ACTUARIAL SECTION

GRS Retirement Consulting

P: 800.521.0498 | F: 763.432.5842 | www.grsconsulting.com

December 21, 2017

Ms. Jill E. Schurtz, Executive Director
St. Paul Teachers' Retirement Fund Association
1619 Dayton Avenue, Room 309
St. Paul, MN 55104-6206

Dear Ms. Schurtz:

We are pleased to present the report of the actuarial valuation of the St. Paul Teachers' Retirement Fund Association ("Fund") as of July 1, 2017. This report provides, among other things, the required annual contribution rate of the Fund for the Plan Year commencing July 1, 2017 and ending on June 30, 2018, according to prescribed assumptions.

The valuation was based upon information furnished by the Fund staff, concerning Retirement Fund benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. Their efforts in furnishing the materials needed are gratefully acknowledged. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the Fund.

The report has been prepared at the request of the Fund's Board of Trustees in accordance with Section 356.215 of the Minnesota Statutes as well as the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement. To the best of our knowledge, this report is complete and accurate, and has been prepared in accordance with prescribed assumptions and generally accepted actuarial principles and practices. This report is intended for use by the Fund and those determined or approved by the Fund's Board of Trustees. This report may be provided to parties other than the Fund only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The required contribution rate of 22.16% of pay shown on page 20 was designed to comply with Minnesota Statutes. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Please note that, given the importance of benefit security to any retirement system, we encourage all retirement systems to consider implementing funding programs that provide for contributions in excess of the levels listed in their valuation report.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section 4 of this report. This report includes risk metrics on page 8, but does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

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 or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

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

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Trustees. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis of this report. The Fund is solely responsible for communicating to GRS any changes required thereto.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Bonita J. Wurst and James D. Anderson are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

We will be pleased to review this report with you at your convenience.

Respectfully submitted,

Bonita J. Wurst — James D. Anderson

Bonita J. Wurst, ASA, EA, FCA, MAAA — James D. Anderson, FSA, EA, MAAA

BJW/JDA:rmn:dj

Summary of Valuation Results

(Dollars in Thousands)

	July 1, 2016 Valuation	July 1, 2017 Valuation
A. CONTRIBUTIONS % OF PAYROLL (Table 11)		
1. Statutory Contributions - Chapter 354A	21.52%	21.64%
2. Required Contributions - Chapter 356	22.44%	22.16%
3. Sufficiency / (Deficiency)	(0.92%)	(0.52%)
B. FUNDING RATIOS		
1. Accrued Liability Funding Ratio		
a Current Assets (Table 1)	$ 1,007,360	$ 1,038,467
b. Actuarial Accrued Liability (Table 9)	1,592,570	1,611,208
c. Funding Ratio	63.25%	64.45%
2. Projected Benefit Funding Ratio (Table 8)		
a. Current and Expected Future Assets	$ 1,741,583	$ 1,773,650
b. Current and Expected Future Benefit Obligations	1,815,411	1,847,501
c. Funding Ratio	95.93%	96.00%
C. PLAN PARTICIPANTS		
1. Active Members		
a. Number (Table 3)	3,455	3,409
b. Projected Annual Earnings	$ 271,781	$ 280,785
c. Average Annual Earnings (Projected dollars)	$ 76,094	$ 78,060
d. Average Age	44.8	44.8
e. Average Service	12.7	12.7
f. Members on Leave of Absence	79	141
2. Others		
a. Service Retirements (Table 4)	3,363	3,478
b. Disability Retirements (Table 5)	32	30
c. Survivors (Table 6)	328	343
d. Deferred Retirements (Table 7)	2,020	2,034
e. Terminated Other Non-Vested (Table 7)	2,915	2,945
f. Total - Others	8,658	8,830
3. Grand Total (1.a + 1.f + 2.f)	12,192	12,380

Accounting Balance Sheet
as of June 30, 2017
(dollars in thousands)

		Market Value	Cost Value
A. ASSETS			
1. Cash, Equivalents, Short-Term Securities		$ 32,899	$ 32,899
2. Investments			
a. Fixed Income		188,598	179,316
b. Equity		637,561	460,644
c. Real Estate		69,727	49,807
d. Alternative		102,628	95,209
3. Other Assets		3,289	3,289
B. TOTAL ASSETS		$ 1,034,702	$ 821,164
C. AMOUNTS CURRENTLY PAYABLE		$ 2,453	$ 2,453
D. ASSETS AVAILABLE FOR BENEFITS			
1. Member Reserves		$ 187,955	$ 187,966
2. Employer Reserves		844,294	630,745
3. Total Assets Available for Benefits		$ 1,032,249	$ 818,711
E. TOTAL AMOUNTS CURRENTLY PAYABLE AND ASSETS AVAILABLE FOR BENEFITS		$ 1,034,702	$ 821,164
F. DETERMINATION OF ACTUARIAL VALUE OF ASSETS			
1. Market Value of Assets Available for Benefits (D.3)		$ 1,032,249	
2. Unrecognized Asset Returns			
a. June 30, 2017	$ 54,191		
b. June 30, 2016	(77,451)		
c. June 30, 2015	(55,629)		
d. June 30, 2014	95,762		
3. UAR Adjustment: .80 * 2(a) + .60 * 2(b) + .40 * 2(c) + .20 * 2(d)		(6,218)	
4. Actuarial Value of Assets: (F.1 - F.3)		$ 1,038,467	

DERIVATION OF OTHER ASSETS *	Market Value
Accounts Receivable	
Employer Contribution	$ 368
Employee Contribution	256
Service Purchases Receivable	31
Pensions Receivable	10
State Contributions	838
Real Estate Income Receivable	81
Commission Recapture Receivable	1
Interest Receivable	617
Dividend Receivable	93
Misc. Receivable	-
Escrow Funds receivable	-
Sale of Securities	941
Total Accounts Receivable	$ 3,236
Fixed Assets	53
Total Other Assets	$ 3,289

**Numbers may not add due to rounding.*

Change(s) in Assets Available for Benefits
as of June 30, 2017
(dollars in thousands)

		Market Value	Cost Value
A.	ASSETS AVAILABLE AT BEGINNING OF PERIOD	$ 959,666	$ 838,738
B.	OPERATING REVENUES		
1.	Member Contributions	$ 20,146	$ 20,146
2.	Employer Contributions	27,543	27,543
3.	Supplemental Contributions	10,665	10,665
4.	Reempoyed Annuitant Employer Contributions	142	142
5.	Investment Income	12,999	12,999
6.	Investment Expenses	(4,823)	(4,823)
7.	Net Realized Gain / (Loss)	27,933	27,933
8.	Other	0	0
9.	Net Change in Unrealized Gain / (Loss)	92,610	0
10.	Total Operating Revenue	$ 187,215	$ 94,605
C.	OPERATING EXPENSES		
1.	Service Retirements	$ 100,965	$ 100,965
2.	Disability Benefits	605	605
3.	Survivor Benefits	11,201	11,201
4.	Refunds	972	972
5.	Administrative Expenses	889	889
6.	Total Operating Expenses	$ 114,632	$ 114,632
D.	OTHER CHANGES IN RESERVES	$ 0	$ 0
E.	ASSETS AVAILABLE AT END OF PERIOD	$ 1,032,249	$ 818,711
F.	DETERMINATION OF CURRENT YEAR UNRECOGNIZED ASSET RETURN		
1.	Average Balance		
	(a) Assets available at BOY		$ 959,666
	(b) Assets available at EOY		1,032,249
	(c) Average balance {[(a) + (b) - Net Investment Income] / 2}		$ 931,598
	{Net investment income: B.5+B.6+B.7+B.9}		
2.	Expected Return: .080 * F.1		74,528
3.	Actual Return		128,719
4.	Current Year Gross Asset Gain/(Loss): F.3 - F.2		$ 54,191

Actuarial Balance Sheet
as of July 1, 2017
(dollars in thousands)

A.	CURRENT ASSETS (TABLE 1; Line F.4)	$	1,038,467
B.	EXPECTED FUTURE ASSETS		
	1. Present Value of Expected Future Statutory Supplemental Contributions*	$	498,890
	2. Present Value of Future Normal Costs		236,293
	3. Total Expected Future Assets	$	735,183
C.	TOTAL CURRENT AND EXPECTED FUTURE ASSETS	$	1,773,650
D.	TOTAL CURRENT AND EXPECTED FUTURE BENEFIT OBLIGATIONS	$	1,847,501
E.	CURRENT AND FUTURE UNFUNDED ACTUARIAL LIABILITY (D - C)	$	73,851

* *Includes the effect of scheduled employee and employer contribution increases and supplemental state contributions.*

Determination of Unfunded Actuarial Accrued Liability (UAAL) and Supplemental Contribution Rate as of July 1, 2017 (dollars in thousands)

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. DETERMINATION OF ACTUARIAL ACCRUED LIABILITY (AAL)			
1. Active Members*			
a. Retirement Benefits	$ 635,767	$ 172,486	$ 463,281
b. Disability Benefits	$ 13,751	$ 5,338	$ 8,413
c. Surviving Spouse and Child Benefits	$ 9,245	$ 3,207	$ 6,038
d. Vested Withdrawals	$ 36,648	$ 41,163	$ (4,515)
e. Refund Liability Due to Death or Withdrawal	$ 2,989	$ 14,099	$ (11,110)
f. Total	$ 698,400	$ 236,293	$ 462,107
2. Deferred Retirements	$ 77,599	$ 0	$ 77,599
3. Former Members without Vested Rights	$ 2,812	$ 0	$ 2,812
4. Annuitants	$ 1,068,690	$ 0	$ 1,068,690
5. Total	$ 1,847,501	$ 236,293	$ 1,611,208
B. DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)			
1. Actuarial Accrued Liability (A.5)			$ 1,611,208
2. Current Assets (Table 1; Line F.4)			$ 1,038,467
3. Unfunded Actuarial Accrued Liability (B.1 - B.2)			$ 572,741
C. DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE**			
1. Present Value of Future Payrolls Through the Amortization Date of June 30, 2042***			$ 4,440,299
2. Supplemental Contribution Rate (B.3 / C.1)			12.90%

* *Includes members on leave of absence.*

** *The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method results in initial payments less than the "interest only" payment on the UAAL. Payments less than the interest only amount will result in the UAAL increasing for an initial period of time.*

****Calculated using 8.0% annual investment return rate.*

Changes in Unfunded Actuarial Accrued Liability (UAAL) as of July 1, 2017 (dollars in thousands)

A.	UAAL AT BEGINNING OF YEAR	$	585,210
B.	CHANGE DUE TO INTEREST REQUIREMENTS AND CURRENT RATE OF FUNDING		
	1. Normal Cost and Expenses	$	24,987
	2. Contributions	$	(58,496)
	3. Interest	$	45,441
	4. Total	$	11,932
C.	EXPECTED UAAL AT END OF YEAR (A + B.4)	$	597,142
D.	INCREASE / (DECREASE) DUE TO ACTUARIAL LOSSES / (GAINS) BECAUSE OF EXPERIENCE DEVIATIONS FROM EXPECTED		
	1. Age and Service Retirements	$	534
	2. Disability Retirements		(62)
	3. Death-in-Service Benefits		128
	4. Withdrawals		(925)
	5. Salary Increases		(145)
	6. Investment Income		(7,976)
	7. Mortality of Annuitants		2,342
	8. Other Items		(10,118)
	9. Total	$	(16,222)
E.	UAAL AT END OF YEAR BEFORE PLAN AMENDMENTS AND CHANGES IN ACTUARIAL ASSUMPTIONS (C + D.9)	$	580,920
F.	CHANGE IN UAAL DUE TO PLAN AMENDMENTS		-
G.	CHANGE IN UAAL DUE TO CHANGES IN ACTUARIAL ASSUMPTIONS		(8,179)
H.	UAAL AT END OF YEAR (E + F + G)	$	572,741

Determination of Contribution Sufficiency as of July 1, 2017 (dollars in thousands)

	Percent-of-Payroll	Dollar Amount
A. STATUTORY CONTRIBUTIONS - CHAPTER 354A		
1. Employee Contributions	7.50%	$ 21,069
2. Employer Contributions		
a. Regular	6.50%	18,265
b. Additional	3.84%	10,782
3. Supplemental Contribution		
a. 1996 Legislation	0.30%	838
b. 1997 Legislation	1.01%	2,827
c. 2014 Legislation	2.49%	7,000
4. Total	21.64%	$ 60,781
B. REQUIRED CONTRIBUTIONS - CHAPTER 356		
1. Normal Cost		
a. Retirement Benefits	6.62%	$ 18,596
b. Disability Benefits	0.19%	535
c. Surviving Spouse and Child Benefits	0.12%	336
d. Vested Withdrawals	1.48%	4,157
e. Refund Liability Due to Death or Withdrawal	0.52%	1,463
f. Total	8.93%	$ 25,087
2. Supplemental Contribution Amortization	12.90%	36,221
3. Allowance for Administrative Expenses	0.33%	927
4. Total	22.16%	$ 62,235
C. CONTRIBUTION SUFFICIENCY / (DEFICIENCY) (A.4 - B.4)	(0.52%)	(1,454)

Projected Annual Payroll for Fiscal Year Beginning on the Valuation Date: $ 280,785

Actuarial Methods and Assumptions as of July 1, 2017

I. ACTUARIAL COST METHOD

An Actuarial Cost Method is a set of techniques used by the actuary to develop contribution levels under a retirement plan. The Actuarial Cost Method used in this valuation for all purposes is the Entry Age Actuarial Cost Method. Under this Method, a Normal Cost is developed by amortizing the actuarial value of benefits expected to be received by each active participant (as a level percentage of pay) over the total working lifetime of that participant, from hire to termination. Years of Service for valuation purposes was provided by the Retirement Fund. Age as of the valuation date was calculated based on the dates of birth provided by the Retirement Fund. Entry Age for valuation purposes was calculated as the age on the valuation date minus the years of service on the valuation date.

To the extent that current assets and future Normal Costs do not support participants' expected future benefits, an Unfunded Actuarial Accrued liability ("UAAL") develops. The UAAL is amortized over the closed statutory amortization period ending June 30, 2042 using level percent-of-payroll assuming payroll increases of 4.00% per annum. The total contribution developed under this method is the sum of the Normal Cost and the payment toward the UAAL.

II. CURRENT ACTUARIAL ASSUMPTIONS

The assumptions were last updated for the July 1, 2017 valuation as a result of an analysis of Combined Service Annuity assumptions completed by the LCPR Actuary and documented in a report dated October 2016. Other assumptions are based on an experience study for the five-year period of July 1, 2006 to June 30, 2011, as well as a legislated change to the investment return assumption effective July 1, 2015.

An experience study for the 2011 to 2016 period is currently in process. This report recommends many changes to demographic assumptions, expected to be effective at a future date.

A. Demographic Assumptions

Mortality:

1. Healthy Mortality*:
    a. Male: RP-2000 Combined Mortality Table for males projected with Scale AA to 2020 set back 1 year
    b. Female: RP-2000 Combined Mortality Table for females projected with Scale AA to 2020 set back 3 years
2. Disabled Mortality:
    a. Male: RP-2000 Disabled Life Mortality Table for males
    b. Female: RP-2000 Disabled Life Mortality Table for females

* *Mortality rates were adjusted to include margin for future mortality improvement as described in the table name above.*

Actuarial Methods and Assumptions as of July 1, 2017

Deaths Expressed as the Number of Occurrences per 10,000:

	Healthy Mortality		Disabled Mortality	
Age	**Male**	**Female**	**Male**	**Female**
20	2	1	226	75
21	2	1	226	75
22	2	1	226	75
23	3	1	226	75
24	3	1	226	75
25	3	1	226	75
26	3	1	226	75
27	3	1	226	75
28	3	2	226	75
29	4	2	226	75
30	4	2	226	75
31	4	2	226	75
32	5	2	226	75
33	5	2	226	75
34	6	3	226	75
35	6	3	226	75
36	7	3	226	75
37	8	4	226	75
38	8	4	226	75
39	9	4	226	75
40	9	4	226	75
41	9	5	226	75
42	10	5	226	75
43	10	5	226	75
44	10	6	226	75

Actuarial Methods and Assumptions as of July 1, 2017

Deaths Expressed as the Number of Occurrences per 10,000:

	Healthy Mortality		Disabled Mortality	
Age	**Male**	**Female**	**Male**	**Female**
45	11	6	226	75
46	12	7	238	82
47	12	8	251	90
48	13	8	264	98
49	13	9	277	106
50	14	9	290	115
51	15	10	303	125
52	17	11	316	135
53	18	12	329	145
54	19	13	342	155
55	21	15	354	165
56	25	17	367	176
57	29	20	380	187
58	33	23	393	197
59	38	27	407	208
60	43	31	420	218
61	49	35	435	229
62	57	40	450	241
63	65	46	466	253
64	76	53	483	266
65	85	60	502	280
66	96	69	522	296
67	111	78	545	313
68	124	88	569	332
69	135	99	596	353

Actuarial Methods and Assumptions
as of July 1, 2017

Rates of Disability:

Disability Expressed as the Number of Occurrences per 10,000:

Age	Disability	Age	Disability
20	2	45	5
21	2	46	5
22	2	47	5
23	2	48	5
24	2	49	5
25	2	50	10
26	2	51	10
27	2	52	10
28	2	53	10
29	2	54	10
30	3	55	20
31	3	56	20
32	3	57	20
33	3	58	20
34	3	59	20
35	3	60	40
36	3	61	40
37	3	62	40
38	3	63	40
39	3	64	40
40	3		
41	3		
42	3		
43	3		
44	3		

Actuarial Methods and Assumptions
as of July 1, 2017

Rates of Termination:

Years of Service	Number of Terminations per 1,000 Active Members: Male	Female
0	400	400
1	180	180
2	140	140
3	100	100
4	60	67
5	50	59
6	45	51
7	41	43
8	37	35
9	33	31
10	29	27
11	25	23
12	20	19
13	20	15
14	20	13
15 & Over	20	13

Rates of Retirement:

Retirements Expressed as the Number of Occurrences per 10,000:

Age	Basic Members Eligible for Rule of 90 Provision	Basic Members Not Eligible for Rule of 90 Provision	Male Coordinated Members Eligible for Rule of 90 Provision	Female Coordinated Members Eligible for Rule of 90 Provision	Male Coordinated Members Not Eligible for Rule of 90 Provision	Female Coordinated Members Not Eligible for Rule of 90 Provision
55	5,000	800	3,500	3,500	700	500
56	5,000	1,300	3,500	3,500	700	500
57	4,000	1,300	3,500	3,500	700	500
58	4,000	1,800	3,500	3,500	700	500
59	3,500	1,800	3,500	3,500	700	500
60	3,500	2,000	3,500	3,500	1,100	800
61	3,500	2,000	3,500	3,500	1,500	1,100
62	3,500	4,000	3,500	3,500	1,900	1,400
63	3,500	4,000	3,500	3,500	2,300	1,900
64	4,000	4,000	3,500	4,000	2,700	2,400
65	5,000	5,000	3,500	5,000	3,100	3,500
66	3,000	5,000	3,500	5,000	3,500	3,500
67	3,000	5,000	3,500	5,000	3,500	3,500
68	3,000	5,000	3,500	5,000	3,500	3,500
69	3,000	5,000	3,500	5,000	3,500	3,500
70 & Over	10,000	10,000	10,000	10,000	10,000	10,000

Actuarial Methods and Assumptions as of July 1, 2017

B. Economic Assumptions

Investment Return Rate: 8.00%

Cost-of-Living Increases: 1.00% per year through 2041; 2.00% beginning 2042; 2.50% beginning 2052.

Wage Inflation: 4.00% per year

Future Salary Increases: In addition to the age-based rates shown below, during the first 15 years of employment, a service-based component of 0.20% x (15-T), where T is completed years of service, is included in the salary increase used.

Annual Salary Increases

Age	Ultimate Rate of Annual Salary Increases	Age	Ultimate Rate of Annual Salary Increases
<22	5.90%	45	4.75%
23	5.85	46	4.70
24	5.80	47	4.65
		48	4.60
25	5.75	49	4.55
26	5.70		
27	5.65	50	4.50
28	5.60	51	4.45
29	5.55	52	4.40
		53	4.35
30	5.50	54	4.30
31	5.45		
32	5.40	55	4.25
33	5.35	56	4.20
34	5.30	57	4.15
		58	4.10
35	5.25	59	4.05
36	5.20		
37	5.15	60 & Over	4.00
38	5.10		
39	5.05		
40	5.00		
41	4.95		
42	4.90		
43	4.85		
44	4.80		

Asset Value: The actuarial value of assets is smoothed by using a five-year average market value.

Actuarial Methods and Assumptions as of July 1, 2017

C. *Other Assumptions*

Marital Status:	It is assumed that 75% of male members and 60% of female members have an eligible spouse. The male spouse is assumed to be two years older than the female spouse. Married members are assumed to have two dependent children.
Deferred Benefit Commencement:	Basic Plan members who terminate vested are assumed to commence benefits at age 61. Coordinated Plan members are assumed to commence benefits at age 62. If the member is already past the assumed deferral age, the member is assumed to commence benefits one year from the valuation date.
Administrative Expenses:	Prior year administrative expenses (excluding investment expenses) are expressed as a percentage-of-payroll and then applied to current projected payroll.
Refund of Contributions:	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit. Account balances for deferred members accumulate interest until the assumed benefit commencement date and are discounted back to the valuation date.
Allowance for Combined Service Annuity:	20.0% load on liabilities for former, vested members. 9.0% load on liabilities for former, non-vested members.
Missing Salary and Salary Minimums:	Active members with reported salaries of $100 or less were assumed to have the average non-zero active salary. Active members with salaries less than those reported at the prior valuation date are valued using their prior salary amount. Active members who have been hired within one year of the valuation date have had their pay annualized by dividing by months of service credited, not to exceed the average non-zero active salary. For members on leave of absence at valuation date who were not on leave at the prior valuation date, the prior year's valuation pay was used.
Missing Data for Deferred Vested Members:	Deferred vested members without a reported benefit and without salary information were assumed to have a final average salary of $40,000.
Decrement Timing:	Retirement and Termination: end of valuation year – consistent with retirements and terminations occurring at the end of the school year. Death and Disability: middle of valuation year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Service Credit Accruals:	It is assumed that members accrue one year of service credit per year. Exact fractional service is used to determine the amount of benefit payable.

Actuarial Methods and Assumptions as of July 1, 2017

Valuation of Future Post-Retirement Benefit Increases:	If the plan has reached the funding ratio threshold required to pay a different benefit increase, Minnesota Statutes require the benefit increase rate to be reflected in the liability calculations. If the plan has not yet reached the funding ratio threshold required to pay a benefit increase, Minnesota Statutes require a projection to be performed to determine the expected attainment of the funding ratio thresholds, and the expected payment of benefit increases must be reflected in the liability calculations.
Supplemental Contributions:	1996 legislation provides for a variable amortization aid contribution paid annually on July 15. We assumed the annual amortization aid contribution will equal $838,000, which was the actual contribution for the most recent fiscal year. Additionally, according to 1997 legislation, annual supplemental contributions currently equal to $2,827,000 are scheduled to be paid on October 1. According to 2014 legislation, the State of Minnesota will make annual additional supplemental contributions of $7,000,000 on October 1. The contributions described herein will continue until the plan is 100% funded or until June 30, 2042, whichever occurs earlier.
Projected Annual Payroll Calculation:	The census data as of July 1, 2017 reflects retirements and terminations occurring during the months of May and June; however, it does not necessarily reflect the replacements hired to fill their positions who may have hire dates in August and September. We assumed that May and June retirements are replaced by members coming in at the B.A. entry salary level of $44,759; and the Projected Annual Payroll for the fiscal year ending June 30, 2018 includes this replacement salary amount.
Changes in Actuarial Assumptions Since the Prior Valuation:	The Combined Service Annuity (CSA) loads on liabilities were changed as follows:

	Active Pre-89	Active Post-89	Vested Terminated	Non-Vested Terminated
Prior	7.0%	2.0%	30.0%	30.0%
Current	0.0%	0.0%	20.0%	9.0%

The assumed cost-of-living adjustments were changed from 1.00% per year through 2054; 2.00% beginning 2055; 2.50% beginning 2066 to 1.00% per year through 2041; 2.00% beginning 2042; 2.50% beginning 2052.