







































## SECTION IV – PENSION EXPENSE

As noted earlier, the Pension Expense (PE) consists of a number of different items. GASB 68 refers to the first as Service Cost which is the Normal Cost using the Entry Age Normal (EAN) actuarial funding method. The second item is interest on the beginning of year TPL and the cash flows during the year at the SEIR in effect as of the previous measurement date.

The next three items refer to any changes that occurred in the TPL due to:

- benefit changes,
- actual versus expected experience or
- changes in actuarial assumptions.

Benefit changes, which are reflected immediately in PE, can be positive, if there is a benefit improvement for existing Plan members, or negative if there is a benefit reduction.

The next item to be recognized is the portion of current year changes in TPL due to actual versus expected experience for the year. The portion to recognize in the current year is determined by spreading the total change over the average expected remaining service life of the entire Plan membership. The remaining service life of active members is the average number of years they are expected to remain active determined as of the beginning of the measurement period. For the year ended June 30, 2018 this number is 11.24. The remaining service life of the inactive members is, of course, zero. Therefore, the figure to use for the amortization is the weighted average of these two amounts, or 5.64. The table below provides the calculation of the average remaining future service life.

Category	Number (1)	Average Years of Future Service Life (2)
a. Active Members	50,019	11.24
b. Inactive Members	49,603	0.00
c. Total	99,622	
Weighted Average Years of Future Service Life [(a1 x a2) + (b1 x b2)]/c1		5.64



Member contributions for the year and projected earnings on the FNP, again at the rate used to calculate the liabilities, are subtracted from the amount determined thus far. The current year portions of previously determined experience, assumption, and investment earnings amounts, recognized as deferred inflows and outflows (see Section IV) are included next. Deferred inflows are subtracted from the PE while deferred outflows are added to the PE. Finally, administrative expenses and other miscellaneous items are included.

The calculation of the Pension Expense is shown in the following table.

**Pension Expense**  
**Determined as of the Measurement Date**  
**(\$ thousands)**

Service Cost	\$429,321
Interest	2,212,890
Current-period benefit changes	0
Expensed portion of current-period difference between expected and actual experience in the total pension liability	85,621
Expensed portion of current-period changes of assumptions	0
Member contributions	(193,942)
Projected earnings on plan investments	(815,365)
Expensed portion of current-period differences between actual and projected earnings on plan investments	(12,116)
Administrative expense	391
Other	3,139
Recognition of beginning deferred outflows of resources as pension expense	1,000,430
Recognition of beginning deferred inflows of resources as pension expense	(20,702)
<b>Pension Expense</b>	<b>\$2,689,667</b>



## **SECTION V – REQUIRED SUPPLEMENTARY INFORMATION**

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

**Paragraph 46:** The required tables are provided in Schedule A.

**Paragraph 47:** In addition the following should be noted regarding the RSI:

### ***Changes of benefit terms:***

- 2017
  - A 3-year freeze on all salary increases for fiscal years ending 2017, 2018 and 2019.
  - The annual COLA for those retiring on or after July 1, 2022 is based on the annual rate of increase in CPI-W from 0.0% to 2.0%, plus 60% of the annual rate of increase in CPI-W from 3.33% to 6.0%, plus 75% of the annual rate of increase in CPI-W above 6.0% and with a cap on the COLA rate of 7.5%.
  - A COLA moratorium for those retiring on or after July 1, 2022 for the first 30 months of retirement benefits. If rate of increase in CPI-W exceeds an annualized rate of 5.5% during the initial 18 month period of receiving retirement benefits, the COLA provided beginning with the 31st monthly benefit includes an additional adjustment based on the annual COLA rate as determined above using the annualized rate over the 18 month period. The COLA rate applied is reduced by 2.5% and then multiplied by 1.5 to reflect the 18 month period.
  - Increase to all non-Tier IV members' contribution rates by 1.5% of compensation effective July 1, 2017 and an additional 0.5% of compensation effective July 1, 2019.
  - In years where employer contribution increase due to poor asset returns, half the increase is applied to Tier IV member contribution rate of up to 2% in total.
  - Tier IV Hybrid Plan Structure for All New Hires (Non-Hazardous and Hazardous) after July 1, 2017:



- i. Non-Hazardous has same retirement eligibility as Tier III
- ii. Non-hazardous benefit multiplier is 1.30% with no breakpoint
- iii. Hazardous duty requires 25 years of service to retire
- iv. Employees contribute 3% more than Tier III employees into the DB Plan.
- v. Employers contribute 1% and employees must contribute at least 1% to DC portion of Hybrid Plan.

***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 (fiscal year ending June 30, 2018 contributions are based on June 30, 2016 valuation). The following actuarial methods and assumptions were used to determine the most recent contributions reported in that schedule:

Actuarial cost method	Entry Age Normal
Amortization method	Level percent of pay, closed 5 year phase into level dollar
Single equivalent amortization period	25.1 years
Asset valuation method	5-year smoothed market
Inflation	2.50 percent
Salary increase	3.50 -19.50 percent, including inflation
Investment rate of return	6.90 percent, net of investment related expense



**SCHEDULE A**

**REQUIRED SUPPLEMENTARY INFORMATION**

**SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY  
(\$ in Thousands)**

<b>Fiscal Year Ending June 30</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
<b>Total pension liability</b>										
Service Cost	\$ 287,473	\$ 310,472	\$ 322,114	\$ 480,350	\$ 429,321					
Interest	1,998,736	2,052,651	2,105,947	2,255,533	2,212,890					
Benefit changes	0	0	0	(1,444,220)	0					
Difference between expected and actual experience	0	0	772,762	0	482,904					
Changes of assumptions	0	0	4,959,705	0	0					
Benefit payments	(1,563,029)	(1,650,465)	(1,729,181)	(1,847,715)	(1,955,985)					
Refunds of contributions	(3,935)	(7,124)	(7,098)	(7,972)	(7,659)					
<b>Net change in total pension liability</b>	<b>719,245</b>	<b>705,534</b>	<b>6,424,249</b>	<b>(564,024)</b>	<b>1,161,471</b>					
<b>Total pension liability - beginning</b>	<b>25,767,688</b>	<b>24,486,933</b>	<b>27,192,467</b>	<b>33,616,716</b>	<b>33,052,692</b>					
<b>Total pension liability - ending (a)</b>	<b>\$26,486,933</b>	<b>\$27,192,467</b>	<b>\$33,616,716</b>	<b>\$33,052,692</b>	<b>\$34,214,163</b>					
<b>Plan net position</b>										
Contributions - employer	\$ 1,268,890	\$ 1,371,651	\$ 1,501,805	\$ 1,542,298	\$ 1,443,053					
Contributions - member	144,807	187,339	135,029	132,557	193,942					
Net investment income	1,443,391	294,412	(100)	1,509,862	875,944					
Benefit payments	(1,563,029)	(1,650,465)	(1,729,181)	(1,847,715)	(1,955,985)					
Administrative expense	0	0	(651)	(674)	(391)					
Refunds of contributions	(3,935)	(7,124)	(7,098)	(7,972)	(7,659)					
Other	0	0	85,608*	(371)	(3,139)					
<b>Net change in plan net position</b>	<b>1,290,124</b>	<b>195,813</b>	<b>(14,588)</b>	<b>1,327,985</b>	<b>545,765</b>					
<b>Plan net position - beginning</b>	<b>9,182,443</b>	<b>10,472,567</b>	<b>10,668,380</b>	<b>10,653,792</b>	<b>11,981,777</b>					
<b>Plan net position - ending (b)</b>	<b>\$10,472,567</b>	<b>\$10,667,380</b>	<b>\$10,653,792</b>	<b>\$11,981,777</b>	<b>\$12,527,542</b>					
<b>Net pension liability - ending (a) - (b)</b>	<b>\$16,014,366</b>	<b>\$16,524,087</b>	<b>\$22,962,924</b>	<b>\$21,070,915</b>	<b>\$21,686,621</b>					



**SCHEDULE OF THE NET PENSION LIABILITY**  
**(\$ in Thousands)**

<b>Fiscal Year Ending June 30</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
Total pension liability	\$ 26,486,933	\$ 27,192,467	\$33,616,716	\$33,052,692	\$34,214,163					
Plan net position	10,472,567	10,668,380	10,653,792	11,981,777	12,527,542					
Net pension liability	\$ 16,014,366	\$ 16,524,087	\$22,962,924	\$21,070,915	\$21,686,621					
Ratio of plan net position to total pension liability	39.54%	39.23%	31.69%	36.25%	36.62%					
Covered payroll	\$ 3,487,577	\$ 3,618,361	\$ 3,720,751	\$ 3,850,978	\$ 3,428,068					
Net pension liability as a percentage of covered payroll	459.18%	456.67%	617.16%	547.16%	632.62%					

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



**SCHEDULE OF EMPLOYER CONTRIBUTIONS**  
**(\$ in Thousands)**

Fiscal Year Ending June 30	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined employer contribution	\$1,443,110	\$1,569,142	\$1,514,467	\$1,379,189	\$1,268,935	\$1,059,652	\$ 926,372	\$ 944,077	\$ 897,428	
Actual employer contributions	<u>1,443,053</u>	<u>1,542,298</u>	<u>1,501,805</u>	<u>1,371,651</u>	<u>1,268,890</u>	<u>1,058,113</u>	<u>926,343</u>	<u>825,801</u>	<u>720,527</u>	
Annual contribution deficiency (excess)	<u>\$ 57</u>	<u>\$ 26,844</u>	<u>\$ 12,662</u>	<u>\$ 7,538</u>	<u>\$ 45</u>	<u>\$ 1,539</u>	<u>\$ 29</u>	<u>\$ 118,276</u>	<u>\$ 176,901</u>	
Covered payroll*	\$3,428,068	\$3,850,978	\$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	42.10%	40.05%	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.
Tier IV	All State Employees, Elected Officials and their Appointees hired on or after July 1, 2017.

#### **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 and IV	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.
-------------	---





Tier I Plans B and C – Earliest of age 55 with 25 years of service, age 60 with 10 years of service, or age 70 with 5 years of service.

Tier II Hazardous – 20 years of credited service.

Tier II and IIIA – 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.

Tier III Hazardous – Earlier of Age 50 and 20 years of benefit service or 25 years of benefit service.

Tier III and IV – Age 63 and 25 years of benefit service or Age 65 and 10 years of benefit service.

Tier IV Hazardous – 25 years of benefit service.

## Benefit

Tier I Hazardous – 50% of FAE plus 2% for each year of service in excess of 20.

Tier I Plan B – 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.

Tier I Plan C – 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, III and IV 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.

Tier IV All Others – 1.30% of FAE times years of service. Minimum benefit with 25 years if \$360 per month.

## 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 and IV – 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, III and IV – 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, III and IV**

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 and IV – 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 and IV – 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, III and IV

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, III and IV

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%.



For employees retiring on or after July 1, 2022, the annual rate of increase will be the CPI-W from 0.00% to 2.00%, plus 60% of the annual rate of increase in CPI-W from 3.33% to 6.00%, plus 75% of the annual rate of increase in CPI-W above 6.00%, with a cap on the COLA rate of 7.50%. In addition, a COLA moratorium for those retiring on or after July 1, 2022 will be on the first 30 months of retirement. If rate of increase in CPI-W exceeds an annualized rate of 5.5% during the initial 18 month period of receiving retirement benefits, the COLA provided beginning with the 31st monthly benefit includes an additional adjustment based on the annual COLA rate as determined above using the annualized rate over the 18 month period. The COLA rate applied would but reduced by 2.5% and then multiplied by 1.5 to reflect the 18 month period.



## Member Contributions\*

Tier I – Hazardous	5.5% of earnings up to Social Security Taxable Wage Base plus 6.5% of earnings above that level.
Tier I – Plan B	3.5% of earnings up to Social Security Taxable Wage Base plus 6.5% of earnings above that level.
Tier I – Plan C	6.5% of earnings.
Tier II – Hazardous	5.5% of earnings.
Tier II – All Others	None.
Tier IIA & III – Hazardous	6.5% of earnings.
Tier IIA & III – All Others	3.5% of earnings.
Tier IV – Hazardous	8% of earnings.
Tier IV – All Others	5% of earnings.

\* Increased for anyone electing to maintain retirement eligibility. An increase to all non-Tier IV members contribution rates of 1.5% of earnings became effective July 1, 2017 and an additional 0.5% of earnings will be effective July 1, 2019. In years where asset losses require further increases in contributions, Tier IV employees' contributions may increase by half the necessary increase in rates (up to 2.0%). Finally, all Tier IV employees must contribute 1% to the Defined Contributions (DC) portion of the Hybrid Plan and may elect additional contribution of up to 3% of salary to the DC portion.



**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:** From the Framework Document between the State and SEBAC, we have assumed the rate of wage inflation is 0.00% for fiscal years ending June 30, 2017, 2018 and 2019 for each active member. In addition, we have reduced the rate of increase by one half due to promotion and merit over this same three-year period. Once this three-year period is complete, the assumptions for salary increases are as follows:

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 (COLA):**

<b>Group</b>	<b>Rate</b>
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%
Post July 1, 2022 Retirees	1.95%

We have also assumed a COLA moratorium for those retiring on or after July 1, 2022 for the first 30 months of retirement. We assume the first COLA received is increased by 0.15% to reflect the possible additional COLA in the event the annualized rate of increase in the CPI-W is greater than 5.5% during the first 18 months of retirement.

**SOCIAL SECURITY WAGE BASE INCREASES:** 3.50% per annum.

**PAYROLL GROWTH ASSUMPTION:** 3.50% per annum.



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

**WITHDRAWAL**

Annual Rates of Withdrawal								
Age	Years of Service							
	0	1	2	3	4	5	6-9	10+
<b>Hazardous Males</b>								
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
<b>Hazardous Females</b>								
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
<b>Nonhazardous Males</b>								
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
<b>Nonhazardous Females</b>								
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

We have assumed that the assumed rate of retirement will increase by 20% of the current assumed rates in the year before July 1, 2022 to reflect the potential behavior of future eligible members to avoid the July 1, 2022 COLA change and moratorium.

**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	Males	Females	Age	Males	Females
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.

**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.

**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:

	<u>Minimum</u>	<u>Maximum</u>
Tier I State Police	60%	80%
All Other Members	40%	60%