions.

These graphs show a distribution of active members by age and by years of service.

CHART 2
Distribution of Active Members by Age as of June 30, 2016

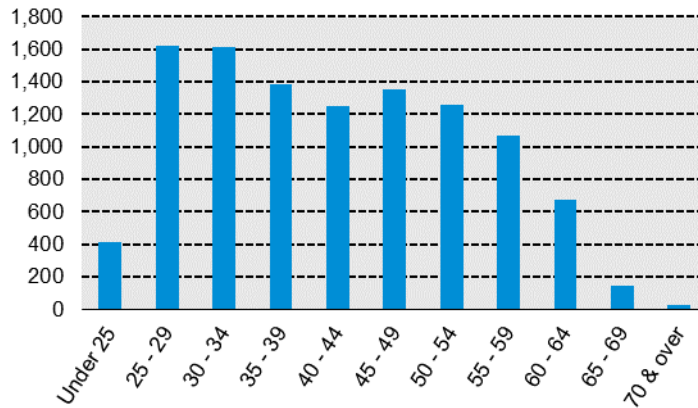
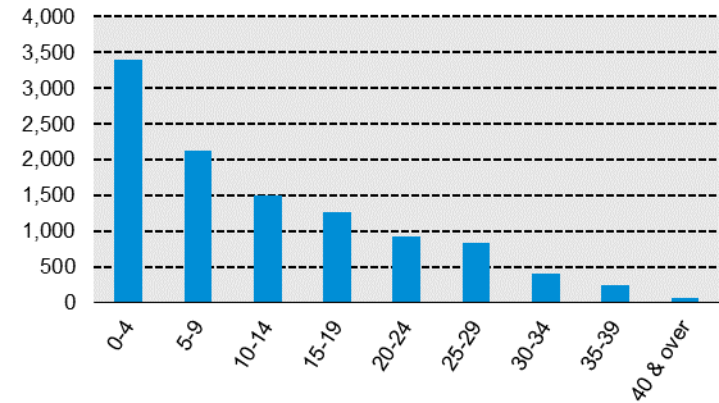


CHART 3
Distribution of Active Members by Years of Service as of June 30, 2016



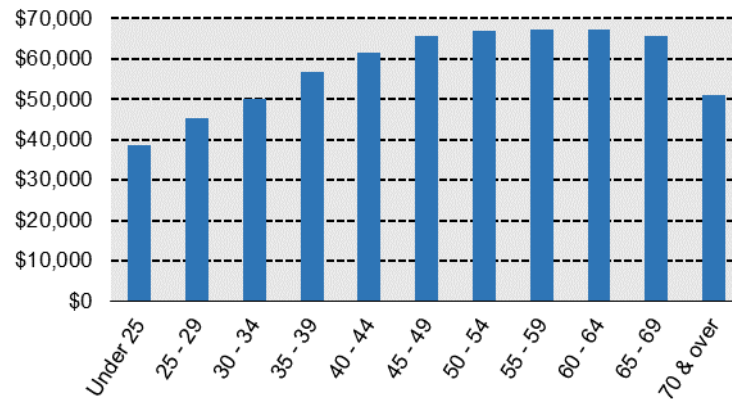
SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Distribution of Active Members by Age and Average Compensation

In this year's valuation, there were 10,813 active members with an average compensation of \$57,986. The 10,514 active members in the prior valuation had an average compensation of \$56,095.

CHART 4

Distribution of Active Members by Age and Average Compensation as of June 30, 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Retirees and Beneficiaries

As of July 1, 2016, 7,563 retirees and 686 beneficiaries were receiving total monthly benefits of \$15,602,746. For comparison, in the previous valuation, there were 7,378 retirees and 647 beneficiaries receiving monthly benefits of \$14,784,843.

These graphs show a distribution of the current retirees and beneficiaries based on their monthly amount and age, by type of pension.

CHART 5
Distribution of Retirees and Beneficiaries by Type and by Monthly Amount as of July 1, 2016

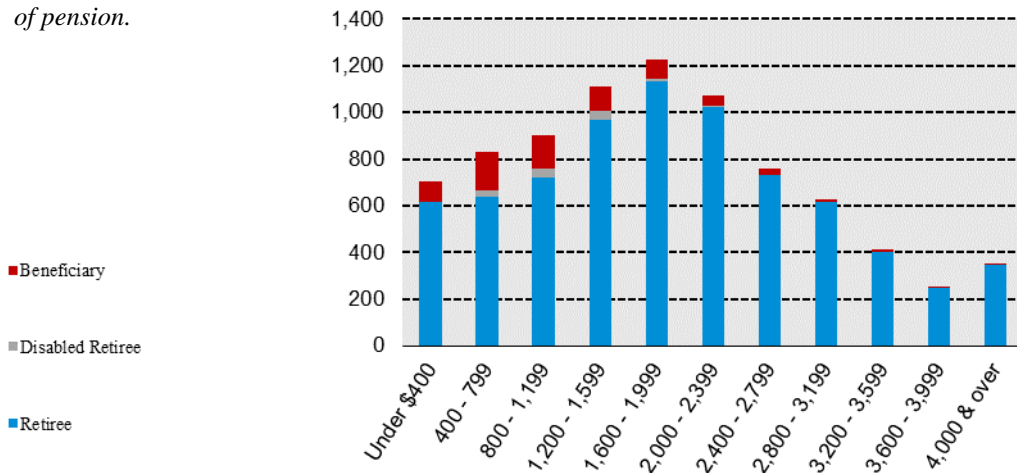
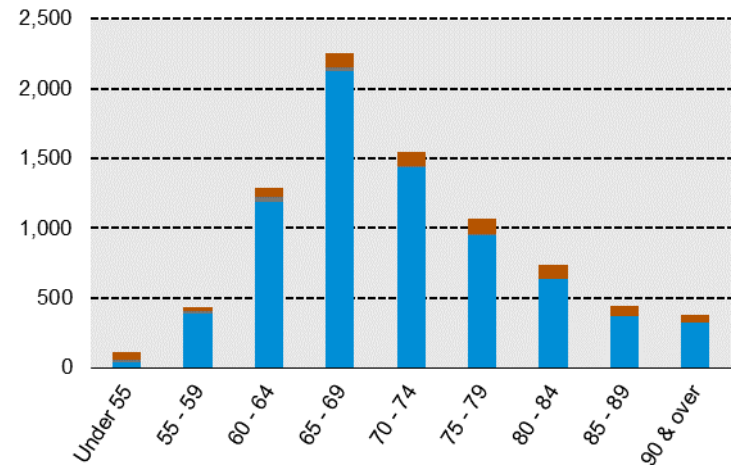


CHART 6
Distribution of Retirees and Beneficiaries by Type and by Age as of July 1, 2016



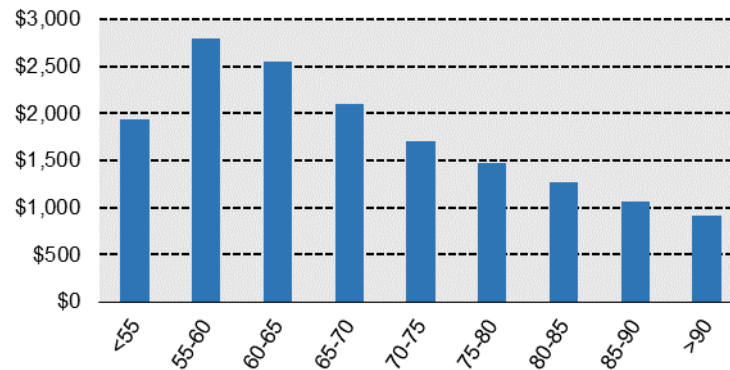
SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Distribution of Retirees and Beneficiaries by Age and Average Monthly Benefit Amount

As of July 1, 2016, the average monthly benefit amount among 7,563 retirees and 686 beneficiaries was \$1,891. In the previous valuation, the average monthly benefit amount among 7,378 retirees and 647 beneficiaries was \$1,842.

CHART 7

Distribution of Retirees and Beneficiaries by Age and Average Monthly Amount as of July 1, 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

B. FINANCIAL INFORMATION

It is desirable to have level and predictable plan costs from one year to the next. For this reason, TFFR's Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date and the value from the prior year.

CHART 8

Determination of Actuarial Value of Assets for Years Ended June 30, 2016, and June 30, 2015

		2016		2015	
1.	Market value of assets available for benefits		\$2,124,335,288		\$2,141,920,800
2.	Calculation of unrecognized return*	<u>Original Amount**</u>	<u>% Not Recognized</u>	<u>% Not Recognized</u>	
(a)	Year ended June 30, 2016	-\$156,759,166	80% -\$125,407,333		
(b)	Year ended June 30, 2015	-93,205,396	60% -55,923,238	80%	-\$74,564,316
(c)	Year ended June 30, 2014	147,144,380	40% 58,857,751	60%	88,286,628
(d)	Year ended June 30, 2013	87,575,593	20% 17,515,119	40%	35,030,237
(e)	Year ended June 30, 2012	-159,245,999	0	20%	<u>-31,849,200</u>
(f)	Total unrecognized return		-\$104,957,700		\$16,903,349
3.	Actuarial value of assets (Current Assets): (1) – (2f)		<u>\$2,229,292,288</u>		<u>\$2,125,017,451</u>
4.	Actuarial value as a percent of market value: (3) ÷ (1)		<u>104.9%</u>		<u>99.2%</u>

* Recognition at 20% per year over 5 years

** Total return minus expected return on market value

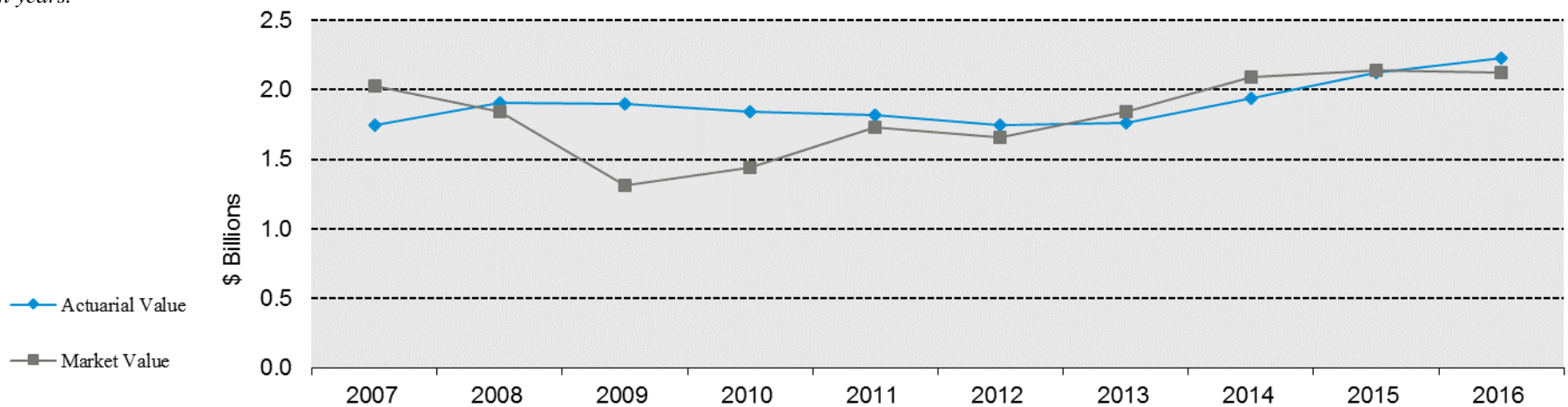
SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Both the actuarial value and market value of assets are representations of TFFR's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because TFFR's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 9

Actuarial Value of Assets vs. Market Value of Assets as of June 30, 2007 – 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on TFFR's investment policy. The assumed rate of return on the actuarial value of assets for the year ended June 30, 2016, was 7.75%. The actual rate of return on an actuarial basis for the Plan Year ended June 30, 2016, was 6.16%.

Since the actual return for the year was less than the assumed return, TFFR experienced an actuarial loss during the year ended June 30, 2016, with regard to its investments.

This chart shows the gain/(loss) due to investment experience on the market value and the actuarial value of assets.

CHART 10

Investment Experience for Year Ended June 30, 2016 – Market Value and Actuarial Value

	Market Value	Actuarial Value
1. Value assets as of June 30, 2015	\$2,141,920,800	\$2,125,017,451
2. Contributions during fiscal year ended June 30, 2016	161,995,828	161,995,828
3. Benefits and expenses during fiscal year ended June 30, 2016	-187,820,336	-187,820,336
4. Value of assets as of June 30, 2016	2,124,335,288	2,229,292,988
5. Total investment income (4) – (1) – (2) +(3)	8,238,996	130,100,044
6. Average value of assets (1) + [(2) + (3)] ÷ 2	2,129,008,546	2,112,105,197
7. Actual rate of return: (5) ÷ (6)	0.39%	6.16%
4. Assumed rate of return	7.75%	7.75%
5. Expected return: (2) x (4)	164,998,162	\$163,688,153
6. Actuarial gain/(loss): (1) – (5)	<u>-\$156,759,166</u>	<u>-\$33,588,108</u>

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Because actuarial planning is long-term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last thirty years, including five-year, ten-year, fifteen-year, twenty-year and thirty-year averages.

**Chart 11
Investment Return**

Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value
1987	9.2%	12.3%	2002	-8.6%	3.0%
1988	5.0%	7.3%	2003	2.1%	0.6%
1989	14.3%	8.6%	2004	18.9%	1.9%
1990	6.7%	7.7%	2005	13.3%	3.3%
1991	7.5%	5.8%	2006	14.6%	8.5%
1992	12.4%	6.5%	2007	20.4%	14.4%
1993	14.7%	8.1%	2008	-7.0%	11.6%
1994	1.2%	7.0%	2009	-27.0%	1.7%
1995	13.6%	9.1%	2010	13.9%	-0.5%
1996	15.6%	11.3%	2011	23.5%*	1.4%
1997	18.5%	12.6%	2012	-1.4%*	-1.4%
1998	13.2%	12.6%	2013	13.4%*	2.7%
1999	11.5%	13.5%	2014	16.1%*	12.6%
2000	11.6%	13.3%	2015	3.5%*	10.7%
2001	-7.6%	8.6%	2016	0.4%*	6.2%

Average Rates of Return		
Last 5 years:	6.1%	6.2%
Last 10 years:	4.5%	5.8%
Last 15 years:	5.5%	5.0%
Last 20 years:	6.4%	6.7%
Last 30 years:	7.5%	7.3%

* As determined by Segal.

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

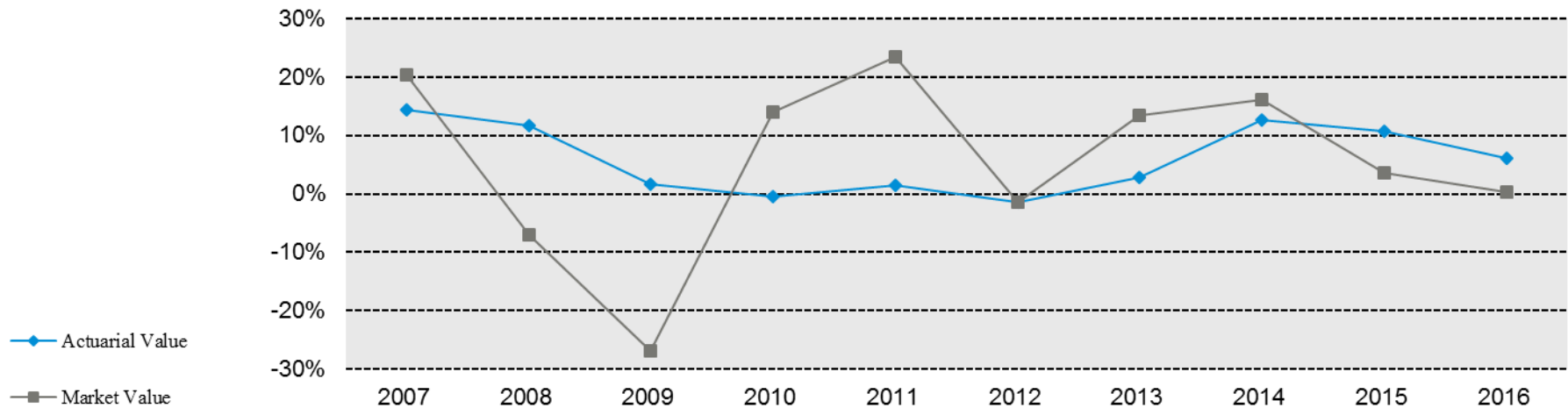
Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

Administrative Expenses

Administrative expenses for the year ended June 30, 2016, totaled \$1,851,656. An explicit administrative expense assumption was added effective July 1, 2015.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2016.

CHART 12
Market and Actuarial Rates of Return for Years Ended June 30, 2007 - 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Cash Flow

Cash flow is the difference between contributions and benefit payments, refunds, and expenses. Negative cash flow indicates that the payments made from the Fund exceed contributions made to the Fund.

Chart 13

History of Cash Flow

Year Ending June 30,	Disbursements or Expenditures					Net Cash Flow for the Year ²	Market Value of Assets	Net Cash Flow as Percent of Market Value
	Contributions ¹	Benefit Payments	Refunds	Administrative Expenses	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2007	\$66,362,099	(\$99,737,905)	(\$3,328,931)	(\$1,592,060)	(\$104,658,896)	(\$38,296,797)	\$2,029,777,412	-1.9%
2008	70,573,389	(106,456,334)	(5,500,476)	(1,639,521)	(113,596,331)	(43,022,942)	1,846,113,411	-2.3%
2009	74,380,980	(113,966,079)	(2,362,251)	(1,707,506)	(118,035,836)	(43,654,856)	1,309,716,730	-3.3%
2010	78,105,830	(124,472,154)	(2,557,240)	(1,902,796)	(128,932,190)	(50,826,360)	1,437,949,843	-3.5%
2011	84,923,250	(127,435,564)	(2,210,738)	(2,003,705)	(131,650,007)	(46,726,757)	1,726,179,317	-2.7%
2012	88,808,604	(135,250,568)	(2,479,194)	(1,596,976)	(139,326,738)	(50,518,134)	1,654,149,659	-3.1%
2013	115,849,348	(145,943,323)	(3,053,395)	(1,623,638)	(150,620,356)	(34,771,008)	1,839,583,960	-1.9%
2014	120,991,968	(158,350,355)	(3,908,921)	(1,586,045)	(163,845,321)	(42,853,353)	2,090,977,056	-2.0%
2015	152,463,762	(168,349,762)	(3,889,671)	(1,923,392)	(174,162,825)	(21,699,063)	2,141,920,800	-1.0%
2016	161,995,828	(180,617,784)	(5,350,896)	(1,851,656)	(187,820,336)	(25,824,508)	2,124,335,288	-1.2%

¹ Column (2) includes employee and employer contributions, as well as any purchased service credits during the year.

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

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include, but are not limited to:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net loss from this other experience for the year ended June 30, 2016, amounted to \$7,608,779, which is less than 0.2% of the actuarial accrued liability.

A brief summary of demographic gain/(loss) experience of TFFR for the year ended June 30, 2016, is shown in the chart below.

The chart shows elements of the experience gain/(loss) for the most recent year.

CHART 14

Experience Due to Changes in Demographics for Year Ended June 30, 2016

1.	Turnover	-\$2,923,056
2.	Retirement	56,645
3.	Deaths among retired members and beneficiaries	-44,215
4.	Salary/service increase for continuing actives	536,090
5.	New entrants	-6,978,001
6.	Miscellaneous	<u>1,743,758</u>
7.	Total	-\$7,608,779

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

C. DEVELOPMENT OF EMPLOYER COSTS

The amount of actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. This total amount is then divided by the projected payroll for active members to determine the actuarially determined contribution of 13.22% of payroll.

Effective July 1, 2013, the amortization period was set to 30 years, but declines by one year in each subsequent valuation. As of July 1, 2016, the amortization period has 27 years remaining.

The chart compares this valuation's recommended contribution with the prior valuation.

CHART 15
Actuarially Determined Contribution

	Year Beginning July 1			
	2016		2015	
	Amount	% of Compensation	Amount	% of Compensation
1. Total normal contribution rate, adjusted for timing*	\$80,236,633	12.04%	\$72,798,417	11.63%
2. Less: member contribution rate	<u>78,305,065</u>	<u>-11.75%</u>	<u>73,528,490</u>	<u>-11.75%</u>
3. Employer normal contribution rate, adjusted for timing*	\$1,931,568	0.29%	-\$730,073	-0.12%
4. Actuarial accrued liability	3,589,393,851		3,449,775,982	
5. Actuarial value of assets	2,229,292,988		2,125,017,451	
6. Unfunded actuarial accrued liability: (4) - (5)	1,360,100,863		1,324,758,531	
7. Payment on unfunded actuarial accrued liability, adjusted for timing*	86,189,591	12.93%	82,360,453	13.16%
8. Actuarially determined contribution (3) + (7)	<u>\$88,121,159</u>	<u>13.22%</u>	<u>\$81,630,380</u>	<u>13.04%</u>
9. Total payroll supplied by System, annualized	\$627,002,353		\$589,783,780	
10. Projected annual payroll for fiscal year beginning July 1	\$666,426,087		\$625,774,379	

* Normal cost includes administrative expenses and contributions are assumed to be paid at the middle of every month

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

The actuarially determined contribution as of July 1, 2016, is based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. It includes all changes affecting future costs, adopted benefit changes, actuarial gains and losses, and changes in the actuarial assumptions.

Reconciliation of Actuarially Determined Contribution

The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

The chart reconciles the actuarially determined contribution from the prior valuation to the amount determined in this valuation.

CHART 16

Reconciliation of Actuarially Determined Contribution from July 1, 2015 to July 1, 2016

	July 1, 2016	July 1, 2015
1. Prior valuation	13.04%	11.57%
2. Increases/(decreases) due to:		
a. Change in amortization period (decrease from 29 years to 28 years remaining as of July 1, 2015 and decrease from 28 years to 27 years remaining as of July 1, 2016)	0.00%	0.00%
b. Change in covered payroll and normal cost	-0.39%	-0.23%
c. Employer contributions received at 12.75% rather than 13.04% for FY2016 and 12.75% rather than 11.57% for FY2015	-0.06%	-0.15%
d. Liability experience	0.07%	0.04%
e. Investment experience	0.32%	-0.53%
f. Legislative changes	0.00%	0.00%
g. Change in actuarial assumptions	0.00%	2.34%
h. Change to valuation software as a result of the actuarial audit	0.24%	0.00%
i. Total	<u>0.18%</u>	<u>1.47%</u>
3. Current valuation (1. + 2.i.)	13.22%	13.04%
4. Statutory employer contribution rate	12.75%	12.75%
5. Margin available [contribution sufficiency/(deficiency)] (4. – 3.)	<u>-0.47%</u>	<u>-0.29%</u>

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

D. ADDITIONAL INFORMATION

Critical information to assess the funding progress is the historical comparison of the actuarially determined contribution (annual required contribution prior to July 1, 2014) to the actual contributions. Chart 17 below presents a graphical representation of this information for TFFR.

The other critical piece of information regarding TFFR's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Plan. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

Chart 18 shows the funded ratio calculated using both the actuarial value of assets and the market value of assets.

The details regarding the calculations of these values may be found in Section 4.

CHART 17
Actuarially Determined Versus Actual Employer Contributions, Years Ended June 30

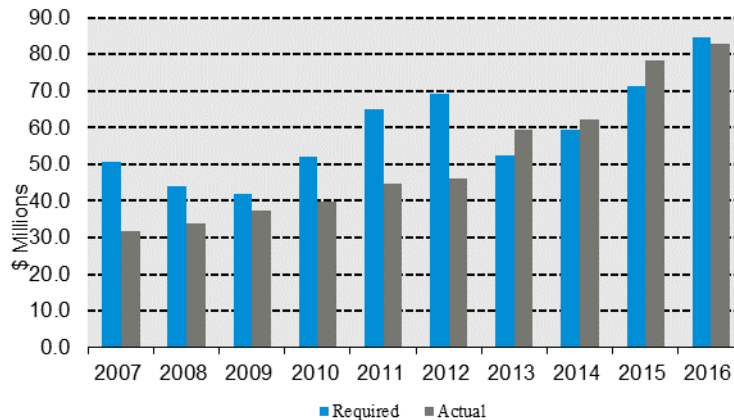
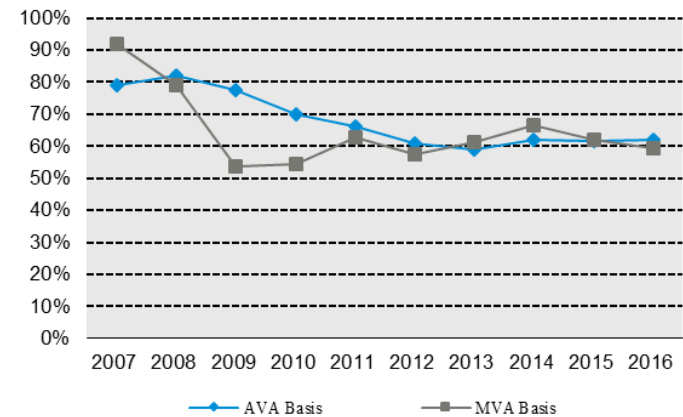


CHART 18
Funded Ratio, Years Ended June 30



SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

Membership Data

Membership data was provided on electronic files sent by the RIO staff. Data for active members includes sex, birth date, service, salary for the prior fiscal year, and accumulated contributions. Data for inactive members was similar, but also includes the members' unreduced benefit. For retired members, data includes status (service retiree, disabled retiree or beneficiary), sex, birth date, pension amount, date of retirement, form of payment, and beneficiary sex and birth date if applicable.

While not verifying the correctness of the data at the source, we performed various tests to ensure the internal consistency of the data and its overall reasonableness.

Membership statistics are summarized in Exhibit A. Exhibit B summarizes certain active member data, and the age/service distribution of active members among tiers is shown in Exhibit C. Exhibit D-1 and Exhibit D-2 show the distribution of retirees by option and by benefit amount. Exhibit E shows a reconciliation of the member data from last year's valuation to this year's valuation.

The number of active members increased by 2.8% since last year, from 10,514 to 10,813. Note that normally the actual number of members employed during the year will be somewhat higher than the valuation count, since the July 1 count excludes most June and July retirees but does not include new teachers joining the system for the next school year.

Total payroll increased 6.3% since last year. For all comparative purposes, payroll is the amount supplied by the RIO staff (i.e., the 2015-2016 member pay), annualized. However, this figure is increased by one year's assumed pay increase to determine the member's rate of pay (and thus, total projected payroll) at July 1, 2016. Pay is assumed to change only at the beginning of a school/fiscal year.

Average pay increased by 3.4%, from \$56,095 to \$57,986. This includes the impact of replacing more highly paid members who retire with new teachers. The average increase in salary for the 9,661 continuing members (members active in both this valuation and the preceding valuation) was 6.0%.

The average age of active members decreased from 42.5 years to 42.3 years, and their average service decreased from 12.4 years to 12.1 years.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

The table below shows additional information about the active membership this year and last year. Tier 1 Grandfathered members are those who had 65 points as of June 30, 2013, or were at least age 55 and vested. Members who joined prior to June 30, 2008, and did not meet these criteria are considered Tier 1 Non-grandfathered members. Tier 2 members are those hired or rehired after June 30, 2008. All new members in future years will enter as Tier 2 members, so the number will increase over time. The Tier 1 Grandfathered and Non-grandfathered population will decrease each year as members leave due to retirement, termination, death, and disability.

Active Statistics		
	July 1, 2016	July 1, 2015
1. Plan Eligibility		
a. Tier 1 Grandfathered	2,559	2,869
b. Tier 1 Non-grandfathered	3,272	3,312
c. Tier 2	<u>4,982</u>	<u>4,333</u>
d. Total	10,813	10,514
2. Benefit Eligibility		
a. Non-Vested	3,380	3,145
b. Vested	5,608	5,494
c. Early Retirement	851	888
d. Normal Retirement	<u>974</u>	<u>987</u>
e. Total	10,813	10,514

In addition, this table shows the number of members who are non-vested, those who are vested but not eligible for retirement, those who are eligible only for an early retirement (reduced) benefit, and those eligible for a normal (unreduced) benefit. As of the valuation date, 1,825 members were eligible for either reduced or unreduced retirement, a decrease over last year's figure of 1,875.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT A Member Data	July 1, 2016	July 1, 2015
1. Active members		
a. Males	2,742	2,670
b. Females	8,071	7,844
c. Total members	10,813	10,514
d. Total payroll supplied by System, annualized	\$627,002,353	\$589,783,780
e. Average salary	\$57,986	\$56,095
f. Average age	42.3	42.5
g. Average service	12.1	12.4
h. Total contributions with interest	\$792,788,975	\$737,479,504
i. Average contribution with interest	\$73,318	\$70,143
2. Vested inactive members		
a. Number	1,601	1,607
b. Total annual deferred benefits	\$11,131,831	\$10,722,390
c. Average annual deferred benefit	\$6,953	\$6,672
d. Average age	49.3	49.3
3. Non-vested inactive members		
a. Number	779	660
b. Employee contributions with interest due	\$5,214,7	\$3,659,588
c. Average refund due	\$6,702	\$5,545
d. Average age	37.0	37.5
4. Service retirees		
a. Number	7,435	7,250
b. Total annual benefits	\$175,417,123	\$166,577,429
c. Average annual benefit	\$23,593	\$22,976
d. Average age	71.3	71.0
5. Disabled retirees		
a. Number	128	128
b. Total annual benefits	\$1,885,987	\$1,869,981
c. Average annual benefit	\$14,734	\$14,609
d. Average age	62.7	62.0
6. Beneficiaries		
a. Number	686	647
b. Total annual benefits	\$9,929,829	\$8,970,707
c. Average annual benefit	\$14,475	\$13,865
d. Average age	72.9	73.8

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT B

Historical Summary of Active Member Data

Year Ending June 30,	<u>Active Members</u>		<u>Total Payroll Supplied by System, Annualized</u>		<u>Average Salary</u>		Average Age	Average Service
	Number	Percent Increase/ (Decrease)	Amount in \$ Millions	Percent Increase/ (Decrease)	\$ Amount	Percent Increase/ (Decrease)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1997	10,010	2.2%	294.1	4.6%	29,382	2.3%	43.4	14.0
1998	9,896	-1.1%	298.4	1.5%	30,156	2.6%	43.5	14.0
1999	10,046	1.5%	314.6	5.4%	31,318	3.9%	44.0	14.4
2000	10,025	-0.2%	323.0	2.7%	32,223	2.9%	43.9	14.1
2001	10,239	2.1%	342.2	5.9%	33,421	3.7%	44.4	14.4
2002	9,931	-3.0%	348.1	1.7%	35,052	4.9%	44.5	14.4
2003	9,916	-0.2%	367.9	5.7%	37,105	5.9%	44.8	14.6
2004	9,826	-0.9%	376.5	2.3%	38,321	3.3%	44.9	14.7
2005	9,801	-0.3%	386.6	2.7%	39,447	2.9%	44.9	14.7
2006	9,585	-2.2%	390.1	0.9%	40,703	3.2%	44.8	14.6
2007	9,599	0.1%	401.3	2.9%	41,810	2.7%	44.7	14.5
2008	9,561	-0.4%	417.7	4.1%	43,684	4.5%	44.6	14.4
2009	9,707	1.5%	440.0	5.3%	45,327	3.8%	44.5	14.3
2010	9,907	2.1%	465.0	5.7%	46,937	3.6%	44.2	14.0
2011	10,004	1.0%	488.8	5.1%	48,857	4.1%	43.9	13.8
2012	10,014	0.1%	505.3	3.4%	50,458	3.3%	43.7	13.7
2013	10,138	1.2%	526.7	4.2%	51,953	3.0%	43.2	13.2
2014	10,305	1.6%	557.2	5.8%	54,073	4.1%	42.9	12.8
2015	10,514	2.0%	589.8	5.8%	56,095	3.7%	42.5	12.4
2016	10,813	2.8%	627.0	6.3%	57,986	3.4%	42.3	12.1

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT C

**Members in Active Service as of June 30, 2016
By Age, Years of Service, and Average Compensation**

Age	Years of Credited Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	411	411	--	--	--	--	--	--	--	--
	38,535	38,535	--	--	--	--	--	--	--	--
25 - 29	1,621	1,285	336	--	--	--	--	--	--	--
	45,205	44,030	49,699	--	--	--	--	--	--	--
30 - 34	1,616	545	865	206	--	--	--	--	--	--
	50,185	44,938	51,989	56,494	--	--	--	--	--	--
35 - 39	1,382	340	348	552	142	--	--	--	--	--
	56,728	47,932	55,479	60,830	64,909	--	--	--	--	--
40 - 44	1,249	228	210	249	458	103	1	--	--	--
	61,402	49,482	57,248	62,698	66,762	69,301	59,863	--	--	--
45 - 49	1,357	184	153	181	292	398	146	3	--	--
	65,668	52,803	56,837	64,118	67,662	70,432	76,102	64,788	--	--
50 - 54	1,259	161	92	130	155	185	408	127	1	--
	66,925	53,501	59,260	59,864	64,604	71,057	73,472	72,398	80,435	--
55 - 59	1,068	128	81	95	123	144	188	198	111	--
	67,244	54,221	56,218	60,336	67,981	69,713	71,465	75,141	70,965	--
60 - 64	678	74	38	68	77	87	86	65	137	46
	67,241	52,353	55,310	61,660	62,746	70,455	69,741	74,326	73,173	78,387
65-70	145	28	11	13	24	13	17	10	9	20
	65,823	64,539	54,873	53,256	61,659	59,646	72,528	80,161	69,474	76,311
70 & over	27	12	4	1	2	1	--	3	1	3
	51,034	38,795	57,439	39,640	59,001	72,975	--	65,992	78,003	58,674
Total	10,813	3,396	2,138	1,495	1,273	931	846	406	259	69
	57,986	45,908	53,618	60,784	66,266	70,174	73,065	74,132	72,144	76,928

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT D-1

Schedule of Annuitants by Type of Benefit as of July 1, 2016

Type of Benefits/ Form of Payment	Number	Annual Benefits Amount	Average Monthly Benefits
Service:			
Straight Life	2,917	\$59,292,259	\$1,694
100% J&S	3,035	82,538,546	2,266
50% J&S	644	16,890,793	2,186
5 Years C&L	19	274,660	1,205
10 Years C&L	175	3,398,376	1,618
20 Years C&L	100	2,296,394	1,914
Level	<u>545</u>	<u>10,726,095</u>	<u>1,640</u>
Subtotal:	7,435	\$175,417,123	\$1,966
Disability:			
Straight Life	105	\$1,573,577	\$1,261
100% J&S	14	176,960	1,053
50% J&S	7	104,057	1,239
5 years C&L	1	6,254	521
10 Years C&L	0	0	0
20 Years C&L	1	9,663	805
Level	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal:	128	\$1,885,987	\$1,228
Beneficiaries:			
Straight Life	662	\$9,692,053	\$1,220
5 Years Certain Only	3	8,505	236
10 Years Certain Only	11	92,606	702
20 Years Certain Only	<u>10</u>	<u>136,664</u>	<u>1,139</u>
Subtotal:	686	\$9,929,828	\$1,206
Total:	8,249	\$187,232,938	\$1,891

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

**EXHIBIT D-2
Schedule of Annuitants by Monthly Benefit as of July 1, 2016**

Monthly Benefit Amount	Number of Members	Female	Male	Average Service
Under \$200	241	179	62	6.27
200 - 399	461	348	113	11.88
400 - 599	445	348	97	16.64
600 - 799	387	281	106	20.45
800 - 999	398	292	106	22.61
1,000 - 1,199	506	380	126	25.86
1,200 - 1,399	528	359	169	27.55
1,400 - 1,599	583	379	204	29.13
1,600 - 1,799	619	414	205	29.25
1,800 - 1,999	608	407	201	30.12
2,000 - 2,199	557	381	176	30.09
2,200 - 2,399	514	335	179	30.67
2,400 - 2,599	406	269	137	32.00
2,600 - 2,799	356	232	124	32.53
2,800 - 2,999	336	210	126	33.02
3,000 - 3,199	292	202	90	33.48
3,200 - 3,399	239	155	84	34.49
3,400 - 3,599	175	102	73	33.99
3,600 - 3,799	144	78	66	35.41
3,800 - 3,999	105	62	43	35.26
4,000 & over	<u>349</u>	<u>168</u>	<u>181</u>	<u>36.54</u>
Total:	8,249	5,581	2,668	27.41

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT E

Reconciliation of Member Data by Status

	Active Members	Vested Terminated Members	Non-Vested Terminated Members	Service Retirees	Disabled Retirees	Beneficiaries	Total
A. Number as of July 1, 2015	10,514	1,607	660	7,250	128	647	20,806
B. Additions and new hires	1,032	0	8	0	0	0	1,040
C. Participant movement							
1. Retirement	-296	-57	0	354	-1	0	0
2. Disability	-3	-2	0	0	5	0	0
3. Died with beneficiary	-3	0	0	-58	-2	67	4**
4. Died without beneficiary	-4	-1	-1	-111	-1	-24	-142
5. Terminated vested	-164	164	0	0	0	0	0
6. Terminated non-vested	-205	0	205	0	0	0	0
7. Refunds	-176	-37	-47	0	0	0	-260
8. Rehired as active	120	-73	-46	0	-1	0	0
9. Expired benefits	0	0	0	0	0	-5	-5
10. New alternate payee	0	0	0	0	0	1	1
11. Data corrections	<u>-2*</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>-2</u>
D. Number as of July 1, 2016	10,813	1,601	779	7,435	128	686	21,442

**Removed from database after being reported to TFFR in error*

***Due to multiple beneficiaries*

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT F

Statement of Change in Plan Net Assets for Year Ended June 30, 2016

	As of June 30	
	2016	2015
A. Assets available at beginning of year	\$2,141,920,800	\$2,090,415,057*
B. Revenue for the year		
1. Contributions		
a. Employee contributions	\$76,342,685	\$72,268,451
b. Employer contributions	82,839,932	78,422,098
c. Purchased service credit	2,768,245	1,600,739
d. Interest, penalties and other	<u>44,966</u>	<u>172,474</u>
e. Total	\$161,995,828	\$152,463,762
2. Income		
a. Interest, dividends, and other income	\$49,982,337	\$40,486,496
b. Securities lending income	304,571	0
c. Investment expenses	-6,034,689	-6,916,830
d. Security lending expenses	<u>-60,907</u>	<u>0</u>
e. Net	\$44,191,312	\$33,569,666
3. Net realized and unrealized gains/(losses)	<u>-35,952,316</u>	<u>39,635,140</u>
4. Total revenue: (1e) + (2c) + (3)	\$170,234,824	\$225,668,568
C. Expenditures for the year		
1. Benefits and refunds		
a. Refunds	\$5,350,896	\$3,889,671
b. Regular annuity benefits	179,625,551	167,792,430
c. Partial lump-sum benefits paid	<u>992,233</u>	<u>557,332</u>
d. Total	\$185,968,680	\$172,239,433
2. Administrative and miscellaneous expenses	<u>1,851,656</u>	<u>1,923,392</u>
3. Total expenditures	\$187,820,336	\$174,162,825
D. Increase/(decrease) in net assets: (B4 – C3)	-\$17,585,512	\$51,505,743
E. Value of assets at end of year: (A + D)	<u>\$2,124,335,288</u>	<u>\$2,141,920,800</u>

* The market value of assets as of June 30, 2014 was restated due to GASB 68 implementation.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT G

Statement of Plan Net Assets (Assets at Market or Fair Value)

	As of June 30	
	2016	2015
1. Cash and cash equivalents (operating cash)	\$19,747,422	\$18,964,788
2. Invested securities lending collateral	19,859,451	0
3. Receivables:		
a. Member and employer contributions	\$25,494,939	\$23,591,127
b. Investment income	9,517,943	8,574,358
c. Miscellaneous receivables	<u>7,963</u>	<u>20,646</u>
d. Total receivables	\$35,020,845	\$32,186,131
4. Investments		
a. Invested cash	\$18,515,640	\$29,631,182
b. Domestic equities	477,387,621	461,830,284
c. International equities	654,529,861	652,582,263
d. Domestic fixed income	358,183,152	379,036,997
e. International fixed income	120,903,608	101,138,757
f. Real assets	369,771,496	389,351,436
g. Private equity	<u>73,374,321</u>	<u>81,662,078</u>
h. Total investments	\$2,072,665,699	\$2,095,232,997
5. Total assets: (1) + (2) + (3d) + (4h)	\$2,147,293,417	\$2,146,383,916
6. Deferred outflows of resources related to pensions	\$168,324	\$76,002
7. Liabilities		
a. Securities lending collateral	\$19,859,451	\$0
b. Accounts payable	128,532	151,094
c. Accrued expenses	1,354,756	1,193,136
d. Investment expenses payable	<u>1,713,404</u>	<u>3,101,713</u>
e. Total liabilities	\$23,056,143	\$4,445,943
8. Deferred inflows related to pensions	\$70,310	\$93,175
9. Total market value of assets available for benefits: (5) + (6) – (7e) – (8)	\$2,124,335,288	\$2,141,920,800

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT G (continued)

Statement of Plan Net Assets (Assets at Market or Fair Value)

	As of June 30	
	2016	2015
10. Asset allocation (investments)		
a. Invested cash	0.9%	1.4%
b. Domestic equities	23.0%	22.0%
c. International equities	31.6%	31.2%
d. Domestic fixed income	17.3%	18.1%
e. International fixed income	5.8%	4.8%
f. Real estate	17.9%	18.6%
g. Private equity	<u>3.5%</u>	<u>3.9%</u>
h. Total investments	100.0%	100.0%

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT H

Development of Unfunded Actuarial Accrued Liability

	Year Ending June 30	
	2016	2015
1. Unfunded actuarial accrued liability at beginning of year	\$1,324,758,531	\$1,198,326,269
2. Normal cost at beginning of year	70,147,697	60,617,900
3. Total contributions	161,995,828	152,463,762
4. Interest on:		
(a) Unfunded actuarial accrued liability and normal cost	\$108,105,233	\$100,715,534
(b) Total contributions	<u>5,676,683</u>	<u>5,512,663</u>
(c) Total interest: (4a) – (4b)	<u>\$102,428,550</u>	<u>\$95,202,871</u>
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)	\$1,335,338,949	\$1,201,683,278
6. Changes due to (gain)/loss from:		
(a) Investments	\$33,588,108	-\$51,873,093
(b) Demographics	7,608,779	3,623,699
(c) Total changes due to (gain)/loss: (6a) + (6b)	41,196,887	-48,249,394
7. Change due to plan amendments	0	0
8. Change in actuarial cost method	0	0
9. Change in actuarial assumptions	0	171,324,647
10. Change due to actuarial audit	-16,434,973	N/A
11. Unfunded actuarial accrued liability at end of year: (5) + (6c) + (7) + (8) + (9) + (10)	<u>\$1,360,100,863</u>	<u>\$1,324,758,531</u>

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT I

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability

For Actives:

The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.

Actuarial Accrued Liability

For Pensioners:

The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Actuarial Cost Method:

A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the Actuarially Determined Contribution (ADC).

Actuarial Gain or Actuarial Loss:

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., TFFR's assets earn more than projected, salary increases are less than 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 yield in actuarial liabilities that 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.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <ol style="list-style-type: none">Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, andDiscounted according to an assumed rate (or rates) of return to reflect the time value of money.
Actuarial Present Value of Future Plan Benefits:	<p>The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.</p>
Actuarial Valuation:	<p>The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).</p>
Actuarial Value of Assets:	<p>The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.</p>

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

Actuarially Determined:	Values that 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.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under GASB. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Assumptions or Actuarial Assumptions:	<p>The estimates on which the cost of the Fund is calculated including:</p> <ul style="list-style-type: none">(a) <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;(b) <u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;(c) <u>Retirement rates</u> - the rate or probability of retirement at a given age;(d) <u>Turnover rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;(e) <u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.
Funding Period or Amortization Period:	The term "Funding Period" is used in two ways. First, it is the period used in calculating the Amortization Payment as a component of the ADC. Second, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

GASB:	Governmental Accounting Standards Board.
GASB 67 and GASB 68:	Governmental Accounting Standards Board Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Margin:	The difference, whether positive or negative, between the statutory employer contribution rate and the Actuarially Determined Contribution (ADC) as defined by GASB.
Net Pension Liability:	The Net Pension Liability is equal to Total Pension Liability minus Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability, or retirement.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount, or in relation to covered payroll, if the actuarial assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Real Rate of Return:	Nominal rate of return on investments, adjusted for inflation.
Total Pension Liability:	The actuarial accrued liability based on the blended discount rate as described in GASB 67/68.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Pensioners as of the valuation date (including 686 beneficiaries in pay status)		8,249
2. Members inactive during year ended June 30, 2016, with vested rights		1,601
3. Members active during the year ended June 30, 2016		10,813
Fully vested	7,433	
Not vested	3,380	
4. Other non-vested inactive members as of June 30, 2016		779

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. Determination of Actuarial Accrued Liability			
1. Active members			
a. Retirement benefits	\$2,118,617,183	\$636,231,737	\$1,482,385,446
b. Disability benefits	33,023,457	14,996,785	18,026,672
c. Death benefits	35,998,781	15,609,541	20,389,240
d. Withdrawal benefits	<u>141,479,143</u>	<u>138,918,945</u>	<u>2,560,198</u>
e. Total	\$2,329,118,564	\$805,757,008	\$1,523,361,556
2. Inactive vested members	84,502,367	--	84,502,367
3. Inactive non-vested members	5,214,727	--	5,214,727
4. Retirees and beneficiaries	<u>1,976,315,201</u>	--	<u>1,976,315,201</u>
5. Total	\$4,395,150,859	\$805,757,008	\$3,589,393,851
B. Determination of Unfunded Actuarial Accrued Liability			
1. Actuarial accrued liability			\$3,589,393,851
2. Actuarial value of assets			<u>2,229,292,288</u>
3. Unfunded actuarial accrued liability: (1) – (2)			\$1,360,100,863

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT II

Actuarial Balance Sheet

	July 1, 2016	July 1, 2015
A. Assets		
1. Current Assets		
a. Market Value	\$2,124,335,288	\$2,141,920,800
b. Adjustment for actuarial value	<u>104,957,700</u>	<u>-16,903,349</u>
c. Actuarial value of assets	\$2,229,292,288	\$2,125,017,451
2. Actuarial present value of future contributions		
a. Member contributions	\$859,717,173	\$799,757,682
b. Employer normal costs	-53,959,465	-63,391,746
c. Unfunded actuarial accrued liability	<u>\$1,360,100,863</u>	<u>1,324,758,531</u>
d. Total	\$2,165,858,571	\$2,061,124,467
3. Total (1c + 2d)	<u>\$4,395,150,859</u>	<u>\$4,186,141,918</u>
B. Liabilities (Present Value of Projected Benefits)		
1. Retirees and beneficiaries	\$1,976,315,201	\$1,874,669,272
2. Inactive members	89,717,094	85,198,880
3. Active members	<u>2,329,118,564</u>	<u>2,226,273,766</u>
4. Total	<u>\$4,395,150,859</u>	<u>\$4,186,141,918</u>

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT III

Comparison of Employer Contribution to Actuarially Determined Contribution

Fiscal Year	Actuarially Determined Contribution (ADC) ¹		Actual Employer Contribution ²		Percentage of ADC Contributed
	% of Payroll ³	Amount ⁴	% of Payroll	Amount	[(5)/(3)]
(1)	(2)	(3)	(4)	(5)	(6)
2007	12.29%	50,532,462	7.75%	31,865,466	63.1%
2008	10.15%	44,114,585	7.75%	33,683,550	76.4%
2009	9.24%	41,986,174	8.25%	37,487,655	89.3%
2010	10.78%	52,053,217	8.25%	39,836,646	76.5%
2011	12.79%	65,112,696	8.75%	44,545,433	68.4%
2012	13.16%	69,373,794	8.75%	46,126,193	66.5%
2013	9.49% ⁵	52,396,153	10.75%	59,352,860	113.3%
2014	10.26%	59,513,485	10.75%	62,355,146	104.8%
2015	11.57%	71,167,632	12.75%	78,422,098	110.2%
2016	13.04%	84,724,122	12.75%	82,839,932	97.8%

¹ Prior to FY 2014, the ADC is the same as the GASB ARC determined under GASB 25.

² Prior to FY 2014, these amounts include prior year corrections.

³ The ADC for each fiscal year is based on the actuarial valuation as of the beginning of the year. Therefore, the FY 2016 ADC is based on the July 1, 2015 valuation. The ADC is defined as the contribution rate required to pay the employer normal cost and to amortize the unfunded actuarial accrued liability over the closed 30-year period that began July 1, 2013 as a level percentage of payroll.

⁴ The dollar amount of the ADC for FY2014 through FY 2016 is based on actual payroll for the year and differs from the estimated dollar amount shown in the prior year's actuarial valuation report because of differences between estimated and actual payroll.

⁵ The FY 2013 ADC reflects the actuarial present value of the increased statutory contributions scheduled to occur July 1, 2014.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT IV

Schedule of Employer Contributions

Fiscal Year	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Actual Covered Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2013	\$52,396,153	\$59,300,720	\$(6,904,567)	\$551,655,590	10.75%
2014	59,513,485	62,355,146	(2,841,661)	580,053,235	10.75%
2015	71,167,632	78,422,098	(7,254,466)	615,104,860	12.75%
2016	84,724,122	82,839,932	1,884,190	649,724,868	12.75%

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT V

Schedule of Funding Progress

Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded/ Accrued Liability (UAAL) (3) – (2)	Funded Ratio (2) / (3)	Total Payroll Supplied by System, Annualized	UAAL as a % of Compensation (4) / (6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
07/01/2007	1,750,100,000	2,209,300,000	459,200,000	79.2%	401,300,000	114.4%
07/01/2008	1,909,500,000	2,330,600,000	421,200,000	81.9%	417,700,000	100.8%
07/01/2009	1,900,327,834	2,445,896,710	545,568,876	77.7%	439,986,705	124.0%
07/01/2010	1,841,960,220	2,637,165,045	795,204,825	69.8%	465,007,110	171.0%
07/01/2011	1,822,598,871	2,749,751,755	927,152,884	66.3%	488,764,292	189.7%
07/01/2012	1,748,080,771	2,871,870,286	1,123,789,515	60.9%	505,285,069	222.4%
07/01/2013	1,762,321,644	2,997,139,087	1,234,817,443	58.8%	526,698,342	234.4%
07/01/2014	1,940,473,504	3,138,799,773	1,198,326,269	61.8%	557,222,917	215.1%
07/01/2015	2,125,017,451	3,449,775,982	1,324,758,531	61.6%	589,783,780	224.6%
07/01/2016	2,229,292,988	3,589,393,851	1,360,100,863	62.1%	627,002,353	216.9%

Note: Numbers for 7/1/2007 – 7/1/2008 valuation dates are rounded

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Exhibit VI

Determination of Contribution Sufficiency

			July 1, 2016	
A. Statutory Contributions			Percent of Payroll	Dollar Amount
1. Member contributions			11.75%	\$78,305,065
2. Employer contributions			<u>12.75%</u>	<u>84,969,326</u>
3. Total			<u>24.50%</u>	<u>\$163,274,391</u>
B. Actuarially Determined Contribution			Percent of Payroll	Dollar Amount
1. Gross normal cost:				
(a) Retirement			9.06%	\$60,354,225
(b) Disability			0.20%	1,336,108
(c) Death			0.22%	1,451,543
(d) Deferred termination benefit and refunds			<u>1.85%</u>	<u>12,334,187</u>
(e) Total normal cost as of July 1			<u>11.33%</u>	<u>75,476,063</u>
2. Gross normal cost including administrative expenses and adjusted for timing			12.04%	80,236,633*
3. Less member contribution rate			11.75%	78,305,065
4. Employer normal cost rate: (2) – (3)			0.29%	1,931,568
5. Unfunded actuarial accrued liability rate, adjusted for timing			12.75%	86,189,591
6. Total: (4) + (5)			<u>13.22%</u>	<u>88,121,159</u>
C. Contribution Sufficiency / (Deficiency): (A.2) – (B.6)			-0.47%	-\$3,151,833
Projected annual payroll for fiscal year beginning on the valuation date				\$666,426,087

* Includes expected administrative expenses of \$1,902,577

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT VII
Solvency Test

	July 1, 2016	July 1, 2015
1. Actuarial accrued liability (AAL)		
a. Active member contributions	\$792,788,975	\$737,479,504
b. Retirees and beneficiaries	1,976,315,201	1,874,669,272
c. Active and inactive members (employer financed)	<u>820,289,675</u>	<u>837,627,206</u>
d. Total	\$3,589,393,851	\$3,449,775,982
2. Actuarial value of assets	2,229,292,988	2,125,017,451
3. Cumulative portion of AAL covered		
a. Active member contribution	100.0%	100.0%
b. Retirees and beneficiaries	51.4%	74.0%
c. Active and inactive members (employer financed)	0.0%	0.0%

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EXHIBIT VIII

Net Pension Liability

	June 30, 2016	June 30, 2015
The components of the net pension liability were as follows:		
Total pension liability	\$3,589,393,851	\$3,449,775,982
Plan fiduciary net position	<u>(2,124,335,288)</u>	<u>(2,141,920,800)</u>
Net pension liability	\$1,465,058,563	\$1,307,855,182
Plan fiduciary net position as a percentage of the total pension liability	59.2%	62.1%

The net pension liability was measured as of June 30, 2016, and is determined based on the total pension liability from the July 1, 2016, actuarial valuation.

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of July 1, 2016.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2016, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75%
Salary increases	4.25% to 14.50%, varying by service, including inflation and productivity
Investment rate of return	7.75%, net of investment expenses
Cost-of-living adjustments	None

For active and inactive members, mortality rates were based on the RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. For healthy retirees, mortality rates were based on the RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. For disabled retirees, mortality rates were based on the RP-2014 Disabled Mortality Table set forward four years.

The actuarial assumptions used were based on the results of an experience study dated April 30, 2015. They are the same as the assumptions used in the July 1, 2016 funding actuarial valuation.

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The long-term expected investment rate of return assumption was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the Fund's target asset allocation are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Global Equities	58%	7.30%
Global Fixed Income	23%	0.88%
Global Real Assets	18%	5.32%
Cash Equivalents	<u>1%</u>	0.00%
Total	100%	

Discount rate: The long-term expected rate of return on pension plan investments is 7.75%. The high quality tax-exempt general obligation municipal bond rate (20-Bond GO Index) as of the closest date prior to the valuation date of June 30, 2016, is 2.85%, as published by the Board of Governors of the Federal Reserve System.

The discount rate used to measure the total pension liability was 7.75% as of June 30, 2016. The projection of cash flows used to determine the discount rate assumes that member and employer contributions will be made at rates equal to those based on this July 1, 2016, Actuarial Valuation Report. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments for current plan members as of June 30, 2016. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability as of June 30, 2016.

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Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability as of June 30, 2016, and June 30, 2015, calculated using the discount rate of 7.75%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.75%) or 1-percentage-point higher (8.75%) than the current rate:

	1% Decrease	Current Discount Rate	1% Increase
Net pension liability as of June 30, 2015	\$1,728,392,470	\$1,307,855,182	\$957,135,967
Net pension liability as of June 30, 2016	\$1,900,291,033	\$1,465,058,563	\$1,102,551,032

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EXHIBIT IX

Schedules of Changes in Net Pension Liability

	2016	2015
Total pension liability		
Service cost	\$68,239,440	\$60,617,900
Interest	265,439,909	249,063,837
Change of benefit terms	0	0
Differences between expected and actual experience	(8,092,800)	2,209,258
Changes of assumptions	0	171,324,647*
Benefit payments, including refunds of employee contributions	<u>(185,968,680)</u>	<u>(172,239,433)</u>
Net change in total pension liability	\$139,617,869	\$310,976,209
Total pension liability – beginning	<u>3,449,775,982</u>	<u>3,138,799,773</u>
Total pension liability – ending (a)	<u>\$3,589,393,851</u>	<u>\$3,449,775,982</u>
Plan fiduciary net position		
Contributions – employer	\$82,839,932	\$78,422,098
Contributions – member	76,342,685	72,268,451
Contributions – purchased service credit	2,768,245	1,600,739
Contributions – other	44,966	172,474
Net investment income	8,238,996	73,204,806
Benefit payments, including refunds of employee contributions	(185,968,680)	(172,239,433)
Administrative expense	<u>(1,851,656)</u>	<u>(1,923,392)</u>
Net change in plan fiduciary net position	(\$17,585,512)	\$51,505,743
Plan fiduciary net position – beginning	<u>2,141,920,800</u>	<u>2,090,415,057**</u>
Plan fiduciary net position – ending (b)	\$2,124,335,288	\$2,141,920,800
Net pension liability – ending (a) – (b)	<u>\$1,465,058,563</u>	<u>\$1,307,855,182</u>
Plan fiduciary net position as a percentage of the total pension liability	59.2%	62.1%
Actual covered employee payroll	\$649,724,868	\$615,104,860
Plan net pension liability as percentage of covered employee payroll	225.5%	212.6%

* Increase in net pension liability due to changes in assumptions resulted primarily from a decrease in the investment return assumption and an updated mortality improvement scale.

** Restated due to GASB implementation.

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**EXHIBIT X
Summary of Assumptions and Methods**

Investment Return Rate: 7.75% per annum, compounded annually, equal to an assumed 2.75% inflation rate plus a 5.50% real rate of return, less 0.50% for expected investment expenses. (Adopted effective July 1, 2015)

Mortality Rates:
Post-Retirement Non-Disabled*: RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. (Adopted effective July 1, 2015) Sample 2014 mortality rates are as follows:

Age	Male	Female
50	0.20%	0.14%
55	0.27%	0.17%
60	0.37%	0.24%
65	0.51%	0.37%
70	0.77%	0.58%
75	1.22%	0.95%
80	3.62%	2.82%
85	6.93%	5.40%
90	12.15%	9.56%
95	20.11%	16.30%
100	29.38%	25.11%

The mortality tables were then adjusted to future years using the generational projection to reflect future mortality improvement.

Post-Retirement Disabled*: RP-2014 Disabled Mortality Table set forward 4 years. (Adopted effective July 1, 2015)

Pre-Retirement Non-Disabled*: RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. (Adopted effective July 1, 2015)

*The mortality rates were based on historical and current demographic data, as used in the experience study dated April 30, 2015. The underlying tables reasonably reflect the mortality experience of the Fund as of the measurement date.

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Retirement Rates:

The following rates of retirement are assumed for members eligible to retire. (Adopted effective July 1, 2015.)

Age	Unreduced Retirement *		Reduced Retirement
	Male	Female	Male/Female
50-54	15.00%	15.00%	
55-57	15.00%	15.00%	2.00%
58	15.00%	15.00%	3.00%
59	15.00%	15.00%	3.50%
60	15.00%	15.00%	4.00%
61	25.00%	25.00%	6.50%
62	35.00%	35.00%	9.00%
63	25.00%	30.00%	12.00%
64	35.00%	40.00%	12.00%
65	40.00%	50.00%	
66	30.00%	40.00%	
67	30.00%	30.00%	
68	25.00%	30.00%	
69	25.00%	30.00%	
70-74	25.00%	25.00%	
75	100.00%	100.00%	

* If a member reaches eligibility for unreduced retirement before age 65 under the rule of 85 (Grandfathered Tier 1) or the Rule of 90/Age 60 (Non-grandfathered Tier 1 and Tier 2), 10% is added to the rate at the age (and only this age) the member becomes first eligible for an unreduced retirement benefit.

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Disability Rates:

Shown below for selected ages. (Adopted effective July 1, 2010.)

Age	Rates
20	0.011%
25	0.011%
30	0.011%
35	0.011%
40	0.033%
45	0.055%
50	0.088%
55	0.154%
60	0.297%

Termination Rates:

Termination rates based on years of service, for causes other than death, disability, or retirement. (Adopted effective July 1, 2015.)

Years from Hire	Male	Female
0	20.00%	20.00%
1	14.00%	12.00%
2	11.00%	9.00%
3	8.00%	7.00%
4	6.50%	6.00%
5	5.00%	5.00%
6	4.00%	4.00%
7	3.50%	3.50%
8	3.00%	3.00%
9	2.50%	2.50%
10	2.50%	2.50%
11	2.00%	2.50%
12	2.00%	2.50%
13	2.00%	2.50%
14	2.00%	2.50%
15-18	1.50%	2.00%
19	0.75%	2.00%
20-24	0.75%	1.50%
25 & over	0.75%	0.75%

Termination rates eliminated at first retirement eligibility

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Salary Increase Rates:

Inflation rate of 2.75% plus productivity increase rate of 1.50%, plus step-rate/promotional increase as shown below. (Adopted effective July 1, 2015.)

Years from Hire	Annual Step-Rate Promotional Component	Annual Total Salary Increase
0	10.25	14.50
1	3.50	7.75
2	3.25	7.50
3	3.00	7.25
4	2.75	7.00
5	2.50	6.75
6	2.25	6.50
7	2.00	6.25
8-9	1.75	6.00
10-11	1.50	5.75
12-13	1.25	5.50
14-15	1.00	5.25
16-18	0.75	5.00
19-22	0.50	4.75
23-24	0.25	4.50
25 & over	0.00	4.25

Payroll Growth Rate:

3.25% per annum. This assumption does not include any allowance for future increase in the number of members. (Adopted effective July 1, 2010.)

Percent Married:

For valuation purposes, 75% of members are assumed to be married. Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses. (Adopted effective July 1, 1992.)

Percent Electing a Deferred Termination Benefit:

Terminating members are assumed to elect the most valuable benefit at the time of termination. Termination benefits are assumed to commence at the first age at which unreduced benefits are available. (Adopted effective July 1, 1990.)

Loading Factor for New Retirees:

The liability includes a 3% load for members who retired during the year ended June 30, 2016, to reflect that their benefit is not finalized as of the valuation date.

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Annual Administrative Expenses:	Administrative expenses of \$1,902,577 (actual expenses for the previous year, increased with inflation) are expected to be paid monthly for the year beginning July 1, 2016.
Asset Valuation Method:	The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The actual investment return for this purpose is determined net of all investment expenses. The actuarial value is further adjusted, if necessary, to be within 20% of the market value.
Actuarial Cost Method:	Normal cost and actuarial accrued liability are calculated on an individual basis and are allocated by salary. Entry age is determined as the age at member's enrollment in TFFR. The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.
Amortization Period and Method:	The actuarially determined contribution (ADC) is determined as the sum of (a) the employer normal cost rate, and (b) a level percentage of payroll required to amortize the unfunded actuarial accrued liability over the 30-year closed period that began July 1, 2013.

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EXHIBIT XI

Summary of Plan Provisions

Effective Date:	July 1, 1971
Plan Year:	Twelve-month period ending June 30 th
Administration:	The Teachers' Fund for Retirement (TFFR) is administered by a Board of Trustees. A separate State Investment Board is responsible for the investment of the trust assets, although TFFR's Board establishes the asset allocation policy. The Retirement and Investment Office is the administrative agency for TFFR.
Type of Plan:	TFFR is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is a cost-sharing multiple-employer public employee retirement system.
Eligibility:	All certified teachers of any public school in the State participate in TFFR. This includes teachers, supervisors, principals, administrators, etc. Non-certified employees such as teacher's aides, janitors, secretaries, drivers, etc. are not allowed to participate in TFFR. Eligible employees become members at their date of employment.
Member Contributions:	All active members contribute 11.75% of their salary per year. The employer may "pick up" the member's contributions under the provisions of Internal Revenue Code Section 414(h). The member contribution rate was increased from 7.75% to 9.75% effective July 1, 2012, and was increased to 11.75% effective July 1, 2014. The total addition of 4.00% to the member contribution rate will remain in effect until TFFR is 100% funded on an actuarial basis. At that point, the member contribution rate will revert to 7.75%.
Salary:	The member's total earnings are used for salary purposes, including overtime, etc., and including nontaxable wages under a Section 125 plan, but excluding certain extraordinary compensation, such as fringe benefits or unused sick and vacation leave.

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Employer Contributions:

The district or other employer that employs a member contributes a percentage of the member's salary. This percentage consists of a base percentage of 7.75%, plus, since July 1, 2008, additions as shown below.

Effective Date	Addition to 7.75% Base Rate	Employer Contribution Rate
July 1, 2008	0.50%	8.25%
July 1, 2010	1.00%	8.75%
July 1, 2012	3.00%	10.75%
July 1, 2014	5.00%	12.75%

However, the additions are subject to a “sunset” provision, so the contribution rate will revert to 7.75% once the funded ratio reaches 100%, measured using the actuarial value of assets. The contribution rate will not automatically increase if the funded ratio later falls back below 100%.

Service:

Employees receive credit for service while a member. A member may also purchase credit for certain periods, such as time spent teaching at a public school in another state, by paying the actuarially determined cost of the additional service. Special rules and limits govern the purchase of additional service.

Tiers:

Members who join TFFR by June 30, 2008 are in Tier 1, while members who join later are in Tier 2. If a Tier 1 member terminates, takes a refund, and later rejoins TFFR after June 30, 2008, that member will be in Tier 2. As of June 30, 2013, Tier 1 members who are at least age 55 and vested (3 years of service) as of the effective date, or the sum of the member's age and service is at least 65, are considered Grandfathered, and previous plan provisions will not change. Tier 1 members who do not fit these criteria as of June 30, 2013, are considered Non-grandfathered. These members, along with Tier 2, will have new plan provisions, as described below.

Final Average Compensation (FAC): The average of the member's highest three (Tier 1 members) or five (Tier 2 members) plan year salaries. Monthly benefits are based on one-twelfth of this amount.

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Normal Retirement:

a. Eligibility:

- Tier 1 members may retire upon Normal Retirement on or after age 65 with credit for 3 years of service, or if earlier, when the sum of the member's age and service is at least 85. Effective as of June 30, 2013, Tier 1 members who are at least age 55 and vested (3 years of service) as of the effective date, or the sum of the member's age and service is at least 65, normal retirement eligibility will not change (participants are Grandfathered). For those who will not meet these criteria as of June 30, 2013 (Non-grandfathered), members may retire upon Normal Retirement on or after age 65 with credit for 3 years of service, or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.
- Tier 2 members may retire upon Normal Retirement on or after age 65 with credit for 5 years of service, or, if earlier, when the sum of the member's age and service is at least 90. Effective July 1, 2013, Tier 2 members may retire upon Normal Retirement on or after age 65 with credit for 5 years of service, or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.

b. Monthly Benefit: 2.00% of FAC (monthly) times years of service.

c. Payment Form: Benefits are paid as a monthly life annuity, with a guarantee that if the payments made do not exceed the member's contributions plus interest, determined as of the date of retirement, the balance will be paid in a lump-sum to the member's beneficiary. Optional forms of payment are available; see below.

Early Retirement:

a. Eligibility: Tier 1 members may retire early after reaching age 55 with credit for three years of service, while Tier 2 members may retire early after reaching age 55 with credit for five years of service.

b. Monthly Benefit: 2.00% of FAC (monthly) times years of service, multiplied by a factor that reduces the benefit 6% for each year from the earlier of (i) age 65, or (ii) the age at which current service plus age equals 85 (Tier 1 members) or 90 (Tier 2 members). Effective July 1, 2013 for members who are either Non-grandfathered Tier 1 or Tier 2: 2.00% of FAC (monthly) times years of service, multiplied by a factor that reduces the benefit 8% for each year from the earlier of (i) age 65, or (ii) the age at which current service plus age equals 90 with a minimum age of 60.

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c. Payment Form: Same as for Normal Retirement above.

Disability Retirement:

a. Eligibility: A member is eligible provided he/she has credit for at least one year of service. Effective July 1, 2013, a member is eligible provided he/she has credit for at least five years of service.

b. Monthly Benefit: 2.00% of FAC (monthly) times years of service with a minimum 20 years of service. Effective July 1, 2013, 2.00% of FAC (monthly) times years of service.

c. Payment Form: The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement that is in excess of the sum of payments already received will be paid in a lump sum to the member's beneficiary.

d. All alternative forms of payment other than level income and the partial lump-sum option are also permitted in the case of disability retirement. For basis recovery only, disability benefits are converted to normal retirement benefits when the member reaches normal retirement age or age 65, whichever is earlier.

Deferred Termination Benefit:

a. Eligibility: A Tier 1 member with at least three years of service, or a Tier 2 member with at least five years of service, who does not withdraw his/her contributions from the fund, is eligible for a deferred termination benefit.

b. Monthly Benefit: 2.00% of FAC (monthly) times years of service. Both FAC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or when the sum of the member's age and service is 85 (Grandfathered Tier 1 members) or 90 with a minimum age of 60 (Non-grandfathered Tier 1 and Tier 2 members). Reduced benefits may commence at or after age 55 if the member is not eligible for an unreduced benefit. Reductions are the same as for Early Retirement.

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c. Payment Form: The form of payment is the same as for Normal Retirement above.

d. Death Benefit: A member who dies after leaving active service but before retiring is entitled to receive a benefit as described below.

Withdrawal (Refund) Benefit:

a. Eligibility: Tier 1 members leaving covered employment with less than three years of service, and Tier 2 members leaving covered employment with less than five years of service, are eligible. Optionally, vested members may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

b. Benefit: The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 6% per year (0.5% per month).

Death Benefit:

a. Eligibility: Death must have occurred while an active or an inactive, non-retired member.

b. Benefit: Upon the death of a nonvested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, the beneficiary may elect (i) the refund benefit above, or (ii) a life annuity of the normal retirement benefit, determined under Option One below, based on FAC and service as of the date of death, but without applying any reduction for the member's age at death. In determining the reduction for Option One, members not eligible for normal retirement benefits use the Fund's option tables for disabled members.

Optional Forms of Payment:

There are optional forms of payment available on an actuarially equivalent basis, as follows:

Option 1 - A life annuity payable while either the participant or his beneficiary is alive, "popping-up" to the original life annuity if the beneficiary predeceases the member.

Option 2 - A life annuity payable to the member while both the member and beneficiary are alive, reducing to 50% of this amount if the member predeceases the

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beneficiary, and "popping-up" to the original life annuity if the beneficiary predeceases the member.

Option 3a - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 60 payments (five years), the payments will be continued to a beneficiary for the balance of the five-year period. (This option has been replaced by Option 3b. It is not available to employees who retire on or after August 1, 2003. Retirees who elected this option prior to that date are unaffected.)

Option 3b - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 240 payments (twenty years), the payments will be continued to a beneficiary for the balance of the twenty-year period. (This option replaced Option 3a effective August 1, 2003.)

Option 4 - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 120 payments (10 years), the payments will be continued to a beneficiary for the balance of the ten-year period.

Option 5 - A non-level annuity payable to the member, designed to provide a level total income when combined with the member's Social Security benefit. This option is not available to disabled retirees.

In addition, members may elect a partial lump-sum option (PLSO) at retirement. Under this option, a member receives an immediate lump-sum equal to 12 times the monthly life annuity benefit and a reduced annuity. The reduction is determined actuarially. The member can then elect to receive the annuity benefit in one of the other optional forms, except that members who receive a PLSO may not elect Option 5 – the level income option. The PLSO is not available to disabled retirees or retirees who are not eligible for an unreduced retirement benefit.

Actuarial equivalence is based on tables adopted by the Board of Trustees.

Cost-of-living Increase:

From time to time, TFFR has been amended to grant certain post-retirement benefit increases. However, TFFR has no automatic cost-of-living increase features.

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EXHIBIT XII

Summary of Plan Changes

1991 Legislative Session:

1. Benefit multiplier increased from 1.275% to 1.39% for all future retirees.
2. Provide a post-retirement benefit increase for all annuitants receiving a monthly benefit on June 30, 1991. The monthly increase is the greater of a 10% increase or a level increase based on years of service and retirement date:
 - a. \$3 per year of service for retirements before 1980
 - b. \$2 per year of service for retirements between 1980 and 1983
 - c. \$1 per year of service for retirements from 1984 through June 30, 1991

Minimum increase is \$5 per month. Maximum increase is \$75 per month.

1993 Legislative Session:

1. Benefit multiplier increased from 1.39% to 1.55% for all future retirees.
2. Provide a post-retirement benefit increase for all annuitants receiving a monthly benefit on June 30, 1993. The monthly increase is the greater of a 10% increase or a level increase based on years of service and retirement date:
 - a. \$3 per year of service for retirements before 1980
 - b. \$2.50 per year of service for retirements between 1980 and 1983
 - c. \$1 per year of service for retirements from 1984 through June 30, 1993

Minimum increase is \$5 per month. Maximum increase is \$100 per month.

3. Minimum retirement benefit increased to \$10 times years of service up to 25, plus \$15 times years of service greater than 25. (Previously was \$6 up to 25 years of service plus \$7.50 over 25 years of service.)
4. Disability benefit changed to 1.55% of FAC times years of service using a minimum of 20 years of service.

1995 Legislative Session:

There were no material changes made during the 1995 legislative session.

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1997 Legislative Session:

1. Benefit multiplier increased from 1.55% to 1.75% for all future retirees.
2. Member contribution rate and employer contribution rate increased from 6.75% to 7.75%.
3. A \$30.00/month benefit improvement was granted to all retirees and beneficiaries.

1999 Legislative Session:

1. Active members will now be fully vested after three years (rather than five years) of service.
2. Early retirement benefits will be reduced 6% per year from the earlier of (i) age 65, or (ii) the date as of which age plus service equals 85 (rather than from age 65 in all cases).
3. An ad hoc COLA was provided for all retirees and beneficiaries. This increase is equal to an additional \$2.00 per month for each year of service plus \$1.00 per month for each year since the member's retirement.
4. The formula multiplier was increased from 1.75% to 1.88% effective July 1, 1999.

2001 Legislative Session:

1. An ad hoc COLA was provided for all retirees and beneficiaries. The ad hoc COLA increase is equal to an additional \$2.00 per month for each year of service plus \$1.00 per month for each year since the member's retirement. Retirees and beneficiaries will also receive two additional increases equal to 0.75% times the monthly benefit, payable July 1, 2001 and July 1, 2002. The two 0.75% increases are conditional. If the actuarial margin is a shortfall, i.e., is negative, by 60 basis points or more, or if the margin has been negative by 30 or more basis points for two years, the Board could elect to suspend the increase.
2. The formula multiplier was increased from 1.88% to 2.00% effective July 1, 2001.

2003 Legislative Session:

1. Partial lump-sum option adopted, equal to twelve times the monthly life annuity benefit. Not available if level-income option is elected. Not available for reduced retirement or disability retirement.
2. Five-year certain and life option replaced with 20-year certain and life. This does not impact retirees who retired under the five-years certain and life option.

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3. Employer service purchase authorized.
4. Active members of the Department of Public Instruction are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2004. Both assets and liabilities for all TFFR service will be transferred for electing employees. Transferred assets will be based on the actuarial present value of the member's accrued TFFR benefit, or the member's contribution account balance if larger.

2005 Legislative Session:

There were no material changes made during the 2005 legislative session.

2007 Legislative Session:

1. For active members hired on or after July 1, 2008 (called Tier 2 members):
 - a. Members will be eligible for an unreduced retirement benefit when they reach age 65 with at least five years of service (rather than three years of service); or if earlier, when the sum of the member's age and service is at least 90 (rather than 85).
 - b. Members will be eligible for a reduced (early) retirement benefit when they reach age 55 with five years of service, rather than three years of service.
 - c. Members will be fully vested after five years of service (rather than three year of service).
 - d. The Final Average Compensation for Tier 2 members is the average of the member's highest five plan year salaries, rather than the average of the three highest salaries.
2. The employer contribution rate increases from 7.75% to 8.25% effective July 1, 2008, but this rate will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets. (If the funded ratio later falls below 90% again, the contribution rate will not automatically return to 8.25%.)
3. Employer contributions are required on the salary of reemployed retirees.
4. Active members of the Department of Career and Technical Education are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2008. Both assets and liabilities for all TFFR service will be transferred for electing employees. Transferred assets will be the actuarial present value of the member's accrued TFFR benefit, or the member's contribution account balance, if larger.

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2009 Legislative Session:

1. An individual who retired before January 1, 2009, and is receiving monthly benefits is entitled to receive a supplemental payment from the fund. The supplemental payment is equal to an amount determined by taking twenty dollars multiplied by the member's number of years of service credit plus fifteen dollars multiplied by the number of years since the member's retirement as of January 1, 2009. The supplemental payment may not exceed the greater of 10% of the member's annual annuity or \$750.00. TFFR will make the supplemental payment in December 2009.
2. The employer contribution rate increases from 8.25% to 8.75% effective July 1, 2010, but this rate will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets. (If the funded ratio later falls below 90% again, the contribution rate will not automatically return to 8.75%.)

2011 Legislative Session:

1. The employer contribution rate increases from 8.75% to 10.75% effective July 1, 2012, and increases thereafter to 12.75% effective July 1, 2014. The member contribution rate increases from 7.75% to 9.75% effective July 1, 2012, and increases thereafter to 11.75% effective July 1, 2014. Employer and member contributions will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets.
2. For current Tier 1 members who, as of June 30, 2013, are vested (at least 3 years of service), and at least age 55, OR the sum of the member's age and service is at least 65, are considered a Tier 1 Grandfathered member. Current Tier 1 members, who will not meet this criteria as of June 30, 2013, are considered a Tier 1 Non-grandfathered member.
3. Eligibility for normal/ unreduced retirement benefits do not change for Tier 1 Grandfathered members. For Tier 1 Non-grandfathered and Tier 2 members, effective after June 30, 2013, unreduced retirement benefits start when the member reaches age 65 and is vested (3 years for Tier 1 Non-grandfathered, 5 years for Tier 2); or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.
4. Early retirement benefits do not change for Tier 1 Grandfathered members. For Tier 1 Non-grandfathered and Tier 2 members, effective after June 30, 2013, the normal retirement benefit will be reduced by 8% per year from the earlier of age 65 OR the age at which the sum of the member's age and service is at least 90, with a minimum age of 60.
5. Effective after June 30, 2013, all members may retire on disability after a period of at least five years of service (rather one year of service). The amount of the benefit is based on a 2% multiplier and actual service (rather than a minimum of twenty years of service in the current calculation).

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6. Effective July 1, 2012, re-employed retirees are required to pay member contributions.
7. Effective August 1, 2011, beneficiary and death benefit provisions were updated, and the 60-month death payment benefit was removed.

2013 Legislative Session:

1. Employer and member contribution rates will be reset to 7.75% once the Fund reaches a 100% funded ratio (rather than the 90% funded ratio enacted with the 2011 Legislation), measured using the actuarial value of assets.
2. Various technical and administrative changes that do not have an actuarial effect on the Plan were enacted.

2015 Legislative Session:

1. Various technical and administrative changes that do not have an actuarial effect on the Plan were enacted.

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