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GASB STATEMENT NO. 67 REPORT

FOR THE

CONNECTICUT STATE EMPLOYEES' RETIREMENT SYSTEM

PREPARED AS OF JUNE 30, 2016

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February 16, 2017

State of Connecticut
State Employees' Retirement Commission
55 Elm Street
Hartford, CT 06106

Members of the Commission:

Presented in this report is information to assist the Connecticut State Employees' Retirement System in meeting the requirements of the Governmental Accounting Standards Board (GASB) Statement No. 67. The information is presented for the period ending June 30, 2016.

The annual actuarial valuation used as a basis for much of the information presented in this report was performed as of June 30, 2016. The valuation was based on data, provided by the Retirement System staff for active, inactive and retired members along with pertinent financial information.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the System, and on actuarial assumptions that are, individually and in the aggregate, internally consistent and reasonably based on the actual experience of the System. In addition, the calculations were completed in compliance with the laws governing the System and, in our opinion, meet the requirements of GASB 67. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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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.

Sincerely yours,

John J. Garrett ASA, FCA, MAAA
Principal and Consulting Actuary

Edward Koebel EA, FCA, MAAA
Principal and Consulting Actuary

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REPORT OF THE ANNUAL GASB STATEMENT NO. 67
REQUIRED INFORMATION FOR THE
CONNECTICUT STATE EMPLOYEES' RETIREMENT SYSTEM
PREPARED AS OF JUNE 30, 2016

SECTION I – INTRODUCTION

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), "*Financial Reporting For Pension Plans*", in June 2012. This report, prepared as of June 30, 2016 (the Measurement Date), presents information to assist the Connecticut State Employees' Retirement System (System) in meeting the requirements of GASB 67. Much of the material provided in this report is based on the data, assumptions and results of the annual actuarial valuation of the System as of June 30, 2016. The results of that valuation were detailed in a report dated January 19, 2017.

GASB 67 requires a measurement of the Total Pension Liability (TPL) utilizing the Entry Age Normal actuarial funding method. The Net Pension Liability (NPL) is then set equal to the TPL minus the System's Fiduciary Net Position (FNP) (basically the market values of assets) as of the measurement date. The benefit provisions recognized in the calculation of the TPL are summarized in Schedule B.

Among the assumptions needed for the liability calculation is a Single Equivalent Interest Rate (SEIR). To determine the SEIR, the FNP must be projected into the future for as long as there are anticipated benefits payable under the plan's provision applicable to the membership and beneficiaries of the System on the Measurement Date. Future contributions were projected to be made in accordance with the laws governing the Retirement System. If the FNP is not projected to be depleted at any point in the future, as the results currently indicate, the long term expected rate of return on plan investments expected to be used to finance the benefit payments may be used as the SEIR.

If however, at a future measurement date the FNP is projected to be depleted, the SEIR is determined as the single rate that will generate a present value of benefit payments equal to the sum of the present value determined by discounting all projected benefit payments through the date of depletion by the long term expected rate of return, and the present value determined by discounting those benefits after the date of depletion by a 20-year tax-exempt municipal bond (rating AA/Aa or higher) rate. The rate used, if necessary, for this purpose is the General Obligation 20-year Municipal Bond Index published monthly by the Board of Governors of the Federal Reserve System. We have determined as of the Measurement Date that use of a 6.90 percent discount rate meets the requirements of GASB 67.

The sections that follow provide the results of all the necessary calculations, presented in the order laid out in GASB 67 for note disclosure and Required Supplementary Information (RSI).

SECTION II – FINANCIAL STATEMENT NOTES

The actuarial related information presented herein will follow the order presented in GASB 67. There are other non-actuarial items required which are not included in this report. Paragraph numbers are provided for ease of reference.

Paragraph 30(a) (4): The data required regarding the membership of the System were furnished by the Employees' Retirement Board staff. The following table summarizes the membership of the system as of June 30, 2016, the Valuation Date.

Membership

	Number
Retired Members Or Their Beneficiaries Currently Receiving Benefits	48,191
Inactive Members Entitled To But Not Yet Receiving Benefits	1,412
Active Members	50,019
Total	99,622

Paragraphs 31(a) (1)-(4): As stated above, the NPL is equal to the TPL minus the FNP. That result as of June 30, 2016 is presented in the table below ($ thousands).

	Fiscal Year Ending June 30, 2016
Total Pension Liability (TPL)	$33,616,716
Fiduciary Net Position (FNP)	10,653,792
Net Pension Liability (NPL)	$22,962,924
Ratio of Fiduciary Net Position to Total Pension Liability	31.69%

Paragraph 31(b) (1)(a)-(f): This paragraph requires information regarding the actuarial assumptions used to measure the TPL. The actuarial assumptions utilized in developing the TPL are outlined in Schedule C. The total pension liability was determined by an actuarial valuation as of June 30, 2016, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.50 percent
Salary increases	3.50 – 19.50 percent, including inflation
Investment rate of return	6.90 percent, net of pension plan investment expense, including inflation

The RP-2014 White Collar Mortality Table projected to 2020 by scale BB at 100% for males and 95% for females is used for the period after service retirement and for dependent beneficiaries. The RP-2014 Disabled Retiree Mortality Table at 65% for males and 85% for females is used for the period after disability.

The actuarial assumptions used in the June 30, 2016 valuation were based on the results of an actuarial experience study for the period July 1, 2011 – June 30, 2015.

The long-term expected rate of return on pension plan investments was determined using a log-normal distribution analysis 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. The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Large Cap U.S. Equities	21.0%	5.8%
Developed Non-U.S. Equities	18.0	6.6
Emerging Markets (Non-U.S.)	9.0	8.3
Real Estate	7.0	5.1
Private Equity	11.0	7.6
Alternative Investment	8.0	4.1
Fixed Income (Core)	8.0	1.3
High Yield Bonds	5.0	3.9
Emerging Market Bond	4.0	3.7
Inflation Linked Bonds	5.0	1.0
Cash	4.0	0.4

Discount rate. The discount rate used to measure the total pension liability was 6.90 percent. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that State contributions will be made at the actuarially determined rates in future years. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. 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.

Paragraph 31(b) (1) (g): This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the System, calculated using the discount rate of 6.90 percent, as well as what the System's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (5.90 percent) or 1-percentage-point higher (7.90 percent) than the current rate ($ thousands):

	1% Decrease (5.90%)	Current Discount Rate (6.90%)	1% Increase (7.90%)
System's net pension liability	$27,250,098	$22,962,924	$19,395,014

Paragraph 31(c): June 30, 2016 is the actuarial valuation date upon which the TPL is based. In order to provide the experience gain or loss, an expected TPL is determined as of June 30, 2016 using standard roll forward techniques. The roll forward calculation adds the annual normal cost (also called the service cost), subtracts the actual benefit payments and refunds for the plan year and then applies the expected investment rate of return for the year. The procedure was used to determine the expected TPL as of June 30, 2016, as shown in the following table:

TPL Roll-Forward ($ in thousands)	Old Assumptions (1)	New Assumptions (2)
(a) Interest Rate	8.00%	6.90%
(b) TPL as of June 30, 2015	$27,192,467	
(c) Entry Age Normal Cost for the Year July 1, 2015 – June 30, 2016	$322,114	
(d) Actual Benefit Payments for the Year July 1, 2015 – June 30, 2016	$1,736,279	
(e) Expected TPL as of June 30, 2016 = [(a) x 1.08] + (b) – [(c) x 1.04)]	$27,884,249	
(f) Actual TPL as of June 30, 2016	$28,657,011	$33,616,716
(g) Experience (Gain)/Loss for Year (1f) – (1e)	$772,762	
(h) Assumption (Gain)/Loss for Year (2f) – (1f)		$4,959,705

SECTION III – REQUIRED SUPPLEMENTARY INFORMATION

There are several tables of Required Supplementary Information (RSI) that need to be included in the System's financial statements:

Paragraphs 32(a)-(c): The required tables are provided in Schedule A.

Paragraph 34: In addition the following should be noted regarding the RSI:

Changes of benefit terms:

- 2014
  - The 2011 SEBAC Agreement changed the benefit multiplier for the portion of benefit below the breakpoint from 1.33% to 1.40%. This change was made effective for all active members who retire on or after July 1, 2013 in Tier II, IIA and III.
  - A one-time decision was granted to members not eligible to retire by July 1, 2022 to elect to maintain the same normal retirement eligibility applicable to members eligible to retire before July 1, 2022. Employees who elected by July 1, 2013 to maintain the eligibility are required to make additional employee contributions for the length of their remaining active service with SERS. The additional contribution was up to 0.72% of pensionable earnings.

Changes of assumptions:

- 2016
  - Rates of withdrawal, disability retirement, service retirement and mortality were adjusted to more closely reflect actual and anticipated experience. The analysis and basis for these changes are included in the latest Experience Investigation for the five-year period ending June 30, 2015.
  - Economic assumptions (assumed rates of inflation and investment return), the actuarial cost method, and the UAAL amortization methodology were changed in accordance with Memorandum of Agreement (MOU) between the State and SEBAC effective December 8, 2016.

Method and assumptions used in calculations of actuarially determined contributions. The actuarially determined contributions in the schedule of employer contributions are calculated as of June 30 each biennium for the fiscal years ending two after the valuation date (June 30, 2016 contributions are based on June 30, 2014 valuation.). The following actuarial methods and assumptions were used to determine the most recent contributions reported in that schedule:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of pay, closed
Single equivalent amortization period	17 years
Asset valuation method	5-year smoothed market
Inflation	3.75 percent
Salary increase	4.00-20.00 percent, including inflation
Investment rate of return	8.00 percent, net of investment related expense

SCHEDULE A

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY
GASB 67 Paragraph 32(a)
($ in Thousands)

Fiscal Year Ending June 30	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total pension liability										
Service Cost	$ 287,473	$ 310,472	$ 322,114							
Interest	1,998,736	2,052,651	2,105,947							
Benefit changes	0	0	0							
Difference between expected and actual experience	0	0	772,762							
Changes of assumptions	0	0	4,959,705							
Benefit payments	(1,563,029)	(1,650,465)	(1,729,181)							
Refunds of contributions	(3,935)	(7,124)	(7,098)							
Net change in total pension liability	719,245	705,534	6,424,249							
Total pension liability - beginning	25,767,688	26,486,933	27,192,467							
Total pension liability - ending (a)	$26,486,933	$27,192,467	$33,616,716							
Plan net position										
Contributions - employer	$ 1,268,890	$ 1,371,651	$ 1,501,805							
Contributions - member	144,807	187,339	135,029							
Net investment income	1,443,391	294,412	(100)							
Benefit payments	(1,563,029)	(1,650,465)	(1,729,181)							
Administrative expense	0	0	(651)							
Refunds of contributions	(3,935)	(7,124)	(7,098)							
Other	0	0	85,608*							
Net change in plan net position	1,290,124	195,813	(14,588)							
Plan net position - beginning	9,182,443	10,472,567	10,668,380							
Plan net position - ending (b)	$10,472,567	$10,668,380	$10,653,792							
Net pension liability - ending (a) - (b)	$16,014,366	$16,524,087	$22,962,924							

* Includes $75,550 adjustment to beginning of year net position.

SCHEDULE OF THE NET PENSION LIABILITY
GASB 67 Paragraph 32(b)
($ in Thousands)

Fiscal Year Ending June 30	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total pension liability	$ 26,486,933	$ 27,192,467	$33,616,716							
Plan net position	10,472,567	10,668,380	10,653,792							
Net pension liability	$ 16,014,366	$ 16,524,087	$22,962,924							
Ratio of plan net position to total pension liability	39.54%	39.23%	31.69%							
Covered payroll	$ 3,487,577	$ 3,618,361	$ 3,720,751							
Net pension liability as a percentage of covered payroll	459.18%	456.67%	617.16%							

* Covered payroll equals the total active annual compensation from each year's valuation report.

SCHEDULE OF EMPLOYER CONTRIBUTIONS
GASB 67 Paragraph 32(c)
($ in Thousands)

Fiscal Year Ending June 30	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Actuarially determined employer contribution	$1,514,467	$1,379,189	$1,268,935	$1,059,652	$ 926,372	$ 944,077	$ 897,428			
Actual employer contributions	1,501,805	1,371,651	1,268,890	1,058,113	926,343	825,801	720,527			
Annual contribution deficiency (excess)	$ 12,662	$ 7,538	$ 45	$ 1,539	$ 29	$ 118,276	$ 176,901			
Covered payroll*	$3,720,751	$3,618,361	$3,487,577	$3,480,483	$3,354,682	$3,210,666	$3,295,666			
Actual contributions as a percentage of covered payroll	40.36%	37.91%	36.38%	30.40%	27.61%	25.72%	21.86%			

* Covered payroll equals the total active annual compensation from each year's valuation report.

SCHEDULE B

SUMMARY OF BENEFIT PROVISIONS EVALUATED

The Connecticut State Employees Retirement System (CT SERS) is a defined benefit pension plan established by the Connecticut General Assembly for the purpose of providing retirement allowances and other benefits for State employees in Connecticut, and their survivors and other beneficiaries.

Eligibility Requirements

Tier I	All State Employees, Elected Officials and their Appointees hired prior to July 1, 1984. Those employees hired between July 1, 1982 and January 1, 1984 could elect to move to Tier II.
Tier II	All State Employees, Elected Officials and their Appointees hired on or after July 1, 1984.
Tier IIA	All State Employees, Elected Officials and their Appointees hired on or after July 1, 1997.
Tier III	All State Employees, Elected Officials and their Appointees hired on or after July 1, 2011.
Hybrid	All Higher Education Employees that are eligible for the Alternative Retirement Plan may elect the Hybrid Plan.

Final Average Earnings (FAE)

Tier I, II, and IIA	Average Salary of the three highest paid years of service. Effective January 1, 1986, no one year's earnings can be greater than 130% of the average of the two preceding years in calculating the Final Average Earnings.
Tier III	Average Salary of the five highest paid years of service. No one year's earnings can be greater than 130% of the average of the two preceding years in calculating the Final Average Earnings.

Normal Retirement Benefit

Eligibility	*<u>Tier I Hazardous</u>* – 20 years of credited service. *<u>Tier I Plans B and C</u>* – Earliest of age 55 with 25 years of service, age 60 with 10 years of service, or age 70 with 5 years of service. *<u>Tier II Hazardous</u>* – 20 years of credited service. *<u>Tier II and IIA</u>* – For those who will be eligible for retirement on or before July 1, 2022, the earliest of age 62 with 10 years of vesting service (effective July 1, 1992), age 60 with 25 years of vesting service, age 70 with 5 years of vesting service, or age 62 with 5 years of actual state service for terminations on or after July 1, 1997. For those who will not be eligible for retirement on or before July 1, 2022, the earliest of age 65 with 10 years of vesting service, age 63 with 25 years of vesting service, age 70 with 5 years of vesting service. *<u>Tier III Hazardous</u>* – Earlier of Age 50 and 20 years of benefit service or 25 years of benefit service. *<u>Tier III</u>* – Age 63 and 25 years of benefit service or Age 65 and 10 years of benefit service.
Benefit	*<u>Tier I Hazardous</u>* – 50% of FAE plus 2% for each year of service in excess of 20. *<u>Tier I Plan B</u>* – 2% of FAE times years of service up to age 65. Thereafter, 1% of FAE up to $4,800, plus 2% of FAE in excess of $4,800 times years of service. At age 70, greater of 1.25% of FAE up to $4,800 plus 2.5% of FAE in excess of $4,800 times years of service (maximum 20 years) or 1.0% of FAE up to $4,800 plus 2% of FAE in excess of $4,800 times year of service. Minimum benefit with 25 years is $833.34 per month. *<u>Tier I Plan C</u>* – 2% of FAE times years of service. At age 70, greater of 2.5% of FAE times years of service (maximum 20 years) or 2.0% of FAE times years of

service. Minimum benefit with 25 years is $833.34 per month.

Tier II,IIA and III Hazardous – 2.5% of FAE times years of service up to 20 years plus 2.0% of FAE times years of service in excess of 20 years, if any. Minimum benefit with 25 years is $360 per month.

Tier II, IIA and III All Others – 1.40% of FAE plus 0.433% of FAE in excess of year's breakpoint*, times years of service from October 1, 1982 up to 35 years plus 1.625% of FAE times years of service in excess of 35 years, if any. Minimum benefit with 25 years if $360 per month.

* $10,700 increased by 6% each year after 1982, rounded to nearest $100 but not greater than Social Security Covered Compensation.

Early Retirement Benefit

Eligibility

Hazardous – None.

Tier I – Age 55 with 10 years of service.

Tier II and IIA – Age 55 with 10 years of service.

Tier III – Age 58 with 10 years of service.

Benefit

Tier I – Benefit is Normal Retirement Benefit reduced for retirement prior to age 60 with less than 25 years of service.

Tier II, IIA and III – Benefit is Normal Retirement Benefit reduced 0.25% (effective July 1, 1991) for each month prior to age 60 if at least 25 years of service or age 62 if at least 10 but less than 25 years of service.

For those who retire on or after October 2, 2011 but prior to meeting the age and service requirements for a normal retirement, will be subject to a benefit reduced by 0.50% for each month prior to Normal Retirement.

Disability Retirement Benefit

Tier I	For non-service disabilities occurring prior to age 60 with at least 5 years of service, benefit is 3% of FAE times years of service; maximum benefit is 1.667% of FAE times year of service projected to age 65. For service disabilities occurring prior to age 60, benefit is 1.667% of Salary times years of service projected to age 65 (maximum 30 years). Exception: State Police benefit is equal to the normal retirement benefit if more than 20 years of service. State Police also receives an additional benefit of $360 per month plus $300 to spouse plus $300 to a surviving dependent child.
Tier II, IIA and III	Prior to age 65 for service related disability or at any age with at least 10 years of service, benefit is 1.333% of FAE plus 0.50% of FAE in excess of the year's breakpoint, times service projected to age 65 (maximum 30 years).

Deferred Vested Retirement Benefit

Eligibility	*Tier I* - 10 years of service. *Tier II and IIA* – Effective July 1, 1997, 5 years of actual state service, 10 years of vesting service, or age 70 with 5 years of service. *Tier III* – 10 years of benefit service.
Benefit	*Tier I* – Benefit is payable at Normal Retirement Age or an Early Retirement Benefit is payable at age 55. *Tier II and IIA* – Benefit is payable at Normal Retirement Age or an Early Retirement Benefit is payable at age 55. *Tier III* – Benefit is payable at Normal Retirement Age or an Early Retirement Benefit is payable at age 58.

Pre-Retirement Spouse's Benefit

Tier I	State Police – Survivor benefits to spouse of $670 per month plus $300 to a surviving dependent child. If eligible for early or normal retirement, 50% of the average of the Life Benefit and the 50% Joint & Survivor Benefit the member would have received. If not eligible for retirement but with 25 years of service, the same benefit calculated as though age 55 using service and earnings at death. If not eligible for retirement, return of contributions (5% interest).
Tier II, IIA and III	If eligible for early or normal retirement, 50% of the 50% Joint & Survivor Benefit the member would have received. If not eligible for retirement but with 25 years of service, the same benefit calculated as though age 55 using service and earnings at death. If not eligible for retirement, return of contributions (5% interest).
Tiers I, II, IIA and III	If death is due to employment and there are dependent children under age 18, spouse will be paid $100,000 in 10 annual installments while living and not remarried. In addition, $50 per month will be paid to each child while under age 18. If death is due to employment and there are no dependent children under age 18, spouse will be paid $50,000 in not less than 10 annual installments.

Payment Options	50% or 100% Joint and Survivor (Normal Form if married). Straight life annuity (Normal Form if not married). 10 or 20 year certain and life annuity.

Cost of Living Adjustments (COLA)	Annual adjustments each July 1 of up to 5% for retirements prior to July 1, 1980; 3% for retirements after July 1, 1980. For members (and beneficiaries) not covered by Social Security and age 62 and over, the maximum increase is 6%. For employees retiring after June 30, 1999, the annual adjustment will be 60% of the increase in CPI up to 6% and 75% of the increase in the CPI over 6%. This adjustment will be no less than 2.5% and no greater than 6%. Employees retiring between July 1, 1997 and June 30, 1999 made an irrevocable choice between the above formula and a fixed 3% annual adjustment. An employee from Tier IIA must have at least 10 years of actual state service or directly make the transition into retirement in order to be eligible for annual adjustments. For employees retiring on or after October 2, 2011, the minimum COLA shall be 2.0% and the maximum COLA shall be 7.5%.

Member Contributions*

Tier I – Hazardous	4% of earnings up to Social Security Taxable Wage Base plus 5% of earnings above that level.
Tier I – Plan B	2% of earnings up to Social Security Taxable Wage Base plus 5% of earnings above that level.
Tier I – Plan C	5% of earnings.
Tier II – Hazardous	4% of earnings.
Tier II – All Others	None.
Tier IIA & III – Hazardous	5% of earnings.
Tier IIA & III – All Others	2% of earnings.

* Increased for anyone electing to maintain retirement eligibility.

Hybrid Defined Benefit/Defined Contribution Plan for Employees of Higher Learning

Individuals hired on or after July 1, 2011 otherwise eligible for the Alternate Retirement Plan ("ARP") shall be eligible to be members of the new Hybrid Plan in addition to their existing choices. Individuals who are currently members of the ARP shall be eligible to join the Hybrid Plan on a one time option at the full actuarial cost. The Hybrid Plan shall have defined benefits identical to Tier II/IIA and Tier III for individuals hired on or after July 1, 2011, but shall require employee contributions 3% higher than the contribution required from the Applicable Tier II/IIA/III Plan. An employee shall have the option, upon leaving state service, of accepting the defined benefit amount, or electing to receive a return of his/her contributions to the Hybrid Plan, plus a 5% employer match, plus 4% interest ("cash out option"). In the event the employee elects the cash out option, he/she shall permanently waive any entitlement they may have to health insurance as a retired state employee unless they convert the cash out option to a periodic payment as would be required under the current ARP Plan.

SCHEDULE C

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

Adopted or reaffirmed by the Commission for the June 30, 2016 and later valuations.

VALUATION INTEREST RATE: 6.90% per annum, compounded annually, net of expenses.

SALARY INCREASES:

Years of Service	Rate*
0	9.50%
1	19.50%
2	9.50%
3	5.75%
4	5.50%
5	5.25%
6	5.00%
7	5.00%
8	5.00%
9	5.00%
10	4.50%
11	4.50%
12	4.50%
13	4.50%
14	4.50%
15+	3.50%

*includes Wage Inflation of 3.50%

COST OF LIVING ADJUSTMENTS:

Group	Rate
Pre July 1, 1980 Retirees	3.25%
July 1, 1980 – June 30, 1997 Retirees	3.00%
July 1, 1997 – October 1, 2011 Retirees	2.60%
Post October 1, 2011 Retirees	2.25%

SOCIAL SECURITY WAGE BASE INCREASES: 3.50% per annum.

PAYROLL GROWTH ASSUMPTION: 3.50% per annum.

IMPACT OF LONGLEY DECISION: Benefits for members retiring from service on or after the *Longley* decision date are assumed to increase by 0.084% as a result of the revised treatment of longevity pay. Retroactive application of *Longley* has been reflected in this valuation to the extent impacted retiree benefits have been recalculated.

SEPARATIONS BEFORE SERVICE RETIREMENT: Representative values of the assumed annual rates of separation before service retirement are as follows:

WITHDRAWAL

Annual Rates of Withdrawal								
	Years of Service							
Age	**0**	**1**	**2**	**3**	**4**	**5**	**6-9**	**10+**
Hazardous Males								
20	6.00%	3.00%	6.00%	3.00%	2.75%	2.00%	1.25%	1.25%
25	6.00	3.00	6.00	3.00	2.75	2.00	1.25	1.25
30	6.00	3.00	4.00	3.00	2.75	2.00	1.25	1.25
35	6.00	3.00	4.00	3.00	2.00	2.00	1.25	1.25
40	8.75	3.00	4.00	3.50	2.00	2.50	1.25	1.25
45	8.75	4.00	4.00	3.50	2.00	2.50	1.25	1.25
50	8.75	5.50	4.00	3.50	2.00	2.50	1.25	1.25
55+	8.75	6.00	4.00	3.50	2.00	2.50	1.25	1.25
Hazardous Females								
20	10.00%	10.00%	5.00%	2.50%	3.00%	3.50%	2.50%	1.25%
25	10.00	10.00	5.00	2.50	3.00	3.50	2.50	1.25
30	12.00	6.00	5.00	2.50	3.00	3.50	2.50	1.25
35	12.00	5.00	6.00	2.50	4.00	3.50	2.50	1.25
40	12.00	5.00	6.00	2.00	4.00	3.50	2.50	1.25
45	12.00	5.00	5.00	2.00	4.00	3.50	2.50	1.25
50	12.00	8.00	5.00	2.00	4.00	3.50	2.50	1.25
55+	12.00	8.00	5.00	2.00	4.00	3.50	2.50	1.25
Nonhazardous Males								
20	45.0%	40.0%	40.0%	20.0%	20.0%	10.0%	6.0%	5.0%
25	30.0	28.0	19.0	10.0	7.0	10.0	6.0	5.0
30	22.0	20.0	14.0	9.0	6.0	7.0	4.5	5.0
35	20.0	15.0	14.0	8.0	6.0	4.0	4.0	3.0
40	20.0	15.0	10.0	8.0	6.0	4.0	4.0	2.5
45	22.0	12.0	10.0	8.0	6.0	4.0	4.0	2.0
50	22.0	12.0	10.0	8.0	5.0	4.0	4.0	2.0
55+	25.0	19.0	10.0	8.0	4.0	4.0	3.5	2.0
Nonhazardous Females								
20	45.0%	45.0%	45.0%	20.0%	8.0%	10.0%	6.0%	4.0%
25	25.0	23.0	15.0	12.0	8.0	10.0	6.0	4.0
30	20.0	19.0	12.0	9.0	7.0	6.0	5.0	4.0
35	18.0	13.0	11.0	8.0	6.0	5.0	4.0	3.0
40	18.0	13.0	10.0	8.0	5.5	4.0	3.5	2.5
45	18.0	13.0	10.0	6.0	5.5	4.0	3.0	2.5
50	18.0	13.0	10.0	6.0	5.5	4.0	3.0	2.0
55+	18.0	13.0	10.0	6.0	5.5	4.0	3.0	2.0

DISABILITY

Annual Rates of Disability		
Age	**Hazardous**	**Non-Hazardous**
30	0.05%	0.04%
35	0.12	0.05
40	0.18	0.10
45	0.35	0.12
50	0.40	0.20
55	0.50	0.40
60	0.65	0.50
65	0.80	0.60
70	1.35	0.60

RETIREMENT: The assumed annual rates of retirement are shown below.

Annual Rates of Retirement			
Hazardous			
Age	Tier I, II & IIA		Tier III
	First Year Eligible	All Years After	
40	50%	50%	20%
41	30	40	20
42	30	35	20
43	30	30	20
44	30	25	20
45	40	25	20
46	40	25	20
47	40	25	20
48	40	15	20
49	40	15	20
50	40	20	20
51	40	20	20
52	40	20	20
53	40	25	20
54	40	25	20
55	40	25	20
56	40	25	20
57	40	15	20
58	40	25	20
59	40	20	20
60-64	50	30	20
65-69	50	50	20
70-79	100	30	20
80	100	100	100

Annual Rates of Retirement									
Nonhazardous									
Age	Tier I			Tier II & IIA			Tier III		
	Early	First Year	Other Years	Early	First Year	Other Years	Early	First Year	Other Years
55	6.0%	28.0%		4.5%					
56	6.0	10.0	15.0%	4.0					
57	6.0	10.0	12.5	4.0					
58	6.0	10.0	10.0	4.0			5.0%		
59	6.0	10.0	10.0	4.0			7.0		
60		12.5	12.5	4.0	13.5%		9.0		
61		15.0	12.5	4.0	15.0	13.0%	10.0		
62		10.0	20.0		15.0	24.0	12.0		
63		35.0	15.0		15.0	15.0	12.0	32.0%	
64		45.0	10.0		15.0	15.0	12.0	30.0	30.0%
65		65.0	15.0		25.0	15.0		28.0	25.0
66		65.0	20.0		25.0	21.0		25.0	35.0
67		65.0	22.0		25.0	24.0		25.0	35.0
68		65.0	15.0		25.0	18.0		25.0	35.0
69		65.0	15.0		25.0	18.0		25.0	30.0
70		100.0	15.0		50.0	20.0		50.0	30.0
71		100.0	15.0		50.0	24.0		50.0	30.0
72		100.0	15.0		50.0	22.0		50.0	30.0
73		100.0	15.0		50.0	22.0		50.0	30.0
74		100.0	15.0		50.0	22.0		50.0	30.0
75		100.0	15.0		100.0	22.0		100.0	30.0
76		100.0	15.0		100.0	25.0		100.0	30.0
77		100.0	15.0		100.0	22.0		100.0	30.0
78		100.0	15.0		100.0	25.0		100.0	30.0
79		100.0	15.0		100.0	22.0		100.0	30.0
80		100.0	100.0		100.0	100.0		100.0	100.0

DEATHS AFTER RETIREMENT: The RP-2014 White Collar Mortality Table projected to 2020 by Scale BB at 100% for males and 95% for females is used for the period after retirement and for dependent beneficiaries. Representative values of the assumed annual rates of mortality are as follows:

Age	Men	Women	Age	Men	Women
40	0.043%	0.031%	65	0.705%	0.579%
45	0.067	0.052	70	1.133	0.933
50	0.272	0.194	75	1.943	1.553
55	0.384	0.250	80	3.407	2.688
60	0.501	0.348	85	6.247	4.826

In our opinion, the projection of the mortality rates with Scale BB provide a sufficient margin in the assumed rates of mortality to allow for additional improvement in mortality experience.

The RP-2014 Disabled Retiree Mortality Table at 65% for males and 85% for females is used for the period after disability.

ASSET METHOD: Market Value of Assets.

VALUATION METHOD: Entry Age Normal cost method.

SPOUSES: For members who have elected spouse coverage, husbands are assumed to be three years older than their wives.

PERCENT MARRIED: 80% of active members are assumed to be married with an average of two children who are on average age 12.

OTHER ASSUMPTIONS:

- 20% of Pre-Retirement deaths are assumed to be service related,
- 50% of Tier I Hazardous Employees are assumed to be State Police,
- To take into account State Police Supplemental Benefits and the offset of Workers Compensation, Social Security, and Non-Rehabilitation Earnings, the following minimum and maximum benefits as a percent of salary are assumed for disability benefits:

	Minimum	Maximum
Tier I State Police	60%	80%
All Other Members	40%	60%

SCHEDULE D

GLOSSARY OF TERMS

Actual employer contributions	Cash contributions recognized as additions to a pension plan's fiduciary net position.
Actuarially determined employer contribution	A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.
Covered employee payroll	The payroll of employees that are provided with pensions through the pension plan.
GASB	Governmental Accounting Standards Board is an independent organization that establishes and improves standards of accounting and financial reporting and is recognized as the official source of generally accepted accounting principles (GAAP) for U.S. state and local governments.
Measurement Date	The date the Total Pension Liability, Fiduciary Net Position and Net Pension Liability are determined. Generally it will be the pension plan's fiscal year end, can be no earlier than the end of the employer's prior fiscal year and must be consistently applied from year to year.
Net Pension Liability	The liability of employers to employees for benefits provided through a defined benefit pension plan, calculated as the difference between the Total Pension Liability and the pension plan's Fiduciary Net Position (assets) that are set aside in a qualified pension plan to pay benefits to current employees, retirees and their beneficiaries.
Service cost	The portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

Single Equivalent Interest Rate

The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:

1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.

2. The actuarial present value of projected benefit payments not included in (1) above, calculated using the municipal bond rate (a yield or index rate for 20-year, tax exempt general obligation municipal bonds with an average rating of AA/Aa or higher [or equivalent quality on another rating scale]).

Total Pension Liability:

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service determined under the Entry Age Actuarial Cost Method calculated using the Discount Rate.