



Cavanaugh Macdonald
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**CONNECTICUT POLICEMEN AND FIREMEN
SURVIVORS' BENEFIT FUND**

**ACTUARIAL VALUATION REPORT
PREPARED AS OF JUNE 30, 2018**





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

March 21, 2019

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

Members of the Commission:

Connecticut General Statutes Section 7-113 governs the operation of the Connecticut Policemen and Firemen Survivors' Benefit Fund (SBF). At the direction of the Commission, the actuary makes periodic valuations of the contingent assets and liabilities of the Benefit Fund. This report provides the results of the actuarial valuation of the SBF prepared as of June 30, 2018. In preparing the valuation, the actuary relied on data provided by the Comptroller's Office. While not verifying data at the source, the actuary performed tests for consistency and reasonableness.

This valuation results in an increase to the required employer normal contribution rate for the 2020 fiscal year from 1.10% to 1.59% of annual compensation. In addition, each participating employer is also assessed a \$60 per covered employee administrative expense. Please note that the resulting total contribution requirement for New Britain Police is determined by applying the 1.59% of annual compensation plus the \$60 per covered employee expense less \$4,852 due to the annual recognition of the remaining surplus allocated to that employer as of June 30, 2018.

Since the previous valuation, various economic and demographic assumptions have been revised to reflect the results of the experience investigation for the five-year period ending June 30, 2017. The changes adopted by the Commission on November 15, 2018, include various demographic and economic assumptions summarized below:

- Investment return assumed rate changed from 8.00% to 7.00%,
- Wage Inflation assumed rate changed from 3.50% to 3.00%, and
- Assumed rates of Withdrawal, Disability, Retirement, and Mortality have been adjusted to more closely reflect experience.

In addition, the asset method has been changed to the same method as the Connecticut Municipal Employees Retirement System (MERS) using a smoothed Market Value with 20% reconciliation of investment gains and losses.

The actuarial assumptions recommended by the actuary and adopted by the Commission are reasonably related to the experience under the System and to reasonable expectations of anticipated experience under the System. The valuation method used is the Entry Age Normal Frozen Initial Liability cost method. Gains and losses under this method will impact the employer normal contribution.



Members of the Commission
March 21, 2019
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This is to certify 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 retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

The actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. Use of these computations for purposes other than meeting these requirements may not be appropriate.

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.

The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sincerely yours,

A handwritten signature in blue ink that reads 'John J. Garrett'.

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

A handwritten signature in blue ink that reads 'Edward J. Koebel'.

Edward J. Koebel, EA, FCA, MAAA
Principal and Consulting Actuary





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Section I – Summary of Principal Results

CONNECTICUT POLICEMEN AND FIREMEN SURVIVORS' BENEFIT FUND

PREPARED AS OF JUNE 30, 2018

1. For convenience of reference, the principal results of the 2016 biennial valuation, and the 2018 annual valuation are summarized below. Recommended contributions for each participating employer are provided in Section III.

Valuation Date	June 30, 2018 Annual Valuation	June 30, 2016 Biennial Valuation
Number of Active Members	656	634
Annual Compensation	\$68,470,578	\$54,611,787
Retired Members:		
Number	445	440
Deferred Vested Members:		
Number	33	38
Annuitant Members:		
Number	102	110
Annual Allowances	\$1,415,724	\$1,260,226
Assets:		
Market Value	\$ 34,636,923	\$ 28,470,233
Actuarial Value	\$ 35,084,369	\$ 30,215,956
Funded Ratio	65.0%	72.3%
For Fiscal Year Ending	June 30, 2020	June 30, 2018 and June 30, 2019
Employer Normal Contribution Rate*:	1.59%	1.10%

* The contribution rate for the 2018 valuation is calculated on an interim basis. Interim results are prior to potential change to assets that may result from an ongoing analysis of New London Fire's participation and reported compensation prior to July 1, 2017.





Section I – Summary of Principal Results

2. Schedule A of this report presents the development of the actuarial value of assets.

3. Schedule C of the report presents the development of the actuarial assumptions and methods employed. Since the previous valuation, various economic and demographic assumptions have been revised to reflect the results of the experience investigation for the five-year period ending June 30, 2017. The changes adopted by the Commission on November 15, 2018, include various demographic and economic assumptions summarized below:
 - Investment return assumed rate changed from 8.00% to 7.00%,
 - Wage Inflation assumed rate changed from 3.50% to 3.00%, and
 - Assumed rates of Withdrawal, Disability, Retirement, and Mortality have been adjusted to more closely reflect experience.

In addition, the asset method has been changed to the same method as the Connecticut Municipal Employees Retirement System (MERS) using a smoothed Market Value with 20% reconciliation of investment gains and losses.

4. Schedule D gives a summary of the benefit and contribution provisions of the plan. There have been no changes since the previous valuation.





Section II – Assets

1. As of June 30, 2018, the total market value of assets amounted to \$34,636,923 as reported by the Comptroller's Office. This represents an investment return of 13.49% and 6.64% for the fiscal years ending June 30, 2017 and June 30, 2018, respectively. Schedule B shows receipts and disbursements of the System for the two years preceding the valuation date and a reconciliation of the fund balances at market value.
2. Schedule A shows the development of the actuarial value of assets as of June 30, 2018. The actuarial value of assets developed in this valuation is \$35,084,369 reflecting a rate of return on the actuarial value of 7.86% and 7.52% for fiscal years ending June 30, 2017 and June 30, 2018, respectively. The method to calculate the actuarial value of assets was changed to the method consistent with the MERS plan, a smoothed market value with 20% recognition of investment gains and losses.





Section III – Contributions Payable By Employer

The following table shows the comparison of the employer normal contribution rate payable by the employer as calculated in the June 30, 2016 biennial valuation and the June 30, 2018 annual valuation. The 2018 valuation results apply to the fiscal year ending June 30, 2020. These amounts include only the employer normal contribution rate. The recommended dollar amount for each entity is determined by applying the normal contribution rate to annual compensation at the beginning of the applicable fiscal year, plus the additional administrative expense of \$60 per covered employee. In addition, New Britain Police will subtract \$4,852 from the amount determined above due to the annual recognition of their surplus balance as of June 30, 2018. The asset surplus for all other towns has been fully recognized and is \$0 in the June 30, 2018 valuation.

CALCULATION OF ANNUAL NORMAL COST

	Interim June 30, 2018 Results*	June 30, 2016
(1) Actuarial Liabilities		
Present Value of Future Benefits Payable to:		
(a) Present Annuitants	\$ 12,289,886	\$ 11,076,756
(b) Present Retired Members	14,637,567	15,272,795
(c) Present Active Members	25,482,594	14,773,227
(d) Inactive Members	<u>1,568,564</u>	<u>658,472</u>
(e) Total Actuarial Liabilities	\$ 53,978,611	\$ 41,781,251
(2) Actuarial Value of Assets	35,084,369	30,215,956
(3) Present Value of Future Contributions by Members	7,303,461	5,518,969
(4) Asset Surplus for all towns except New Britain	0	0
(5) Unfunded Accrued Liability (Surplus) for New Britain	(50,687)	(50,320)
(6) Present Value of Future Employer Normal Costs		
(1e) – (2) – (3) – (4) – (5)	11,641,468	6,096,646
(7) Present Value of Future Salary	730,346,124	551,896,936
(8) Employer Normal Contribution Rate		
(6) / (7), not less than zero	1.59%	1.10%

* The contribution rate for the 2018 valuation is calculated on an interim basis. Interim results are prior to potential change to assets that may result from an ongoing analysis of New London Fire's participation and reported compensation prior to July 1, 2017.





Section III – Contributions Payable By Employer

CALCULATION OF ESTIMATED CONTRIBUTIONS BY EMPLOYER*

Municipality	Active Members	Estimated Contributions for fiscal year ending June 30, 2020**
Derby Police	34	\$67,813
Manchester Fire	81	153,290
Middlefield Police	0	0
Milford Fire	115	205,297
Milford Police	119	197,131
New Britain Police	135	253,916
New London Fire	63	109,201
New London Police	73	137,193
Seymour Police	36	76,891
Total	656	\$1,200,732

* Estimated contribution amounts shown above include the \$60 administrative fee per active member and the offset for the New Britain Police municipality.

** The estimated contribution for the 2020 fiscal year is calculated on an interim basis. Interim results are prior to potential change to assets that may result from an ongoing analysis of New London Fire's participation and reported compensation prior to July 1, 2017.





Schedule A – Development of Actuarial Value of Assets

	June 30, 2018
(1) Actuarial Value Beginning of Year*	\$32,567,529
(2) Market Value End of Year	34,636,923
(3) Market Value Beginning of Year	32,459,514
(4) Cash Flow	
(a) Contributions	1,210,481
(b) Disbursements	<u>(1,188,078)</u>
(c) Net: (4)(a) + (4)(b)	22,403
(5) Investment Income	
(a) Market Total: (2) – (3) – (4)(c)	2,155,006
(b) Assumed Rate	8.00%
(c) Amount for Immediate Recognition: [(1) x (5)(b)] + [(4)(a) + (4)(b)] x (5)(b) x 0.5]	2,606,298
(6) Expected Actuarial Value End of Year: (1) + (4)(c) + (5)(c)	\$35,196,230
(7) Phased-In Recognition of Investment Income	
(a) Difference Between Market & Expected Actuarial Value: (2) – (6)	(559,307)
(b) 20% of Difference: 0.2 x (7)(a)	(111,861)
(8) Preliminary Actuarial Value End of Year: (6) + (7)(b)	35,084,369
(9) Final Actuarial Value End of Year Using 20% Corridor: Greater of [(8) and .8 x (2)], but no more than 1.2 x (2)	35,084,369
(10) Difference Between Market & Actuarial Values: (2) – (9)	(447,446)
(11) Rate of Return on Preliminary Actuarial Value	7.52%

* Prior to Corridor Constraints, if applicable





Schedule B – Summary of Receipts and Disbursements

(Market Value)

	YEAR ENDING	
	June 30, 2018	June 30, 2017
<u>Receipts for the Year</u>		
Contributions:		
Members	\$576,916	\$554,892
Employer/Transfers	<u>633,565</u>	<u>644,799</u>
Subtotal	1,210,481	1,199,691
Investment Earnings (net of expenses)	<u>2,161,833</u>	<u>3,859,154</u>
TOTAL	3,372,314	5,058,845
<u>Disbursements for the Year</u>		
Benefit Payments and Refunds	(1,188,078)	(1,222,157)
Other	<u>(6,827)</u>	<u>0</u>
TOTAL	(1,194,905)	(1,222,157)
<u>Excess of Receipts over Disbursements</u>	2,177,409	3,836,688
<u>Reconciliation of Asset Balances</u>		
Asset Balance as of the Beginning of Year	32,459,514	28,622,826
Excess of Receipts over Disbursements	<u>2,177,409</u>	<u>3,836,688</u>
Asset Balance as of the End of Year	34,636,923	32,459,514
Rate of Return	6.64%	13.49%





Schedule C – Outline of Actuarial Assumptions and Methods

Adopted or reaffirmed by the Commission for the June 30, 2018 and later valuations.

VALUATION INTEREST RATE: 7.00% per annum, compounded annually, net of expenses.

SALARY INCREASES: Representative values of assumed annual rates of salary increase are as follows:

Service	Annual Rates of		
	Merit & Seniority	Base (Economy)	Increase Next Year
0	7.00%	3.00%	10.00%
5	3.50%	3.00%	6.50%
10	1.90%	3.00%	4.90%
15	1.50%	3.00%	4.50%
20	1.38%	3.00%	4.38%
25	1.12%	3.00%	4.12%
30	0.70%	3.00%	3.70%
35	0.50%	3.00%	3.50%
40	0.50%	3.00%	3.50%

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

Age	Withdrawal and Vesting		Service Related Disability*	Death		Service Retirement
	0 – 4 years	5 – 24 years		Male	Female	
20	6.50%	5.00%	0.10%	0.06%	0.02%	
25	6.50	5.00	0.10	0.08	0.03	
30	5.75	4.00	0.10	0.08	0.03	
35	3.50	2.50	0.14	0.09	0.04	
40	3.50	2.00	0.22	0.10	0.06	
45	3.50	1.50	0.30	0.15	0.09	25.00%
50	3.50	0.00	0.64	0.25	0.14	15.00
55	3.50	0.00	2.40	0.41	0.24	13.00
60	3.50	0.00	4.80	0.67	0.34	15.00
65	0.00	0.00				100.00

*Non-Service related disability rates for Policemen and Firemen are assumed to be zero at all ages.





Schedule C – Outline of Actuarial Assumptions and Methods

DEATHS AFTER RETIREMENT: The RP-2014 Blue Collar Mortality Table adjusted to 2006 and projected to 2015 with Scale MP-2017 and projected to 2022 with Scale BB is used by Police and Fire for the period after retirement and for dependent beneficiaries. Representative values of the assumed annual rates of mortality are as follows:

Age	Male	Female	Age	Male	Female
40	0.101%	0.060%	65	1.370%	0.908%
45	0.148	0.092	70	1.996	1.405
50	0.568	0.406	75	3.149	2.316
55	0.845	0.505	80	5.174	3.862
60	0.987	0.657	85	8.632	6.650

For disabled retirees, the RP-2014 Disabled Retiree Mortality Table projected to 2020 by Scale BB is used.

ASSET METHOD: Actuarial Value, as developed in Schedule A. The actuarial value of assets recognizes 20% of any difference between actual and expected investment income (gain/loss) in the valuation year. In addition, the actuarial value of assets cannot be less than 80% or more than 120% of the market value of assets.

VALUATION METHOD: Entry Age Normal Frozen Initial Liability Cost method. Under this method, actuarial gains and losses will directly impact the normal contribution calculations of the employers. Initial liabilities for employer joining the Fund are determined upon entry and amortized over a 30-year period as a level dollar amount. This amortization amount is required in addition to the normal contribution and administrative expenses of the Fund.

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

PERCENT MARRIED: 90% of active members are assumed to be married.

LOADING: Since some retiree membership data has historically been reported without spousal information, a load has been added to more accurately reflect the potential retiree liability. The load factor is based on the assumed discount rate, post-retirement mortality tables and marital assumptions.





Schedule D – Summary of Main Benefit and Contribution Provisions

The Connecticut Policemen and Firemen Survivors' Benefit Fund became effective July 1, 1966. The following summary describes the main membership, benefits and contribution provisions of the Fund as interpreted for the valuation.

MEMBERSHIP

Any municipality may elect or vote to include any of its policemen and/or firemen as of the next following July 1st. Only full-time employees are eligible for membership.

BENEFITS

Survivor benefits are provided upon the death of an active or retired member of the Fund. Benefits are based on the annual rate of full-time pay on the date of death. For retired members, the rate of pay immediately prior to retirement is used.

The annual benefit payable from the date of death is equal to one of the following:

1. To a surviving spouse, an amount equal to 30% of pay.
2. To a surviving spouse with one dependent child under the age of 18, an amount equal to 45% of pay.
3. To a surviving spouse with two or more dependent children under the age of 18, an amount equal to 60% of pay.
4. To one dependent child under the age of 18 in the case where there is no benefit payable to a surviving spouse, an amount equal to 30% of pay.
5. To two or more dependent children under the age of 18 in the case where there is no benefit payable to a surviving spouse, an amount equal to 45% of pay.
6. To a depended parent in the case where there is no benefit payable to a surviving spouse or dependent child, an amount equal to 30% of pay.

Benefits to surviving spouses cease upon death or remarriage. Benefits to dependent children cease at age 18. Benefits to dependent parents cease upon death.

If there are no survivors eligible for a benefit on the date of the member's death, accumulated member contributions without interest are paid to a designated beneficiary of the member's estate.





Schedule D – Summary of Main Benefit and Contribution Provisions

CONTRIBUTIONS TO THE FUND

Active members contribute at the rate of 1.00% of salary. Participating municipalities contribute an amount as determined by the actuarial valuation that is necessary to adequately fund all benefits. An annual administration fee of \$60 per active member is also paid by the employer.





Schedule E – Detailed Distributions of the Data

Total Active Members as of June 30, 2018
Distributed by Age Group and Years of Service

Age Group	Derby Police	Manchester Fire	Middlefield Police	Milford Fire	Milford Police	New Britain Police	New London Fire	New London Police	Seymour Police	Total	
										No.	Compensation
Under 25	0	2	0	1	3	2	1	0	0	9	611,768
25 to 29	5	6	0	8	18	20	4	9	8	78	7,155,618
30 to 34	9	11	0	29	24	36	14	13	1	137	13,298,077
35 to 39	6	7	0	17	22	30	3	11	5	101	10,649,651
40 to 44	3	14	0	19	14	20	3	6	5	84	9,127,351
45 to 49	4	11	0	15	16	19	9	13	9	96	10,822,490
50 to 54	6	20	0	9	7	7	10	13	4	76	8,632,775
55 to 59	0	8	0	13	7	0	12	6	3	49	5,368,275
60 & Up	1	2	0	4	8	1	7	2	1	26	2,804,573
Total	34	81	0	115	119	135	63	73	36	656	68,470,578

Average Age: 41.0

Average Service: 12.7

Average Pay: \$99,343





Schedule E – Detailed Distributions of the Data

Eligible Retirees and Deferred Vested Members as of June 30, 2018
Distributed by Age Group

Age Group	Derby Police	Manchester Fire	Middlefield Police	Milford Fire	Milford Police	New Britain Police	New London Fire	New London Police	Seymour Police	Total Count
Under 30	0	1	0	1	0	7	0	4	2	15
30 to 34	0	1	0	2	3	8	2	8	2	26
35 to 39	0	1	0	4	2	10	3	8	1	29
40 to 44	1	1	0	1	8	7	2	5	0	25
45 to 49	2	6	0	3	9	6	2	5	1	35
50 to 54	1	8	0	15	19	3	2	11	6	66
55 to 59	3	7	0	15	20	0	1	15	1	62
60 to 64	5	10	0	15	15	0	4	10	3	62
65 to 69	3	9	0	14	7	0	4	4	7	48
70 to 74	1	18	0	8	4	0	11	9	6	57
75 to 79	3	12	0	4	2	0	4	4	1	30
80 to 84	3	6	0	0	0	0	4	1	5	19
85 to 89	0	1	0	0	0	0	1	0	1	3
90 & Up	0	1	0	0	0	0	0	0	0	1
Total	22	82	0	82	89	41	40	84	36	478

Average Age: 57.3





Schedule E – Detailed Distributions of the Data

Total Annuitants as of June 30, 2018
Distributed by Age Group

Age Group	Derby Police	Manchester Fire	Middlefield Police	Milford Fire	Milford Police	New Britain Police	New London Fire	New London Police	Seymour Police	Total	
										No.	Annual Benefit
Under 30	0	0	0	0	1	0	0	0	0	1	20,375
30 to 34	0	0	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	1	0	0	1	0	2	31,981
40 to 44	0	0	0	0	0	1	0	0	0	1	21,790
45 to 49	1	0	0	0	0	0	0	0	0	1	19,858
50 to 54	0	0	0	1	1	0	0	0	0	2	38,221
55 to 59	1	0	0	0	1	0	0	0	0	2	32,756
60 to 64	0	2	0	2	0	0	0	2	4	10	236,253
65 to 69	1	0	0	1	3	0	4	2	1	12	189,534
70 to 74	0	0	0	3	5	0	2	1	1	12	136,159
75 to 79	2	3	0	5	4	0	6	0	0	20	258,582
80 to 84	1	3	0	9	1	0	2	1	0	17	187,737
85 to 89	0	3	0	5	3	0	2	1	0	14	181,899
90 & Up	0	0	0	2	2	0	1	2	1	8	60,578
Total	6	11	0	28	22	1	17	10	7	102	1,415,724

Average Age: 74.3

Average Benefit: \$13,880

