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**Connecticut State Teachers' Retirement System
Retiree Health Insurance Plan
Actuarial Valuation
as of June 30, 2016**





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

November 1, 2016

Board of Directors

Connecticut State Teachers' Retirement System

765 Asylum Avenue

Hartford, CT 06105

Members of the Board:

The laws governing the operation of the Connecticut State Teachers' Retirement System (the System) provide that actuarial valuations of the assets and liabilities of the System shall be made at least once every two years. We have conducted the actuarial valuation of the System's retiree health insurance benefits (the Plan) as of June 30, 2016 and the results of the valuation are contained in the following report.

In performing the valuation, we relied on data supplied by the System and performed limited tests on the data for consistency and reasonableness. The valuation was prepared based upon our understanding of Chapter 167a, Section 10-183t of the Connecticut General Statutes and the Plan's provisions provided by the System's staff.

The normal cost and accrued liability of the System are developed using the entry age normal cost method. Under this method, the normal cost is the level percent of payroll necessary to fully fund the expected benefits to be earned over the career of each individual active member. The cost of providing the Plan's benefits is financed on a pay-as-you-go basis as follows: active teachers pay for the Plan's costs through a contribution of 1.25% of their annual salaries (less \$500,000); retired teachers pay, through monthly premiums, for one third of the basic costs for the Connecticut State Teachers' Retirement Board (CTRB) Sponsored Medicare Supplemental Plans; and the State of Connecticut (the State) pays for one third of the Plan's costs through an annual appropriation in the General Fund. Additionally, the administrative costs of the Plan are financed by the State.

The liabilities and information for the purpose of complying with Governmental Accounting Standards Board Statements No. 43 and No. 45 presented in this report represent the State's portion of the cost of providing the Plan's benefits. Based upon our interpretation of Chapter 167a, Section 10-183t(d) of the Connecticut statutes, it is assumed the State will pay for any long-term shortfall arising from insufficient active member contributions.

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In determining the System's liabilities, future events, such as investment returns, salary increases, deaths, retirements, etc., are anticipated based upon the set of actuarial assumptions as approved by the Board. Since the previous valuation, several assumptions have been revised or updated as a result of the "Experience Study for the Five-Year Period Ending June 30, 2015", dated October 29, 2015. Additionally, the assumed initial per capita health care costs, the assumed rates of health care inflation used to project the per capita costs, and the participation assumptions have been revised.

The assumptions recommended by the actuary are in the aggregate reasonable related to the experience under the Plan and to reasonable expectations of anticipated experience under the Plan and meet the parameters for the disclosures under GASB Statements No. 43 and No. 45.

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries and meet the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained herein, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the Plan and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the Plan.

Future actuarial results may differ significantly from the current results 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. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Eric H. Gary', written in a cursive style.

Eric H. Gary, FSA, FCA, MAAA
Principal and Chief Health Actuary

A handwritten signature in blue ink, appearing to read 'Andrew A. Paine', written in a cursive style.

Andrew A. Paine, ASA, FCA, MAAA
Senior Actuary



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Section I: Board Summary

The table below summarizes the results of the June 30, 2016 actuarial valuation as compared with the prior valuation.

Table I-1: Comparative Summary of Principal Results		
	June 30, 2014	June 30, 2016
Membership		
Active Members		
Number	51,433	50,877
Annual Payroll	\$3,831,624	\$3,949,926
Retirees and Beneficiaries		
Number of Retirees Receiving Health Insurance Benefits	25,407	27,557
Number of Spouses Receiving Health Insurance Benefits	11,648	12,603
Inactive Members		
Vested	1,480	2,085
Assets		
Market Value	\$0	\$0
Actuarial Information		
Unfunded Actuarial Liability (UAL)	\$2,433,036	\$2,997,535
Funded Ratio	0.00%	0.00%
Amortization Period	30 years	30 years
Computed Contribution Rates		
Normal Cost	2.04%	2.40%
Unfunded Accrued Liability	<u>2.36%</u>	<u>2.93%</u>
Total	4.40%	5.33%
Member	<u>1.24%</u>	<u>1.24%</u>
State	3.16%	4.09%
State Contribution Amount for Fiscal Year Ending		
June 30, 2015	\$125,620	
June 30, 2016	\$130,331	
June 30, 2017		\$166,802
<i>All dollar amounts are in thousands</i>		



Section I: Board Summary

Summary of Key Findings

This report provides the annual expense required to be recognized by the State for purposes of complying with the accounting disclosure requirements of the Governmental Accounting Standards Board Statements No. 43 and No. 45.

The actuarially determined employer normal cost contribution rate increased from 0.80% as of June 30, 2014 to 1.16% as of June 30, 2016. The unfunded actuarial accrued liability increased from \$2.433 billion to \$2.998 billion over the two-year period. The unfunded actuarial accrued liability rate increased from 2.36% to 2.93%. We note the following key findings:

- The assumed per capita cost of basic benefits provided by the CTRB Sponsored Medicare Supplemental Plans has increased by 1% since the prior valuation.
- As a result of the Experience Study for the Five-Year Period Ending June 30, 2015, the discount rate has been lowered from 4.50% to 4.25% to reflect the decrease in the rate of inflation. Similarly, the payroll growth rate assumption was decreased from 3.75% to 3.25% to reflect the decrease in the rate of inflation and the decrease in the rate of real wage increase. Last, the salary growth assumption, the payroll growth rate, the rates of withdrawal, the rates of retirement, the rates of mortality, and the rates of disability incidence were adjusted based upon the experience study's findings and their adoption by the Board.
- The number of retired members, spouses of retired members, and surviving spouses of retired members currently participating in the CTRB Sponsored Medicare Supplemental Plans has increased by 15% since the prior valuation.
- The assumed participation rates for the Subsidized Local School District Coverage and the CTRB Sponsored Medicare Supplemental Plans for both future retirees and current pre-65 retirees have been revised based on recent plan experience.

Section II of the report provides summarized information on the membership data used in the valuation. Section III of the report covers the Plan's assets and Section IV of the report covers the Plan's liabilities. The results of the valuation are provided in Section V of the report and the accounting information is in Section VI. The appendices provide additional information on: A) the Plan members; B) the actuarial assumptions and methods; and C) the summary of Plan provisions. It should be noted that all information contained in this report for periods prior to June 30, 2010 was produced by a prior actuarial consulting firm.



Section II: Membership Data

Data regarding the membership of the Plan for use in the valuation were furnished by the System. The following table summarizes the membership data as of June 30, 2016 and is compared with that reported for the prior valuation.

Table II-1: Summary of Membership Data		
	June 30, 2014	June 30, 2016
Active Members		
Total Number of Active Members	51,433	50,877
Total Annual Compensation	\$3,831,624	\$3,949,926
Retirees and Beneficiaries		
Number of Retirees Receiving Health Insurance Benefits	25,407	27,557
Number of Spouses Receiving Health Insurance Benefits	11,648	12,603
Inactive Members		
Number of Vested Inactive Members	1,480	2,085

All dollar amounts are in thousands



Section III: System Assets

GASB Statements No. 43 and No. 45 define plan assets as resources, usually in the form of stocks, bonds, and other classes of investments, that have been segregated and restricted in a trust, or equivalent arrangement, in which (a) employer contributions to the plan are irrevocable, (b) assets are dedicated to providing benefits to retirees and their beneficiaries, and (c) assets are legally protected from creditors of the employers or plan administrator, for the payment of benefits in accordance with the terms of the plan.

As of June 30, 2016, no assets are held in a qualified trust solely to provide benefits to retirees and their beneficiaries in accordance with the terms of the Plan.



Section IV: System Liabilities

The present value of benefits is the value, as of the valuation date, of all future benefits expected to be paid to current members of the Plan. An actuarial cost method allocates each individual's present value of benefits to past and future years of service. The actuarial accrued liability includes the portion of the active member present value of benefits allocated to past service as well as the entire present value of benefits for retirees, beneficiaries and inactive members. The unfunded actuarial accrued liability (UAAL) is the difference between the actuarial accrued liability and the actuarial value of assets. Table IV-1 shows the allocation of the present value of future benefits into components for future normal cost contributions and actuarial accrued liabilities and the determination of the UAAL as of the valuation date.

Table IV-1: Calculation and Allocation of Present Value of Future Benefits			
	Entry Age Actuarial Cost Method		
	(1) Present Value of Future Benefits	(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1) - (2)
Active Members			
Service Retirement	\$2,277,106	\$1,010,103	\$1,267,003
Disability Retirement	28,896	24,926	3,970
Survivors' Benefits	34,321	22,521	11,800
Termination	279,712	233,039	46,673
Total for Active Members	2,620,035	1,290,589	1,329,446
Inactive Members	131,116	0	131,116
Retirees and Beneficiaries	1,536,973	0	1,536,973
Total	\$4,288,124	\$1,290,589	\$2,997,535
Actuarial Value of Assets			\$0
Unfunded Actuarial Accrued Liability			\$2,997,535
Funded Ratio			0.00%
<i>All dollar amounts are in thousands</i>			

The valuation shows the Plan has an actuarial accrued liability of \$1,329,446,000 for benefits expected to be paid on account of the present active membership, based on service to the valuation date. The liability for retiree health insurance benefits payable to inactive members with vested pension benefits is \$131,116,000. The liability on account of benefits payable to retirees amounts to \$1,536,973,000. The total actuarial accrued liability of the Plan amounts to \$2,997,535,000. Against these liabilities, the Plan has present assets for valuation purposes of \$0. Therefore, the unfunded actuarial accrued liability is equal to \$2,997,535,000.



Section IV: System Liabilities

The calculation of the System's actuarial liabilities require the use of several assumptions concerning the future experience of the System and its members. In each valuation, the latest year of actual experience is compared to that expected by the prior valuation. The differences are actuarial gains and losses which decrease or increase the AAL. Table IV-2 provides for the reconciliation of the AAL and shows the primary sources of this year's gains and losses due to actuarial experience.

Table IV-2: Reconciliation of the AAL

1.	AAL as of June 30, 2014	\$2,433,036
2.	Normal Cost	78,027
3.	Expected Benefit Payments	(69,109)
4.	Expected Interest	<u>111,460</u>
5.	Expected AAL as of June 30, 2015 (1 + 2 + 3 + 4)	\$2,553,414
6.	Normal Cost	81,538
7.	Expected Benefit Payments	(74,214)
8.	Expected Interest	<u>116,921</u>
9.	Expected AAL as of June 30, 2016 (5 + 6 + 7 + 8)	\$2,677,659
10.	Actuarial Experience (Gain)/Loss	
	Demographic Experience	53,367
	Assumption Changes	<u>266,509</u>
	Total Actuarial (Gain)/Loss	\$319,876
11.	AAL as of June 30, 2016 (10 + 11)	\$2,997,535

All dollar amounts are in thousands.



Section V: Actuarial Valuations Results

Section IV of this report presented the Plan's total present value of future benefits allocated between the present value of future normal cost contributions and actuarial accrued liability. The portion of the active members' present value of benefits allocated to future years of service is funded through annual normal cost contributions determined by the entry age normal actuarial cost method. Under the entry age normal actuarial cost method, the Plan's annual normal cost rate is calculated as a percent of covered payroll, which is expected to remain level over all future years of service. The portion of the total normal cost rate in excess of the active member contribution rate is the State's normal cost rate. The normal cost rate developed as of the valuation date is presented in Table V-1. Table V-1 also shows the State's contribution rate that is necessary to amortize, as a level percent of active member payroll, the UAAL over a period of thirty years.

Table V-1: State Contribution Rate	
Normal Cost Rate of Active Members by Expected Benefit Type	
Service Retirement	1.89%
Termination	0.41%
Disability Retirement	0.05%
Survivors' Benefits	0.05%
Total Normal Cost Rate for Active Members	2.40%
Less: Active Member Contribution Rate	1.24%
State Normal Cost Rate	1.16%
Unfunded Actuarial Accrued Liability	2.93%
State Contribution Rate	4.09%



Section VI: Accounting Information

- Governmental Accounting Standards Board Statements No. 43 and No. 45 set forth certain items of required supplementary information to be disclosed in the financial statements of the Plan and the State. One such item is the schedule of funding progress, as shown below.

Table VI-1: Schedule of Funding Progress						
Actuarial Valuation as of June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a % of Active Member Payroll [(b) - (a)] / (c)
2008	\$0	\$2,318,841	\$2,318,841	0.0%	\$3,399,305	68.22%
2010	0	2,997,856	2,997,856	0.0%	3,645,974	82.22%
2012	0	3,048,307	3,048,307	0.0%	3,652,518	83.46%
2014	0	2,433,036	2,433,036	0.0%	3,831,624	63.50%
2016	0	2,997,535	2,997,535	0.0%	3,949,926	75.89%

All dollar amounts are in thousands

All figures prior to 6/30/2010 were reported by the prior actuarial firm.

- The following shows the schedule of employer contributions.

Table VI-2: Schedule of Employer Contributions			
Fiscal Year Ending June 30	Annual Required Contribution (a)	Actual Contributions (b)	Percent Contributed (b) / (a)
2008*	\$116,123	\$20,770	17.9%
2009*	116,667	22,433	19.2
2010*	121,334	12,108	10.0
2011*	177,063	5,312	3.0
2012*	184,145	49,486	26.9
2013*	180,460	27,040	15.0
2014*	187,227	25,955	13.9
2015*	125,620	25,145	20.0
2016	130,331	19,960	15.3
2017	166,802	N/A	N/A

All dollar amounts are in thousands

* Historical information as provided in the most recent financial report.



Section VI: Accounting Information

3. The information presented in the required supplementary schedules was determined as part of the actuarial valuation at June 30, 2016. Additional information as of the latest actuarial valuation follows.

Table VI-3: Additional Information	
Valuation date	June 30, 2016
Actuarial cost method	Entry Age
Amortization method	Level Percent of Pay, Open
Amortization period	30 years
Asset valuation method	Market Value of Assets
Actuarial assumptions:	
Investment rate of return (includes inflation)	4.25%
Projected salary increases (includes inflation)	3.25% - 6.50%
Inflation	2.75%
Claims Trend Assumption	7.25% - 5.00%
Year of Ultimate Trend	2022
Contribution Trend Assumption	7.25% - 5.00%
Year of Ultimate Trend	2022

The assumed investment rate of return reflects the fact no assets are set aside within the System that are legally held exclusively for retiree health insurance benefits. If a qualified trust or equivalent arrangement were set up for this purpose, the investment rate of return may be increased.



Section VI: Accounting Information

4. The following shows contributions towards the Annual OPEB Cost (AOC)

Table VI-4: Trend Information			
Fiscal Year Ending June 30	Annual OPEB Cost (AOC)	Percentage of AOC Contributed	Net OPEB Obligation (NOO)
2008*	\$116,123	17.9%	\$ 95,353
2009*	113,704	19.7	186,624
2010*	115,321	10.5	289,837
2011*	167,368	3.2	451,893
2012*	165,955	29.8	568,362
2013*	179,620	15.1	720,942
2014*	192,851	13.5	887,838
2015*	118,175	21.3	980,868
2016	137,983	14.5	1,098,891

All dollar amounts are in thousands

* Historical information as provided in the most recent financial report.

5. Following is information to assist the System in the calculation of the Annual OPEB Cost (AOC) and the Net OPEB Obligation (NOO) for the fiscal year ending June 30, 2016.

Table VI-5: Annual OPEB Cost and Net OPEB Obligation	
Fiscal Year Ending June 30, 2016	
(a) Employer Annual Required Contribution	\$ 130,331
(b) Valuation Discount Rate	4.50%
(c) Interest on Net OPEB Obligation: (i) * (b)	\$ 44,139
(d) Amortization Factor	26.8830
(e) Adjustment to Annual Required Contribution: (i) / (d)	\$ 36,487
(f) Annual OPEB Cost: (a) + (c) - (e)	\$ 137,983
(g) Employer Contributions for Fiscal Year Ending June 30, 2016	\$ 19,960
(h) Increase in Net OPEB Obligation: (f) - (g)	\$ 118,023
(i) Net OPEB Obligation at beginning of Fiscal Year	\$ 980,838
(j) Net OPEB Obligation at end of Fiscal Year: (h) + (i)	\$ 1,098,891

All dollar amounts are in thousands



Section VI: Accounting Information

6. On June 2, 2015, GASB Statement No. 74 and GASB Statement No. 75 (GASB 74 and 75) were unanimously adopted by the GASB Board. The disclosure requirements of GASB 74 and 75 will be similar to the disclosure requirements for pension benefits under GASB Statement No. 67 and GASB Statement No. 68. GASB 74 relates to accounting disclosures for plan sponsors and, as such, replaces GASB 43 beginning with fiscal years ending June 30, 2017. GASB 75 relates to accounting disclosures for contributing employers and, as such, replaces GASB 45 beginning with fiscal years ending June 30, 2018. GASB 74 and 75 will require applicable OPEB plan sponsors and contributing employers to disclose the net OPEB liability on the statement of financial position and book an accounting expense based upon the entry age normal actuarial cost method. Beyond the use of a specified actuarial cost method, GASB's new disclosure standards will also require the discount rate used to calculate liabilities to be based upon the yield of 20-year, tax-exempt municipal bonds and the expected rate of return on plan assets, to the extent plan assets are projected to be available for the payment of future benefits. Additionally, GASB 74 and 75 will bring about many other changes in the liability valuation and accounting disclosure processes currently in place that are expected to significantly impact data collection, timing, and effort. As details for the new GASB OPEB disclosure standards emerge, planning and coordination between plan sponsors, contributing employers, actuaries, and auditors is recommended.

As the Plan is not administered through a trust or equivalent arrangement that meets the criteria in paragraph 3 of GASB 74, only paragraphs 58 and 59 of GASB 74 apply (no actuarial valuation is required for GASB 74 disclosures). This will change if/when the Plan becomes funded with a qualified trust.

Per GASB 75, the Plan appears to be an other than insured, multiple-employer, defined benefit OPEB plan that is not administered through a trust that meets the criteria in paragraph 4 of GASB 75 and has a special funding situation. As such, GASB 75 disclosures appear to be as follows:

- A. State (as employer): The primary government and its component units provide OPEB through the same OPEB plan, so, in the reporting entity's financial report, the requirements of paragraphs 162–171 are to be applied. Here, the valuation is based upon only those OPEB liabilities of the State's employees (a small fraction of the Plan's total OPEB liability). This assumes there are State employees that participate in the Plan.



Section VI: Accounting Information

- B. Component units of the State employer: In stand-alone financial statements, component units should apply the requirements of paragraphs 172–192 to account for and report their participation in the Plan. The applicable paragraphs apply the requirements for cost-sharing employers (proportionate share calculations based upon the long-term projected benefit payments to the Plan is encouraged) to the liability determined in “A” (a fraction of a small fraction). This assumes there are State component unit employees that participate in the Plan.
- C. State (as non-employer contributing entity): The State will value the liabilities of the non-State employers and apply the requirements of paragraphs 203–219.
- D. Non-State Employers (e.g., school districts): Each non-State employer participating in the Plan will apply the requirements of paragraphs 193–202.

Moving forward, the System will need to decide if, in addition to a valuation report providing accounting disclosure information, the System will also like to have a funding valuation report. Additionally, the System may want to consider the level of support they want to provide to Non-State Employers (e.g., how the System will provide retiree participant data to Non-State Employers; if future valuations will provide the valuation information produced for “C” broken-out by non-State employers, so non-State employers do not have to go through the valuation process on their own).

As noted previously, GASB’s new disclosure standards will require the discount rate used to calculate the liabilities of pay-as-you-go plans to be based upon the yield of 20-year, tax-exempt municipal bonds (rating AA/Aa or higher). As of June 30, 2016, the Bond Buyer General Obligation 20-year Municipal Bond Index (published monthly by the Board of Governors of the Federal Reserve System) was 3.01%, resulting in an AAL (known as the total OPEB liability, or TOL, under GASB 74 and 75) of \$3,734,043,000.



Appendix A: Membership Data

Table A-1: Schedule of Active Participant Data as of June 30, 2016									
AGE	Years of Service								Total
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & up	
Under 25	577	1							578
Avg. Pay	46,643	76,300							46,694
25 to 29	3,991	605	2						4,598
Avg. Pay	50,872	56,304	65,620						51,593
30 to 34	2,502	3,410	832						6,744
Avg. Pay	54,865	62,091	72,820						60,734
35 to 39	1,148	1,932	3,692	599	1				7,372
Avg. Pay	59,270	66,857	77,193	88,020	87,012				72,574
40 to 44	693	993	2,005	2,886	256				6,833
Avg. Pay	61,606	70,797	80,605	90,993	99,736				82,357
45 to 49	636	818	1,423	2,250	1,758	144			7,029
Avg. Pay	59,199	69,435	81,312	90,675	97,800	98,765			85,407
50 to 54	417	671	1,075	1,192	1,031	1,034	278		5,698
Avg. Pay	60,734	69,233	80,054	89,762	96,188	96,967	98,227		86,272
55 to 59	244	403	889	1,096	759	773	1,070	235	5,469
Avg. Pay	62,512	69,962	79,576	89,048	94,287	95,173	96,145	97,345	88,256
60 to 64	129	207	541	901	768	589	556	773	4,464
Avg. Pay	68,698	74,780	80,025	88,794	94,086	94,830	97,497	99,133	91,082
65 to 69	30	46	181	328	321	289	227	346	1,768
Avg. Pay	72,404	80,550	85,768	88,418	97,319	96,358	95,413	99,692	93,689
70 & up	3	7	17	45	53	48	53	98	324
Avg. Pay	75,856	103,382	90,887	89,015	95,113	103,244	96,565	101,412	97,392
Total	10,370	9,093	10,657	9,297	4,947	2,877	2,184	1,452	50,877
Avg. Pay	54,719	65,622	78,840	90,024	96,386	96,181	96,689	99,131	77,637

Table A-2: Comparative Summary of Active Data		
	June 30, 2014	June 30, 2016
Average Age	44.7 years	44.6 years
Average Service	13.7 years	13.7 years
Average Pay	\$74,497	\$77,637



Appendix A: Membership Data

Table A-3: Members Receiving Health Insurance Benefits Under the Plan June 30, 2016					
	Retirees		Spouses		Total
	Male	Female	Male	Female	
Subsidized Local School District Coverage					
Ages Under 65	495	2,066	785	626	3,972
Ages 65 and Over	<u>2,277</u>	<u>4,998</u>	<u>1,743</u>	<u>1,357</u>	<u>10,375</u>
Total	2,772	7,064	2,528	1,983	14,347
CTRB Sponsored Medicare Supplemental Plans					
Medical with Prescriptions	920	1,785	717	547	3,969
Medical with Prescriptions, Vision & Hearing	<u>4,953</u>	<u>10,063</u>	<u>4,398</u>	<u>2,430</u>	<u>21,844</u>
Total	5,873	11,848	5,115	2,977	25,813
Total	8,645	18,912	7,643	4,960	40,160

Table A-4: CTRB Sponsored Medicare Supplemental Plan Participation by Attained Age Retirees and Spouses Combined June 30, 2016							
Medical with Prescriptions							
Gender	Attained Age						Total
	Under 65	65 - 69	70 - 74	75 - 79	80 - 84	85+	
Male	1	153	297	207	376	603	1,637
Female	<u>7</u>	<u>199</u>	<u>332</u>	<u>353</u>	<u>509</u>	<u>932</u>	<u>2,332</u>
Total	8	352	629	560	885	1,535	3,969
Medical with Prescriptions, Vision & Hearing							
Gender	Attained Age						Total
	Under 65	65 - 69	70 - 74	75 - 79	80 - 84	85+	
Male	20	2,686	3,178	1,771	1,005	691	9,351
Female	<u>32</u>	<u>4,200</u>	<u>4,007</u>	<u>2,032</u>	<u>1,212</u>	<u>1,010</u>	<u>12,493</u>
Total	52	6,886	7,185	3,803	2,217	1,701	21,844
Total							
Gender	Attained Age						Total
	Under 65	65 - 69	70 - 74	75 - 79	80 - 84	85+	
Male	21	2,839	3,475	1,978	1,381	1,294	10,988
Female	<u>39</u>	<u>4,399</u>	<u>4,339</u>	<u>2,385</u>	<u>1,721</u>	<u>1,942</u>	<u>14,825</u>
Total	60	7,238	7,814	4,363	3,102	3,236	25,813



Appendix B: Summary of Actuarial Assumptions and Methods

Investment Rate of Return

Assumed annual rate of 4.25% net of investment and administrative expenses.

Health Care Cost Trend Rates

Following is a chart detailing trend assumptions. Trend is applied to the CTRB Sponsored Medicare Supplemental Plans' premiums and claims.

Year of Increase	Claims Trend	Contributions Trend
2016	7.25%	7.25%
2017	7.00%	7.00%
2018	6.75%	6.75%
2019	6.25%	6.25%
2020	5.75%	5.75%
2021	5.25%	5.25%
2022 and beyond	5.00%	5.00%

No increases are assumed for the Subsidized Local School District Coverage's subsidy of \$110 per month for a retired member, plus an additional \$110 per month for a spouse, as the subsidy amount is set by statute and has not increased since July of 1996. The valuation assumes all future recipients of the subsidy receive an amount of \$110 per month.

Anticipated Plan Participation

The assumed annual rates of member participation and spouse coverage are as follows:

Participant	Subsidized Local School District Coverage	CTRB Sponsored Medicare Supplemental Plans
Member Pre 65	60%	N/A
Member Post 65	20%	60%
Spouse/Survivor Pre 65*	45%	N/A
Spouse/Survivor Post 65*	40%	45%

*Percentage of participating members electing spouse coverage.



Appendix B: Summary of Actuarial Assumptions and Methods

Age Related Morbidity

Per capita health care costs of the CTRB Sponsored Medicare Supplemental Plans are adjusted to reflect expected cost changes related to age. The increase to the net incurred claims was assumed to be:

Participant Age	Annual Increase
< 30	0.0%
30 – 34	1.0%
35 – 39	1.5%
40 – 44	2.0%
45 – 49	2.6%
50 – 54	3.3%
55 – 59	3.6%
60 – 64	4.2%
65 – 69	3.0%
70 – 74	2.5%
75 – 79	2.0%
80 – 84	1.0%
85 - 89	0.5%
90 and over	0.0%

Annual Expected Claims of the CTRB Sponsored Medicare Supplemental Plans

Assumed adult per capita health care costs were based on past experience and trended based on the assumptions. The expected value of medical and prescription drug claims of the CTRB Sponsored Medicare Supplemental Plans, age adjusted to age 65, for the year following the valuation date is \$2,513. This amount includes medical, drug, and third-party administrative costs, and represents the amount the System pays as the full contribution amount. The average medical, drug, and administrative costs shown are normalized to age 65 and then age adjusted in calculating liabilities.

For the June 30, 2016 valuation, the assumed health care claims costs are based on the premium equivalent rate provided by the System. CMC accepted all information without audit and has relied upon the sources for the accuracy of the data; however, CMC did review the information for reasonableness. On the basis of this review, CMC believes the data and information provided to be sufficiently complete and reliable, and that it is appropriate for the purposes intended.

The valuation reflects the Plan's January 1, 2015 transition to prescription drug benefits provided through a Medicare Prescription Drug Plan (PDP). As the Plan will no longer participate in the Centers for Medicare & Medicaid Services' (CMS) Retiree Drug Subsidy Program, the Medicare Part D subsidies implicit in the lower costs for PDPs are recognized in the liability under GASB Statements No. 43 and No. 45.



Appendix B: Summary of Actuarial Assumptions and Methods

Spouse Participation in Health Insurance Coverage

Use of actual census data and current coverage elections for spouses of current retirees. For spouses of future retirees, it was assumed females were three years younger than their spouse.

Rates of Annual Salary Increase

Rates of Annual Salary Increase Assumption	
<u>Years of Service</u>	<u>Annual Rate</u>
0 – 1	6.50%
2 – 9	6.25
10 – 11	5.50
12 – 14	5.00
15	4.75
16	4.50
17	4.25
18	4.00
19	3.75
20	3.50
21+	3.25

Active Member Decrement Rates

- a. Table below provides a summary of the assumed rates of service retirement.

Annual Rates of Retirement						
Age	Unreduced		Proratable		Reduced	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	27.5%	27.5%			1.00%	1.00%
55	38.5%	27.5%			4.00%	4.75%
60	22.0%	27.5%	6.0%	5.5%		
65	36.3%	32.5%	13.0%	12.5%		
70	100.0%	32.5%	30.0%	14.5%		
75	100.0%	32.5%	30.0%	18.0%		
80	100.0%	100.0%	100.0%	100.0%		



Appendix B: Summary of Actuarial Assumptions and Methods

- b. Table below provides a summary of the assumed rates of mortality while actively employed and disability.

Annual Rates of Death and Disability				
Age	Pre-Retirement Mortality		Disability	
	Male	Female	Male	Female
20	0.0377%	0.0147%	0.0341%	0.0500%
25	0.0412%	0.0162%	0.0341%	0.0500%
30	0.0404%	0.0205%	0.0341%	0.0410%
35	0.0448%	0.0272%	0.0341%	0.0410%
40	0.0539%	0.0375%	0.0536%	0.0720%
45	0.0818%	0.0622%	0.1219%	0.1200%
50	0.1476%	0.1116%	0.2438%	0.2630%
55	0.2800%	0.1927%	0.5363%	0.4380%
60	0.4557%	0.2914%	0.9604%	0.5000%
64	0.6572%	0.4272%		

- c. Table below provides a summary of the assumed rates of withdrawal for active members prior to eligibility for retirement.

Annual Rates of Withdrawal					
10 or more years of service					
Years of Service	Male	Female	Age	Male	Female
0	14.00%	12.00%	25	1.50%	4.00%
1	11.00	10.50	30	1.50	4.00
2	8.00	8.75	35	1.50	3.50
3	6.50	7.50	40	1.50	2.30
4	4.50	6.75	45	1.59	1.50
5	3.50	6.00	50	2.04	2.00
6	3.00	5.25	55	3.44	2.50
7	2.75	4.75	59	4.00	2.90
8	2.50	4.25			
9	2.50	4.00			

Withdrawal Assumptions

It was assumed that 30% of the vested members who terminate elect to withdraw their contributions while the remaining 70% elect to leave their contributions in the plan in order to be eligible for a benefit at their retirement date. It is assumed that eligible deferred vested participants will commence health care benefits at age 60.



Appendix B: Summary of Actuarial Assumptions and Methods

Post-Retirement Mortality

For healthy retirees and beneficiaries, the RPH-2014 White Collar table with employee and annuitant rates blended from ages 50 to 80 projected to the year 2020 using the BB improvement scale and further adjusted to grade in increases (5% for females and 8% for males) to rates over age 80. For disabled retirees, the RPH-2014 Disabled Mortality table projected to 2017 using the BB improvement scale. The following are sample rates for the retirees, beneficiaries, and disabled:

Annual Rates of Death				
Age	Healthy		Disabled	
	Male	Female	Male	Female
50	0.1476%	0.1116%	1.8406%	1.1487%
55	0.2800%	0.1927%	2.2661%	1.3727%
60	0.4557%	0.2914%	2.7070%	1.5886%
65	0.7214%	0.4747%	3.2573%	1.9356%
70	1.1906%	0.8584%	4.0909%	2.6165%
75	2.0499%	1.5897%	5.4230%	3.8159%
80	3.6764%	2.9756%	7.5768%	5.7047%
85	6.9254%	5.4419%	11.1066%	8.5219%

Marriage Assumption

For the purpose of valuing coverage under the in-service death benefit, 85% of males and 75% of females assumed to be married, with females being three years younger than their spouse.

Asset Valuation Method

The Plan is financed on a pay-as-you-go basis, and no methodology is needed to determine the actuarial value of assets.

Actuarial Cost Method

The Entry Age Normal actuarial cost method allocates the plan's actuarial present value of future benefits to various periods based upon service. The portion of the present value of future benefits allocated to years of service prior to the valuation date is the actuarial accrued liability, and the portion allocated to years following the valuation date is the present value of future normal costs. The normal cost is determined for each active member as the level percent of payroll necessary to fully fund the expected benefits to be earned over the career of each individual active member. The normal cost is partially funded with active member contributions with the remainder funded by employer contributions.

The unfunded accrued liability is determined by subtracting the actuarial value of assets from the actuarial accrued liability.



Appendix B: Summary of Actuarial Assumptions and Methods

Administrative and Investment Expenses

The investment return assumption represents the expected return net of all administrative and investment expenses.

Payroll Growth Rate

The total annual payroll of active members is assumed to increase at an annual rate of 3.25%. This rate does not anticipate increases in the number of members.

Changes from Prior Valuation

As a result of the Experience Study for the Five-Year Period Ending June 30, 2015:

- The discount rate has been lowered from 4.50% to 4.25% to reflect the decrease in the rate of inflation.
- The payroll growth rate assumption was decreased from 3.75% to 3.25% to reflect the decrease in the rate of inflation and the decrease in the rate of real wage increase.
- The demographic assumptions of salary growth, payroll growth, the rates of withdrawal, the rates of retirement, the rates of mortality, and the rates of disability incidence were adjusted based upon the experience study's findings and their adoption by the Board.

Additionally, the assumed initial per capita health care costs, the assumed rates of health care inflation used to project the per capita costs, and the participation assumptions have been revised.

Affordable Care Act (ACA)

The impact of the Affordable Care Act (ACA) was addressed in this valuation. Review of the information currently available did not identify any specific provisions of the ACA that are anticipated to significantly impact results. While the impact of certain provisions such as the excise tax on high-value health insurance plans beginning in 2020 (if applicable), mandated benefits and participation changes due to the individual mandate should be recognized in the determination of liabilities, overall future plan costs and the resulting liabilities are driven by amounts employers and retirees can afford (i.e., trend). The trend assumption forecasts the anticipated increase to initial per capita costs, taking into account health care cost inflation, increases in benefit utilization, plan changes, government-mandated benefits, and technological advances. Given the uncertainty regarding the ACA's implementation (e.g., the impact of excise tax on high-value health insurance plans, changes in participation resulting from the implementation of state-based health insurance exchanges), continued monitoring of the ACA's impact on the Plan's liability will be required.



Appendix C: Summary of Plan Provisions

Outlined below are the principal provisions of the system which were reflected in the results shown in this report.

Covered Employees

Any teacher, principal, superintendent or supervisor engaged in service of public schools, plus professional employees at State schools of higher education if they choose to be covered.

Credited Service

One month for each month of service as a teacher in Connecticut public schools, maximum 10 months for each school year. Ten months of credited service constitutes one year of Credited Service. Certain other types of teaching service, State employment, or war-time military service may be purchased prior to retirement, if the Member pays one-half the cost.

Normal Retirement

Eligibility - Age 60 with 20 years of Credited Service in Connecticut, or 35 years of Credited Service including at least 25 years of service in Connecticut.

Early Retirement

Eligibility - 25 years of Credited Service including 20 years of Connecticut service, or age 55 with 20 years of Credited Service including 15 years of Connecticut service.

Proratable Retirement

Eligibility - Age 60 with 10 years of Credited Service.

Disability Retirement

Eligibility - 5 years of Credited Service in Connecticut if not incurred in the performance of duty and no service requirement if incurred in the performance of duty.

Termination of Employment

Eligibility - 10 or more years of Credited Service.

Teachers' Required Contribution

1.25% of annual salaries in excess of \$500,000 is contributed for health insurance of retired teachers.

State Contribution

The State pays for one third of the costs through an annual appropriation in the General Fund. Administrative costs of the Plan are financed by the State. Based upon Chapter 167a, Subsection D of Section 10-183t of the Connecticut statutes, it is assumed the State will pay for any long-term shortfall arising from insufficient active member contributions.



Appendix C: Summary of Plan Provisions

Retiree Health Care Coverage

Any member that is currently receiving a retirement or disability benefit is eligible to participate in the Plan. There are two types of the health care benefits offered through the system. Subsidized Local School District Coverage provides a subsidy paid to members still receiving coverage through their former employer and the CTRB Sponsored Medicare Supplemental Plans provide coverage for those participating in Medicare, but not receiving Subsidized Local School District Coverage.

Any member that is not currently participating in Medicare Parts A & B is eligible to continue health care coverage with their former employer. A subsidy of up to \$110 per month for a retired member plus an additional \$110 per month for a spouse enrolled in a local school district plan is provided to the school district to first offset the retiree’s share of the cost of coverage, any remaining portion is used to offset the district’s cost. The subsidy amount is set by statute, and has not increased since July of 1996. A subsidy amount of \$220 per month may be paid for a retired member, spouse or the surviving spouse of a member who has attained the normal retirement age to participate in Medicare, is not eligible for Part A of Medicare without cost, and contributes at least \$220 per month towards coverage under a local school district plan.

Any member that is currently participating in Medicare Parts A & B is eligible to either continue health care coverage with their former employer, if offered, or enroll in the plan sponsored by the System. If they elect to remain in the plan with their former employer, the same subsidies as above will be paid to offset the cost of coverage.

If a member participating in Medicare Parts A & B so elects, they may enroll in one of the CTRB Sponsored Medicare Supplemental Plans. Active members, retirees, and the State pay equally toward the cost of the basic coverage (medical and prescription drug benefits). There are three choices for coverage under the CTRB Sponsored Medicare Supplemental Plans. The choices and calendar year premiums charged for each choice are shown in the table below:

Monthly Funding Rates for CTRB Sponsored Medicare Supplemental Plans						
Coverage	2012	2013	2014	2015	2016	2017
Medicare Supplement with Prescriptions	\$124	\$117	\$97	\$91	\$95	\$92
Medicare Supplement with Prescriptions and Dental	\$173	\$160	\$141	\$136	\$143	\$136
Medicare Supplement with Prescriptions, Dental, Vision & Hearing	\$180	\$165	\$146	\$140	\$148	\$141

Those participants electing vision, hearing, and/or dental are required by the System’s funding policy to pay the full cost of coverage for these benefits, and no liability under GASB No. 43 and No. 45 is assumed by the Plan for these benefits.

Survivor Health Care Coverage

Survivors of former employees or retirees remain eligible to participate in the Plan and continue to be eligible to receive either the \$110 monthly subsidy or participate in the CTRB Sponsored Medicare Supplemental Plans, as long as they do not remarry.



Appendix D: Glossary

Actuarial Accrued Liability - The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal costs. Sometimes referred to as "accrued liability" or "past service liability".

Accrued Service - The service credited under the plan which was rendered before the date of the actuarial valuation.

Actuarial Assumptions - Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method - A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal costs and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method".

Actuarial Equivalent - A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.

Actuarial Present Value - The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Age-Related Morbidity - Assumed increase to the net incurred claims related to the increase in age.

Amortization - Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Annual OPEB Cost (AOC) - An accrual-basis measure of the periodic cost of an employer's participation in a defined benefit OPEB plan.

Annual Required Contributions of the Employer (ARC) - The employer's periodic required contributions to a Defined Benefit OPEB Plan, which is the basis for determining an employer's Annual OPEB Cost.

Entry Age Normal Actuarial Cost Method - A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Experience Gain (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, in accordance with the actuarial cost method being used.

Health Care Cost Trend Rates - The annual assumed rate of increase for both claims and contributions.

Implicit Rate Subsidy - The differential between utilizing a blend of active and non-Medicare retiree experience for cost of benefits, and utilizing solely the expected retiree experience. Blending a lower cost active cohort with retirees results in an implicit rate subsidy for the retirees of the entire group.



Appendix D: Glossary

Level Dollar Amortization Method - The dollar amount to be amortized is divided into equal dollar amounts to be paid over a given number of years; part of each payment is interest and part is principal (similar to a mortgage payment on a building). Because payroll can be expected to increase as a result of inflation, level dollar payments generally represent a decreasing percentage of payroll; in dollars adjusted for inflation, the payments can be expected to decrease over time.

Level Percentage of Projected Payroll Amortization Method - Amortization payments are calculated so that they are a constant percentage of the projected payroll of active plan members over a given number of years. The dollar amount of the payments generally will increase over time as payroll increases (e.g., due to inflation); in dollars adjusted for inflation, the payments can be expected to remain level.

Net OPEB Obligation (NOO) - The cumulative difference since the effective date of this Statement between Annual OPEB Cost and the employer's contributions to the plan, including the OPEB liability (asset) at transition, if any, and excluding (a) short-term differences and (b) unpaid contributions that have been converted to OPEB-related debt.

Normal Cost - The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost". Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Other Postemployment Benefits (OPEB) - Postemployment benefits other than pension benefits. Other postemployment benefits (OPEB) include postemployment healthcare benefits, regardless of the type of plan that provides them, and all postemployment benefits provided separately from a pension plan, excluding benefits defined as termination offers and benefits.

Pay-As-You-Go - A method of financing a plan under which the contributions to the plan are generally made at about the same time and in about the same amount as benefit payments and expenses becoming due.

Plan Termination Liability - The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a "going concern" basis and is not normally determined in a routine actuarial valuation.

Sponsor - The entity that established the plan. The sponsor generally is the employer or one of the employers that participate in the plan to provide benefits for their employees and employees of other employers.

Substantive Plan - The terms of an OPEB plan as understood by the employer(s) and plan members.

Unfunded Actuarial Accrued Liability - The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability".

Valuation Assets - The value of current plan assets recognized for valuation purposes. Generally based on book value plus a portion of unrealized appreciation or depreciation.