City of Trenton
Fire and Police Retirement System
Sixty-Seventh Annual Actuarial Valuation
as of June 30, 2019

Contents

GRS Retirement Consulting

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October 8, 2019

Retirement Board
City of Trenton
Fire and Police Retirement System
Trenton, Michigan

Dear Board Members:

The results of the June 30, 2019 Annual Actuarial Valuation of the City of Trenton Fire and Police Retirement System are presented in this report. The purpose of the valuation was to measure the System's funding progress, provide actuarial information in connection with historical accounting standards and to determine the employer contribution rate for the fiscal year ending June 30, 2021. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section C of this report. This report includes risk metrics in Appendix 2, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

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

The findings in this report are based on data and other information through June 30, 2019. The valuation was based upon information furnished by the City, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the City.

This report was prepared using assumptions adopted by the Board. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. Additional information about the actuarial assumptions is included in the section of this report entitled Actuarial Cost Methods and Assumptions.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the June 30, 2019 as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

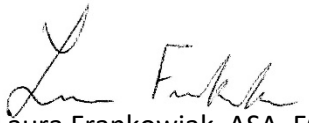
Mark Buis and Laura Frankowiak are Members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

GABRIEL, ROEDER, SMITH & COMPANY

Mark Buis, FSA, EA, FCA, MAAA



Laura Frankowiak, ASA, FCA, MAAA

MB/LF:sc

SECTION A

VALUATION RESULTS

Financial Objective

The financial objective of the City of Trenton Fire and Police Retirement System is to establish and receive contributions, which will remain approximately level from year to year and will not have to be increased for future generations of citizens. This objective meets the requirements of the laws governing the operation of the Retirement System and Article IX, Section 24 of the Constitution of the State of Michigan.

Contribution Rates

The Retirement System is supported by member contributions, City contributions, and investment income from Retirement System assets.

Contributions which satisfy the financial objective are determined by an annual actuarial valuation and are sufficient to:

(1) cover the actuarial present value of benefits assigned to the current year by the actuarial cost methods described in Section C (the normal cost); and
(2) amortize over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal cost (unfunded actuarial accrued liability).

Computed Contributions for fiscal year ending June 30, 2021 are shown on page A-2.

City's Computed Contributions

Contributions for the Fiscal Year Ending	June 30, 2020	June 30, 2021
(1) Total Normal Cost of Benefits (as a % of member pay) *	17.65%	17.21%
(2) Member Contribution %	6.00%	6.00%
(3) Employer Normal Cost % = (1) - (2)	11.65%	11.21%
(4) Projected Active Member Payroll for Coming Year	$ 3,980,080	$ 4,129,710
(5) Employer Normal Cost $ = (3) x (4)	463,679	462,940
(6) Total Accrued Liability	69,401,011	68,930,790
(7) Funding Value of Assets	52,960,484	51,658,437
(8) Total Unfunded Actuarial Accrued Liabilities (UAAL) = (6) - (7)	16,440,527	17,272,353
(9) Amortization Factor (level percent of payroll payments)	12.407787	11.918769
(10) Amortization Payment/(Credit) = (8) / (9)**	1,325,017	1,449,173
(11) Total Computed Employer Contribution Dollars = (5) + (10) , not less than zero	$ 1,788,696	**$ 1,912,113**
(12) Total Computed Employer Contribution Percent = (11) / (4)	44.94%	**46.30%**

** Includes administrative expense load of 0.5%.*

*** Unfunded actuarial accrued liability amortized over a period of 17 years for the fiscal year ending June 30, 2021.*

Present Value of Future Benefits and Accrued Liability

Determination of Unfunded Accrued Liability

		June 30, 2018	June 30, 2019
A.	Accrued Liability		
	1. For retirees and beneficiaries	$55,502,354	$55,664,047
	2. For vested terminated members	349,068	374,672
	3. For present active members		
	a. Value of expected future benefit payments	20,279,675	20,057,450
	b. Value of future normal costs	6,730,086	7,165,379
	c. Active member accrued liability: (a) - (b)	13,549,589	12,892,071
	4. Total accrued liability	69,401,011	68,930,790
B.	Present Assets (Funding Value)	52,960,484	51,658,437
C.	Unfunded Accrued Liability: (A.4) - (B)	$16,440,527	$17,272,353
D.	Funding Ratio: (B) / (A.4)	76.3%	74.9%
E.	Funding Ratio Market Value Basis	74.5%	73.4%

Development of Funding Value of Assets

Year Ended June 30:	2016	2017	2018	2019	2020	2021	2022	2023
A. Funding Value Beginning of Year	$53,951,496	$53,030,880	$53,493,453	$52,960,484				
B. Market Value End of Year	48,809,071	52,257,572	51,692,226	50,581,224				
C. Market Value Beginning of Year	52,961,843	48,809,071	52,257,572	51,692,226				
D. Non-Investment Net Cash Flow	(2,992,837)	(3,207,812)	(3,752,398)	(3,447,475)				
E. Investment Income								
E1. Market Total: B - C - D	(1,159,935)	6,656,313	3,187,052	2,336,473				
E2. Assumed Rate of Investment Return	7.25%	7.25%	7.00%	7.00%				
E3. Amount for Immediate Recognition	3,802,993	3,728,456	3,613,208	3,586,572				
E4. Amount for Phased-In Recognition E1-E3	(4,962,928)	2,927,857	(426,156)	(1,250,099)				
F. Phased-In Recognition of Investment Income								
F1. Current Year: 0.20 x E4	(992,586)	585,571	(85,231)	(250,020)				
F2. First Prior Year	(698,878)	(992,586)	585,571	(85,231)	$ (250,020)			
F3. Second Prior Year	797,346	(698,878)	(992,586)	585,571	(85,231)	$ (250,020)		
F4. Third Prior Year	250,478	797,346	(698,878)	(992,586)	585,571	(85,231)	$ (250,020)	
F5. Fourth Prior Year	(1,087,132)	250,476	797,345	(698,878)	(992,584)	585,573	(85,232)	$(250,019)
F6. Total Recognized Investment Gain	(1,730,772)	(58,071)	(393,779)	(1,441,144)	(742,264)	250,322	(335,252)	(250,019)
G. Funding Value of Assets								
G1. Preliminary Funding Value End of Year: A + D + E3 + F6	53,030,880	53,493,453	52,960,484	51,658,437				
G2. Funding Value End of Year	**53,030,880**	**53,493,453**	**52,960,484**	**51,658,437**				
H. Difference between Market & Funding Value: B-G	(4,221,809)	(1,235,881)	(1,268,258)	(1,077,213)	(334,949)	(585,271)	(250,019)	0
I. Recognized Rate of Return	**4.0 %**	**7.1 %**	**6.2 %**	**4.2 %**				
J. Market Rate of Return	**(2.3)%**	**14.1 %**	**6.3 %**	**4.7 %**				
K. Ratio of Funding Value to Market Value	**109 %**	**102 %**	**102 %**	**102 %**				

The Funding Value of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed 5-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. The Funding Value of Assets is **unbiased** with respect to Market Value. At any time it may be either greater or less than Market Value. If actual and assumed rates of investment income are exactly equal for 4 consecutive years, the Funding Value will become equal to Market Value.

Derivation of Experience Gain (Loss)
Year Ended June 30, 2019

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses often offset one another over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below:

	2018-2019
(1) UAAL* at start of year	$ 16,440,527
(2) Normal cost from last valuation	707,664
(3) Actual contributions	1,983,795
(4) Interest accrual: (1) x .07 + ((2) - (3)) x .07 / 2	1,106,172
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	16,270,568
(6) Change from benefit improvements and revised actuarial assumptions	0
(7) Expected UAAL after changes: (5) + (6)	16,270,568
(8) Actual UAAL at end of year	17,272,353
(9) Gain (loss): (7) - (8)	(1,001,785)
(10) Gain (loss) as percent of actuarial accrued liabilities at the start of year $69,401,011	(1.4)%

* *Unfunded Actuarial Accrued Liability.*

Comparative Statement

Valuation Date June 30	Actuarial Accrued Liabilities & Reserves	Actuarial Accrued Assets	% Funded	Unfunded Actuarial Accrued Liabilities & Reserves			City's Computed Contribution Rate [5]
				Dollars	Amortiz. Period	% of Payroll	
2000[1]	$ 44,798,847 [3]	$ 44,798,847	100.0 %	-	-	-	15.01 %
2001	46,679,422 [3]	46,679,422	100.0 %	-	-	-	14.24 %
2002	46,492,395 [3]	46,492,395	100.0 %	-	-	-	18.00 %
2003	45,598,928 [3]	45,598,928	100.0 %	-	-	-	24.38 %
2004[1]	45,716,012 [3]	45,716,012	100.0 %	-	-	-	27.33 %
2005	49,342,884 [3]	49,342,884	100.0 %	-	-	-	25.24 %
2006	52,250,005 [3]	52,250,005	100.0 %	-	-	-	19.06 %
2007	54,939,391 [4]	56,272,692	102.4 %	$ (1,333,301)	-	-	12.11 %
2008	57,069,715 [4]	59,293,847	103.9 %	(2,224,132)	-	-	11.91 %
2009	58,708,142 [1]	58,480,550	99.6 %	227,592	15	5.9 %	$ 801,120
2010	60,608,694	56,713,241	93.6 %	3,895,453	14[6]	118.2 %	1,116,778
2011	61,683,396	54,485,308	88.3 %	7,198,088	25[6]	249.8 %	1,050,331
2012[1], [2]	63,797,993	53,891,504	84.5 %	9,906,489	24[6]	233.3 %	30.70 %
2013	65,829,182	54,709,029	83.1 %	11,120,153	23[6]	254.1 %	31.62 %
2014	66,314,563	54,501,943	82.2 %	11,812,620	22[6]	300.4 %	35.01 %
2015	66,662,031	53,951,496	80.9 %	12,710,535	21[6]	327.9 %	36.87 %
2016	66,906,300	53,030,880	79.3 %	13,875,420	20	347.6 %	38.23 %
2017[1]	69,066,488	53,493,453	77.5 %	15,573,035	19	391.8 %	42.36 %
2018	69,401,011	52,960,484	76.3 %	16,440,527	18	425.5 %	44.94 %
2019	68,930,790	51,658,437	74.9 %	17,272,353	17	430.8 %	46.30 %

(1) *Revised actuarial assumptions.*

(2) *Retirement System was amended.*

(3) *Under the aggregate funding method, accrued liabilities are equal to plan assets.*

(4) *The System for the years 1999-2008 used the aggregate funding method to determine the annual contribution. Because the aggregate method does not separately identify unfunded actuarial liabilities, information about the funded status and funding progress has been prepared using the entry age actuarial cost method. The information presented is intended to serve as a surrogate for the funded status and funding progress of the System in accordance with Governmental Accounting Standards Board Statement No. 50.*

(5) *Starting with the 2009 valuation, contribution rates are calculated as Level Dollar amounts under the Entry-Age Normal Cost Method. Starting with the 2012 valuation, contribution rates are calculated as level percents of payroll, and percents of payroll are displayed.*

(6) *Starting with the 2010 valuation, unfunded liabilities attributed to an Early Retirement Window are financed over a closed 5-year period. This includes an additional Early Retirement Window that began with the 2011 valuation.*

Comments, Recommendation and Conclusion

Comment A: Computed Contribution Requirements increased from the prior year, from $1,788,696 to $1,912,113. The contribution increase is primarily caused by unfavorable investment performance.

Comment B: The development of the experience gain/loss is shown on page A-5. Over the past year, experience has been unfavorable. The primary source of loss is attributable to unfavorable investment performance, more retirements than expected and higher pay increases than expected. This was slightly offset by gains in retiree experience, and more terminations than expected.

Comment C: The market value of assets returned 4.7% for the year ended June 30, 2019. Under the asset valuation method, investment gains and losses are spread over a 5-year period. Partial recognition of this year's loss combined with the continued phase-in of investment gains and losses from prior years resulted in a net recognized asset loss for 2019. The funding value return of 4.2% was below the 7.0% assumed by the prior year's valuation.

Recommendation: The present value of future benefit payments to retirees and beneficiaries as of June 30, 2019 is $55,664,047. The reported value of the Reserve for Retired Benefit Payments is $48,550,384. The present value of future payments to retired members and beneficiaries is more than the reserve by $7,113,663. We recommend a transfer of $7,113,663 from the Reserve for Employer Contributions to the Reserve Benefit Payments as of June 30, 2019. This transfer adjusts for differences between actual and required interest credits and retirements during the year. This is a bookkeeping recommendation that does not affect the valuation results. For purposes of this valuation, the transfer was assumed to have been made as of June 30, 2019.

Looking Ahead: Due to the asset smoothing method, only a portion of the current year asset loss was recognized this year, and portions of prior year's gains and losses remain to be recognized. If the Market Value of Assets were used (instead of smoothed value), the employer contribution would have been approximately $2,002,000 (instead of $1,912,113), and the funded status would have been about 73.4% (instead of 74.9%).

Conclusion: The City's contribution to the City of Trenton Fire and Police Retirement System, for the fiscal year ending June 30, 2021, has been computed to be $1,912,113.

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial value of assets), it is expected that:

(1) The unfunded actuarial accrued liabilities will be fully amortized after 17 years, and
(2) The funded status of the plan will increase gradually towards a 100% funded ratio.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope: Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

SECTION B

VALUATION DATA

Brief Summary of Act 345 Benefit Conditions Evaluated June 30, 2019

Regular Retirement

Eligibility: For members hired before January 1, 1996: 25 or more years of service regardless of age or age 60 regardless of service. For members hired on or after January 1, 1996: eligibility is age 55 with 20 years of service.

Annual Amount: For members hired before January 1, 1996: Straight life pension equals 2.5% of 3-year Average Final Compensation (AFC) times years of service up to a maximum of 80% of AFC. For members hired on or after January 1, 1996: Straight life pension equals 2.0% of AFC times years of service up to a maximum of 80% of AFC.

Average Final Compensation: Highest 3 years out of last 10. Fire, hired on or before December 31, 1995, AFC includes base wages, holiday pay, overtime pay, and unused vacation time. Police, hired on or before December 31, 1995, AFC includes base wages, holiday pay, overtime pay, and unused vacation time. Police and Fire, hired after January 1, 1996, AFC includes base wages and up to 240 hours of accrued leave time, which is payable at time of retirement. (Effective July 1, 2014 for Fire, longevity and additional earned paid leave days are no longer included in AFC).

Death After Retirement

Eligibility: Payable to a surviving spouse, if any, upon the death of a retired member who was receiving a straight life pension which was effective July 1, 1975 or later.

Annual Amount: Spouse's pension equals 60% of the straight life pension deceased retiree was receiving.

Deferred Retirement

Eligibility: 10 or more years of service.

Annual Amount: Computed as service retirement but based upon service, AFC and benefit in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.

Duty Disability Retirement

Eligibility: Payable upon the total and permanent disability of a member in the line of duty. Automatic 60% to eligible spouse upon death of disability retiree.

Annual Amount: To age 55, 50% of AFC. At age 55, same as service retirement pension with service credit from date of disability to age 55.

Non-Duty Disability Retirement

Eligibility: Payable upon the total and permanent disability of a member with 5 of more years of service.

Annual Amount: To age 55, 1.5% of AFC times years of service. At age 55, same as service retirement pension.

Brief Summary of Act 345 Benefit Conditions Evaluated June 30, 2019 (Concluded)

Duty Death-in-Service Retirement

Eligibility: Payable upon the expiration of worker's compensation to the survivors of a member who died in the line of duty until spouse remarries and until children marry or reach age 18.

Annual Amount: Same amount that was paid by worker's compensation.

Non-Duty Death-in-Service Retirement

Eligibility: Payable to a surviving spouse, if any, upon the death of a member with 10 or more years of service.

Annual Amount: Accrued straight life pension actuarially reduced in accordance with an Option I election.

Post-Retirement Cost-of-Living Adjustments

For members hired before January 1, 1996: 10% after 5 years, 10% after 10 years and 5% after 15 years (each increase based on base pension). For members hired on or after January 1, 1996: no cost-of-living adjustments.

Member Contributions

6% of covered compensation.

Annuity Withdrawal Option

If elected, member contribution account balance is paid in a lump sum at retirement. The regular retirement benefit is then reduced so that total benefits paid (lump sum plus monthly pension) are equivalent to the regular retirement benefit. For members hired before January 1, 1996, the interest rate used to establish equivalency is 4.5%. For members hired on or after January 1, 1996, the interest rate used to establish equivalency is 7.00%.

Retirees and Beneficiaries Comparative Statement

Year Ended June 30	Added to Rolls*		Removed from Rolls		Rolls End of Year		Average Pension	Present Value of Pensions	No. of Active Per Retired	Pensions as a % of Pay
	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions				
1994	9	$ 300,438	1	$ 23,835	79	$1,657,453	$20,980	$17,577,896	1.0	42.6%
1995	4	133,790 #	3	28,774	80	1,762,469	22,031	18,614,608	1.0	43.5%
1996		19,855 #			80	1,782,324	22,279	18,360,691	1.0	40.7%
1997	4	194,960			84	1,977,284	23,539	20,322,751	0.9	47.9%
1998	1	67,594 #	1	4,749	84	2,040,129	24,287	20,625,011	0.9	48.1%
1999	2	139,252 #	1	9,621	85	2,169,760	25,527	21,714,841	0.9	51.1%
2000	2	93,193 #	3	35,721	84	2,227,232	26,515	22,414,016	0.9	47.8%
2001	2	107,477 #	1	12,642	85	2,322,067	27,318	23,088,745	0.8	50.4%
2002	8	210,273 #	3	41,003	90	2,491,336	27,682	24,795,162	0.8	55.1%
2003		15,161 #			90	2,506,497	27,850	25,263,902	0.7	57.4%
2004	5	294,804 #	2	42,397	93	2,758,904	29,666	28,345,444	0.7	66.8%
2005	8	404,045 #	2	63,093	99	3,099,856	31,312	32,728,970	0.6	77.0%
2006	2	37,020 #	5	135,443	96	3,001,433	31,265	31,411,790	0.6	73.8%
2007	6	374,944 #	3	67,010	99	3,309,367	33,428	35,467,661	0.5	90.8%
2008	2	30,918 #	3	63,779	98	3,276,506	33,434	34,602,209	0.5	84.6%
2009	1	55,724 #	2	27,517	97	3,304,713	34,069	34,371,403	0.5	84.9%
2010	9	468,368 #	4	91,010	102	3,682,071	36,099	39,474,872	0.4	111.7%
2011	4	197,312 #	1	36,370	105	3,843,013	36,600	41,166,171	0.4	133.4%
2012	4	134,833 #	4	41,836	105	3,936,010	37,486	42,289,801	0.5	92.7%
2013	3	102,398 #	3	31,165	105	4,007,243	38,164	42,901,127	0.6	91.6%
2014	13	530,697 #	6	136,447	112	4,401,493	39,299	48,362,595	0.6	111.9%
2015	5	290,213 #	3	125,518	114	4,566,188	40,054	49,386,510	0.5	117.8%
2016	4	125,721 #	3	96,557	115	4,595,352	39,960	48,920,912	0.5	115.1%
2017	5	251,258 #	10	310,410	110	4,536,200	41,238	50,106,176	0.5	114.1%
2018	10	485,994 #	3	112,083	117	4,910,111	41,967	55,502,354	0.5	127.1%
2019	4 ^	184,406 #	4	87,198	117	5,007,319	42,798	55,664,047	0.5	124.9%

* *Includes survivors of deceased retirees.*

\# *Includes post-retirement adjustments.*

^ *Includes new alternate payee.*

Retirees and Beneficiaries – June 30, 2019
Tabulated by Attained Age

Attained Ages	No.	Annual Pensions
46	1	$ 42,379
47	1	44,567
50	2	107,818
51	1	40,846
53	3	152,988
54	5	253,126
55	2	99,448
56	2	111,405
57	6	308,516
58	6	296,798
59	3	127,278
60	2	120,595
61	1	62,309
62	3	147,398
63	5	298,093
64	3	120,665
65	4	134,738
66	5	255,005
67	5	272,103
68	3	204,311
69	1	56,668
70	2	121,111
71	4	194,804
72	2	88,478
73	1	9,157
74	3	103,250
76	2	88,487
77	1	22,706
78	1	32,393
79	6	185,316
80	1	60,001
81	5	173,217
82	3	83,142
83	2	53,401
84	4	146,368
85	1	28,212
86	3	90,853
87	1	30,771
88	3	84,877
90	2	78,129
91	2	27,444
93	2	35,858
94	1	6,746
96	1	5,544
Totals	**117**	**$5,007,319**

Additionally, the valuation includes 1 deferred vested participant with attained age 47 and an expected benefit amount of $28,546.

Active Members Comparative Statement

Year Ended June 30	Active Members	Valuation Payroll	Averages			
			Pay	% Incr.	Age	Total Service
1989	83	$3,153,878	$37,999	0.3 %	39.8 yrs.	13.6 yrs.
1990	83	3,137,061	37,796	(0.5)%	38.9	12.8
1991	85	3,554,599	41,819	10.6 %	38.7	12.5
1992	82	3,533,754	43,095	3.1 %	38.6	12.6
1993	83	3,817,187	45,990	6.7 %	38.8	12.8
1994	81	3,890,064	48,025	4.4 %	37.6	11.7
1995	82	4,049,014	49,378	2.8 %	37.1	11.4
1996	83	4,376,296	52,726	6.8 %	37.9	12.3
1997	78	4,131,532	52,968	0.5 %	38.2	12.4
1998	77	4,244,194	55,119	4.1 %	38.9	13.2
1999	75	4,249,463	56,660	2.8 %	39.6	13.8
2000	74	4,656,993	62,932	11.1 %	40.4	14.6
2001	72	4,606,237	63,976	1.7 %	41.1	15.2
2002	69	4,521,806	65,533	2.4 %	41.7	15.8
2003	66	4,364,481	66,129	0.9 %	42.8	16.9
2004	61	4,132,159	67,740	2.4 %	43.0	17.1
2005	56	4,023,462	71,848	6.1 %	42.7	16.6
2006	56	4,066,424	72,615	1.1 %	43.7	17.5
2007	51	3,646,192	71,494	(1.5)%	43.8	17.5
2008	51	3,872,581	75,933	6.2 %	44.8	18.5
2009	51	3,892,915	76,332	0.5 %	45.8	19.5
2010	43	3,295,980	76,651	0.4 %	46.1	19.7
2011	38	2,881,249	75,822	(1.1)%	46.7	20.3
2012	57	4,245,698	74,486	(1.8)%	42.7	16.3
2013	66	4,376,244	66,307	(11.0)%	41.6	14.5
2014	63	3,932,237	62,416	(5.9)%	40.0	12.9
2015	62	3,876,578	62,525	0.2 %	40.0	12.9
2016	63	3,991,591	63,359	1.3 %	40.4	13.3
2017^	59	3,974,464	67,364	6.3 %	40.9	13.8
2018*	61	3,864,155	63,347	(6.0)%	38.1	10.7
2019#	60	4,009,427	66,824	5.5 %	38.2	10.6

^ For those continuing active employees who were active as of 6/30/2016 and 6/30/2017, their average pay increase was 7.1% from 2016-2017.

** For those continuing active employees who were active as of 6/30/2017 and 6/30/2018, their average pay increase was 6.8% from 2017-2018.*

 # For those continuing active employees who were active as of 6/30/2018 and 6/30/2019, their average pay increase was 8.5% from 2018-2019.

Active Members Added to and Removed from Rolls

Year Ended June 30	Number Added During Year		Terminations During Year										Active Members End of Year
			Normal Retirement		Disabled		Died-in-Service		Withdrawal				
									Vested	Other	Total		
	A	E [#]	A	E	A	E	A	E	A	A	A	E	
2010	0	0	7	0.4	0	0.2	0	0.1	1	0	1	0.2	43
2011	0	0	3	0.0	0	0.2	0	0.1	2	0	2	0.2	38
2012	20	20^	1	0.3	0	0.2	0	0.1	0	0	0	0.2	57
2013	11	2	1	1.5	0	0.2	0	0.1	0	1	1	0.4	66
2014	6	9	8	2.8	0	0.1	0	0.1	0	1	1	0.6	63
2015	3	4	3	2.7	0	0.1	0	0.1	0	1	1	0.6	62
2016	2	1	1	2.1	0	0.1	0	0.1	0	0	0	0.6	63
2017	0	4	3	2.0	0	0.1	0	0.1	0	1	1	0.6	59
2018	11	9	8	2.7	0	0.1	0	0.1	0	1	1	0.6	61
2019	4	5	3	2.4	0	0.1	0	0.0	0	2	2	1.0	60
5-Year Totals	20	23	18	11.9	0	0.5	0	0.4	0	5	5	3.4	
10-Year Totals	57	54	38	16.9	0	1.4	0	0.9	3	7	10	5.0	

[#] *The Defined Benefit plan was closed to new hires after 1/1/1996.*

^ *The Defined Benefit plan was reopened.*

A = Actual
E = Expected

Active Members as of June 30, 2019
by Age and Years of Service

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	2							2	$ 87,044
25-29	4	2						6	319,121
30-34	8	4	1					13	736,133
35-39	4	10	1	1				16	1,018,542
40-44	1		3	4	1			9	662,271
45-49		1			5	2		8	664,699
50-54		1			2	2		5	432,879
55-59							1	1	88,738
Totals	**19**	**18**	**5**	**5**	**8**	**4**	**1**	**60**	**$ 4,009,427**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age:	38.2 years
Total Service:	10.6 years
Annual Pay:	$66,824

Asset Information Submitted for Valuation

Balance Sheet

Reported Assets		Reserves for	
Cash & Equivalents	$ 1,463,934	Employee Contributions	$ 2,030,840
Accruals & Payables	9,904	Employer Contributions	0
Fixed Income	13,603,283	Retired Benefit Payments	48,550,384
Domestic Equities	22,893,968	Market Adjustment	1,077,213
International Equities	0		
Real Estate	2,596,275		
Other	10,013,860		
Market Adjustment	1,077,213		
Total Valuation Assets	$51,658,437	Total Reserves	$51,658,437

Revenues and Expenditures

	Fiscal Year	
	2017-2018	2018-2019
Funding Value of Assets Balance - July 1	$53,493,453	$52,960,484
Revenues		
Employee Contributions	242,580	249,758
Employer Contributions	1,579,481	1,734,037
Recognized Investment Income	3,423,448	2,340,389
Other	0	0
Total	5,245,509	4,324,184
Expenditures		
Benefit Payments	4,762,427	4,964,255
Refund of Member Contributions	780,459	425,753
Expenses	235,592	236,223
Total	5,778,478	5,626,231
Funding Value of Assets Balance - June 30	$52,960,484	$51,658,437
Ratio of Investment Income (Net) to Mean Assets	6.2%	4.2%

SECTION C

VALUATION METHODS AND ASSUMPTIONS

Actuarial Methods and Assumptions Used for the Valuations

Age and Service and Casualty Benefits. Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using the individual entry-age actuarial cost method having the following characteristics:

- the annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and

- each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Asset Valuation Method. The actuarial value of assets recognizes assumed investment income fully each year. Differences between actual and assumed investment income are phased in over a closed five-year period. During periods when the investment performance exceeds the assumed rate (using the valuation interest rate assumption), the actuarial value of assets will tend to be less than the market value. During periods when the investment performance is less than the assumed rate, the actuarial value of assets will tend to be greater than the market value. The actuarial value of assets is not permitted to deviate from the market value of assets by more than 20%.

Financing of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities (the portion of total liabilities not covered by present assets or expected future normal cost contributions) were amortized by level (principal & interest combined) percent of payroll contributions over a closed period of 17 years.

Actuarial Methods and Assumptions Used for the Valuations

The valuation process calculates the contribution requirements and benefit values of the System by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost method described above.

The principal areas of financial risk which require assumptions about future experiences are:

- **long-term rates of investment return to be generated by the assets of the System**
- **patterns of pay increases to members**
- **rates of mortality among members, retirees and beneficiaries**
- **rates of withdrawal of active members (without entitlement to a retirement benefit)**
- **rates of disability among members**
- **the age patterns of actual retirement**

In a valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives - - a period of time which can be as long as a century.

Actual experience of the System will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time-to-time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations).

Actuarial Valuation Assumptions

The actuarial assumptions in Section C of this report are based upon the results of an Experience Study for the City of Trenton Fire and Police Retirement System covering the period July 1, 2011 through June 30, 2016. A report dated April 3, 2017 presented the results of the Experience Study. The actuarial assumptions represent estimates of future experience.

The rate of investment return is 7.00% (net of investment expenses), compounded annually. This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time. The assumed real rate of return (the net return in excess of the wage inflation rate) is 4.00%. Experience during the last 5 years has been as follows:

	Year Ended June 30,					5-Year
	2019	2018	2017	2016	2015	Average
1. Nominal Rate[#]	4.2 %	6.2 %	7.1 %	4.0 %	4.9 %	5.3 %
2. Increase in CPI	1.6 %	2.9 %	1.6 %	1.0 %	0.1 %	1.5 %
3. Average salary increase	5.5 %	(6.0)%	6.3 %	1.3 %	0.2 %	1.4 %
4. Real Return						
- investment purposes						3.8 %
- funding purposes						3.9 %
- assumption						4.0 %

[#] *The nominal rate of return was computed using the approximate formula: i = I divided by 1/2 (A+B-I), where I is realized investment income, A is the beginning of year asset value and B is the end of year asset value.*

The rate of price inflation of 2.50% is consistent with other economic assumptions in this report.

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

Service	Salary Increase Assumptions for an Individual Member		
	Merit & Seniority	Base (Economy)	Increase Next Year
1	6.0%	3.0%	9.0%
2	5.3%	3.0%	8.3%
3	4.5%	3.0%	7.5%
4	3.8%	3.0%	6.8%
5	3.0%	3.0%	6.0%
10	1.2%	3.0%	4.2%
15	0.7%	3.0%	3.7%
20	0.3%	3.0%	3.3%
25	0.2%	3.0%	3.2%
30	0.2%	3.0%	3.2%
Ref:	144		

Healthy Life Post-Retirement Mortality Table:

The RP-2014 Healthy Annuitant Generational Mortality Tables, with blue-collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements assumed each year using scale MP-2016. This assumption is used to measure the probabilities of each benefit payment being made after retirement for non-disabled annuitants. This assumption was first used for the June 30, 2017 valuation. Sample values follow:

Sample Ages	Probability of Dying Next Year		Future Life Expectancy (Years)	
	Men	Women	Men	Women
55	0.5896 %	0.4134 %	28.79	31.67
60	0.8617	0.6160	24.23	26.94
65	1.3072	0.9025	19.94	22.43
70	1.9967	1.3949	15.98	18.14
75	3.1690	2.2985	12.36	14.17
80	5.2625	3.9201	9.18	10.64

Based on retirements in 2019. Retirements in future years will reflect improvements in life expectancy.

Healthy Life Pre-Retirement Mortality Table:

The RP-2014 Employee Generational Mortality Tables, with blue-collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements assumed each year using scale MP-2016. This assumption is used to measure the probabilities of members dying before retirement. This assumption was first used for the June 30, 2017 valuation. Sample values follow:

Sample Ages	Probability of Dying Next Year	
	Men	Women
35	0.0712 %	0.0344 %
40	0.0835	0.0483
45	0.1226	0.0732
50	0.2104	0.1187
55	0.3546	0.1927
60	0.6183	0.2942

Based on decrement in 2019. Decrements in future years will reflect improvements in life expectancy.

Disabled Life Post-Retirement Mortality Table:

The RP-2014 Disabled Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements assumed each year using scale MP-2016. This assumption is used to measure the probabilities of each benefit payment being made after retirement for disabled annuitants. This assumption was first used for the June 30, 2017 valuation. Sample values follow:

Sample Ages	Probability of Dying Next Year		Future Life Expectancy (Years)	
	Men	Women	Men	Women
55	2.2970 %	1.4874 %	21.57	25.33
60	2.7111	1.8260	18.50	21.74
65	3.2832	2.1576	15.59	18.28
70	4.0920	2.8169	12.81	14.89
75	5.4602	4.1071	10.16	11.71
80	7.7746	6.2694	7.75	8.95

Based on retirements in 2019. Retirements in future years will reflect improvements in life expectancy.

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Members Hired before July 1, 1996	
Service	**Percent**
25	30%
26	30%
27	25%
28	25%
29	25%
30	25%
31	25%
32	55%
33	55%
34	55%
35	55%
36	55%
37	55%
38	55%
39	55%
40	55%
41	55%
42 & Up	100%
Ref.	1351

Members Hired after July 1, 1996	
Age	**Percent**
55	30%
56	30%
57	30%
58	30%
59	30%
60 & Up	100%
Ref	1560

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Age	Years of Service	% of Active Members Separating within Next Year
ALL	0	5.00%
	1	4.00%
	2	3.00%
	3	2.00%
	4	1.50%
35	5 & Over	1.21%
40		0.44%
45		0.44%
50		0.44%
55		0.44%
60		0.44%
65		0.44%
Ref.		1061 285

Rates of disability were as follows:

Age	% of Active Members Becoming Disabled within Next Year	
	Male	Female
20	0.08%	0.10%
25	0.08%	0.10%
30	0.08%	0.10%
35	0.08%	0.10%
40	0.20%	0.36%
45	0.27%	0.41%
50	0.49%	0.57%
55	0.89%	0.77%
Ref.	9	10

Lump sum at retirement redemption factor: Retirement Present Values were loaded to account for the additional amount included in the FAC due to lump sums at retirement as follows:

Police Officers hired before January 1, 1996:	6%
Police Officers hired after January 1, 1996:	5%
Police Command hired before January 1, 1996	6%
Police Command hired after January 1, 1996	5%
Police Non-Union hired before January 1, 1996	6%
Fire hired before January 1, 1996	6%
Fire hired after January 1, 1996:	5%

Subsidized Annuity Withdrawal Option: Retirement present values were loaded by 3.5% for the subsidized annuity withdrawal option for members hired before January 1, 1996.

Administrative Expenses: 0.5% of payroll included in Normal Cost.

Miscellaneous and Technical Assumptions
June 30, 2019

Marriage Assumption: 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses.

Pay Increase Timing: Beginning of year, on valuation date. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and exact fractional service.

Decrement Relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation: Non-duty disability and mortality decrements do not operate during the first 5 years of service. Disability does not operate during retirement eligibility.

Option Factors: Option factors are based upon the following assumptions:

(1) a 7.00% annual interest rate compounded annually;
(2) The RP-2014 Healthy Annuitant Generational Mortality Tables with blue-collar adjustments and extended via cubic spline. The table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements with static projection scale MP-2016 projected to 2021; and
(3) A blended mortality table made up of 90% of the male rates and 10% of the female rates.

The optional forms are effective for retirements on or after January 1, 2018.

Glossary

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

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

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 cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent **-** A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

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.

Actuary **-** A person who is trained in the applications of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA and ultimately to Fellowship with the designation FSA.

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.

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.

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.

Glossary (Concluded)

Reserve Account **-** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

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.

SECTION D

HISTORICAL ACCOUNTING INFORMATION

Schedule of Funding Progress
(Dollar Amounts In Millions)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b)-(a)	Funded Ratio (a)/(b)	Covered Payroll (c)	UAAL as a Percent of Covered Payroll [(b)-(a)]/(c)
6/30/05	$49.3	$49.3	$ 0.0	100.0 %	$4.0	- -
6/30/06	52.3	52.3	0.0	100.0 %	4.1	- -
6/30/07	56.3	54.9	(1.4)	102.6 %	3.6	(38.9) %
6/30/08	59.3	57.1	(2.2)	103.9 %	3.9	(56.4) %
6/30/09[(1),(3)]	58.5	58.7	0.2	99.6 %	3.9	5.9 %
6/30/10	56.7	60.6	3.9	93.6 %	3.3	118.2 %
6/30/11	54.5	61.7	7.2	88.3 %	2.9	249.8 %
6/30/12[(1),(2)]	53.9	63.8	9.9	84.5 %	4.2	233.3 %
6/30/13	54.7	65.8	11.1	83.1 %	4.4	254.1 %
6/30/14	54.5	66.3	11.8	82.2 %	3.9	300.4 %
6/30/15	54.0	66.7	12.7	80.9 %	3.9	327.9 %
6/30/16	53.0	66.9	13.9	79.3 %	4.0	347.6 %
6/30/17[(1)]	53.5	69.1	15.6	77.5 %	4.0	391.8 %
6/30/18	53.0	69.4	16.4	76.3 %	3.9	425.5 %
6/30/19	51.7	68.9	17.2	74.9 %	4.0	430.8 %

(1) *Revised actuarial assumptions or methods.*
(2) *Retirement System was amended.*
(3) *Change to entry age funding method.*

Pension Only

Fiscal Year Ended June 30	Annual Recommended Contribution	Actual Contributions	Percent Contributed
2006	$ 1,225,311	$ 1,225,411	100%
2007	1,100,318	1,100,318	100%
2008	838,615	838,615	100%
2009	455,199	455,199	100%
2010	485,174	485,174	100%
2011	801,120	801,113	100%
2012	1,116,778	1,116,778	100%
2013	1,050,331	1,050,327	100%
2014	1,329,444	1,329,445	100%
2015	1,411,401	1,411,401	100%
2016	1,424,943	1,424,943	100%
2017	1,479,258	1,479,258	100%
2018	1,579,481	1,579,481	100%
2019	1,734,037	1,734,037	100%
2020	1,788,696	N/A	N/A
2021	1,912,113	N/A	N/A

APPENDIX 1

ACTUARIAL FUNDING POLICY

Actuarial Funding Policy

WHEREAS, the City of Trenton Fire and Police Retirement System ("Retirement System") is established and administered pursuant to the provisions of Public Act 345 of 1937, as amended, applicable collective bargaining agreements, and applicable state and federal laws including, but not limited to Public Act 314 of 1965, as amended ("Act 314") [MCL 38.1132 et seq.], and

WHEREAS, the Board of Trustees of the Retirement System ("Board") is vested with the authority and fiduciary responsibility for the administration, management and operation of the Retirement System, and

WHEREAS, the Board, in consultation with its Actuary, has an obligation to establish the economic and demographic assumptions to be utilized in performing the required actuarial valuation of the Retirement System and in determining the required annual employer contribution to the Retirement System, and

WHEREAS, the Board is aware of upcoming changes to the accounting and reporting standards approved by the Governmental Accounting Standards Board (GASB) for public pension plans, and

WHEREAS, the Board wishes to establish a formal Actuarial Funding Policy addressing the funding objectives and actuarial assumptions to be utilized in determining the funding status of the Retirement System, therefore be it

RESOLVED, that the Board hereby adopts the following Actuarial Funding Policy:

I. GENERAL

A. Purpose

(1) In light of upcoming changes to the GASB financial accounting and reporting standards for public pension plans, the Board of Trustees of the Retirement System desires to establish a formal Actuarial Funding Policy to ensure the systematic funding of future pension obligations of the Retirement System.

B. Policy Objectives

(1) Maintain adequate levels of assets sufficient to fund all benefits expected to be paid to members and beneficiaries when due.

(2) Maintain stability of employer contributions rates, consistent with other funding objectives.

(3) Support the public policy goals of accountability and transparency.

(4) Monitor material risks to assist in any risk management strategies the Board deems appropriate.

(5) Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring costs to future members and employers.

(6) Provide a reasonable margin for adverse experience to offset risk.

(7) Review the Plan's investment return assumption in consideration of the Board's risk profile.

(8) Continue the systematic reduction of the Plan's Unfunded Actuarial Accrued Liabilities (UAAL).

II. LEGAL

A. Annual Actuarial Valuation

(1) Section 20h(4) of Act 314 [MCL 38.1140h(4)], requires the Retirement System to have an actuarial valuation performed annually as follows:

> Except as otherwise provided in this subsection, a system shall have an annual actuarial valuation with assets valued on a market-related basis. The actuarial present value of total projected benefits shall include all pension benefits to be provided by the system to members or beneficiaries pursuant to the terms of the system and any additional statutory or contractual agreements to provide pension benefits through the system that are in force at the actuarial valuation date, including, but not limited to, service credits purchased by members, deferred retirement option plans, early retirement programs, and postretirement adjustment programs. A system that has less than $20,000,000.00 is only required to have an actuarial valuation as required under this subsection done every other year.

B. Annual Employer Contribution

(1) The Board is required, pursuant to Section 20m of Act 314 [MCL 38.1140m], to annually certify the annual required contribution to be made by the employer as follows:

> The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of any system shall confirm in the annual actuarial valuation required under section 20h and the summary annual report required under section 13 that each system under this act provides for the payment of the required employer contribution as provided in this section and shall confirm in the summary annual report that the system has received the required employer contribution for the year covered in the summary annual report. The required employer contribution is the actuarially determined contribution amount. An annual required employer contribution in a system under this act shall consist of a current service cost payment and a payment of at least the annual accrued amortized interest on any unfunded actuarial liability and the payment of the

annual accrued amortized portion of the unfunded principal liability. For fiscal years that begin before January 1, 2006, the required employer contribution shall not be determined using an amortization period greater than 40 years. Except as otherwise provided in this section, for fiscal years that begin after December 31, 2005, the required employer contribution shall not be determined using an amortization period greater than 30 years. In a plan year, any current service cost payment may be offset by a credit for amortization of accrued assets, if any, in excess of actuarial accrued liability. A required employer contribution for a system administered under this act shall allocate the actuarial present value of future plan benefits between the current service costs to be paid in the future and the actuarial accrued liability. The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of a system shall act upon the recommendation of an actuary and the board and the actuary shall take into account the standards of practice of the actuarial standards board of the American academy of actuaries in making the determination of the required employer contribution.

III. POLICY

A. Actuarial Cost Method

(1) The individual entry age normal actuarial cost method of valuation shall be utilized in determining actuarial accrued liability and normal cost with the following characteristics:

(a) the annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and

(b) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

(2) Differences in the past between assumed experience and actual experience (actuarial gains and losses) shall be factored into the actuarial accrued liability.

(3) The normal cost shall be determined on an individual basis for each active member.

(4) The Retirement System's total normal cost shall take into account amounts paid as administrative (non-investment) related expenses for the applicable fiscal year.

B. Asset Smoothing Method

The investment gains or losses of each valuation period, resulting from the difference between actual investment return and assumed investment return, shall be recognized annually in level amounts over a period not to exceed five (5) years in calculating the funding value of assets.

C. Amortization Method

(1) A level percent of payroll amortization method shall be used to systematically pay off the unfunded actuarial accrued liabilities over a closed amortization period not to exceed 25 years as of July 1, 2012.

(2) Unfunded liabilities associated with benefit changes or assumption changes shall be funded over a period not exceeding ten (10) years.

(3) Unfunded liabilities arising from benefit changes provided to retirees or in conjunction with early retirement incentive programs offered by the employer shall be separately funded over a period not exceeding five (5) future years.

(4) In the event that the Retirement System's assets exceed its liabilities, all amortization schedules other than those related to benefit changes for retirees or early retirement incentive programs offered by the employer shall be considered completed, and employer contributions will be set based upon the normal cost and the completion of any remaining amortizations due to benefit changes for retirees or early retirement incentive programs offered by the employer, without regard to the overfunding status of the Retirement System.

D. Assumptions

The economic and demographic actuarial assumptions utilized to determine the contribution requirements and benefit values of the Retirement System shall be determined by the Board in consultation with its actuary.

E. Funding Target

(1) The targeted funded ratio of the Retirement System shall be 100%.

(2) The employer contribution rate shall at least be equal to the normal cost unless the funded ratio of the Retirement System exceeds 150%.

(3) A funding plan shall be developed by the Board in consultation with its actuary if the funded ratio of the Retirement System falls below 60%, which may include additional funding requirements.

F. Risk Management

(1) Assumption Changes

(a) The actuarial assumptions utilized to determine the annual contribution requirements and valuations shall be those last adopted by the Board based on the most recent experience study and upon the advice and recommendation of the Board's actuary. The Board's actuary shall conduct an experience study at least once every five years. The results of the experience study shall be the basis for the actuarial assumptions recommended to the Board.

(b) The actuarial assumptions may be revised during the five-year period between experience studies if significant plan design changes or other significant economic events occur, as advised by the actuary.

(2) Risk Measures. The following risk measures will be annually determined to provide quantifiable measurements of risk as it applies to the Retirement System.

(a) Funded ratio;

(b) Unfunded actuarial accrued liabilities – the years required to pay down the unfunded liabilities of the Retirement System based upon the current funding schedule;

(c) Total unfunded actuarial accrued liabilities as a percentage of total payroll;

(d) Total assets as a percentage of total payroll; and

(e) Total actuarial accrued liabilities as a percentage of total payroll.

(3) Risk Control

(a) The Board shall carefully monitor the risk measures identified above and shall consider steps to mitigate risk, particularly as the funded ratio increases.

IV. REVIEW AND AMENDMENT

A. Periodic Review

(1) This Actuarial Funding Policy shall be reviewed no less frequently than once every five years in conjunction with the required experience study performed by the Board's actuary, and may be reviewed at any time at the Board's discretion.

B. Amendment

(1) The Board, in consultation with its Actuary and Legal Counsel, may amend this Actuarial Funding Policy at any time as deemed necessary to address changes in the makeup, benefit structure and/or funding status of the Retirement System.

APPENDIX 2

RISK MEASURES

Risk Commentary

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; 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. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

- **Investment risk** – actual investment returns may differ from the expected returns;
- **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
- **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
- **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution rate shown on page A-2 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Risk Commentary (Concluded)

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2019	2018
Ratio of the market value of assets to payroll	12.62	13.38
Ratio of actuarial accrued liability to payroll	17.19	17.96
Ratio of actives to retirees and beneficiaries	0.51	0.52
Ratio of net cash flow to market value of assets	-6.8%	-7.3%

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 12.0 times the payroll, a return on assets 5% different than assumed would equal 60% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 17 times the payroll, a change in liability 2% other than assumed would equal 34% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

Risk Measures

Actuarial Valuation Date	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Unfunded AAL (UAAL) (2) - (1)	(4) Covered Payroll	(5) Funded Ratio (1) / (2)	(6) Assets / Payroll (1) / (4)	(7) Liability / Payroll (2) / (4)	(8) Unfunded / Payroll (3) / (4)
6/30/2010	$56,713,241	$60,608,694	$3,895,453	$3,295,980	93.6 %	1720.7 %	1838.9 %	118.2 %
6/30/2011	54,485,308	61,683,396	7,198,088	2,881,249	88.3 %	1891.0 %	2140.9 %	249.8 %
6/30/2012 [a],[b]	53,891,504	63,797,993	9,906,489	4,245,698	84.5 %	1269.3 %	1502.7 %	233.3 %
6/30/2013	54,709,029	65,829,182	11,120,153	4,376,244	83.1 %	1250.1 %	1504.2 %	254.1 %
6/30/2014	54,501,943	66,314,563	11,812,620	3,932,237	82.2 %	1386.0 %	1686.4 %	300.4 %
6/30/2015	53,951,496	66,662,031	12,710,535	3,876,578	80.9 %	1391.7 %	1719.6 %	327.9 %
6/30/2016	53,030,880	66,906,300	13,875,420	3,991,591	79.3 %	1328.6 %	1676.2 %	347.6 %
6/30/2017 [a]	53,493,453	69,066,488	15,573,035	3,974,464	77.5 %	1345.9 %	1737.8 %	391.8 %
6/30/2018	52,960,484	69,401,011	16,440,527	3,864,155	76.3 %	1370.6 %	1796.0 %	425.5 %
6/30/2019	51,658,437	68,930,790	17,272,353	4,009,427	74.9 %	1288.4 %	1719.2 %	430.8 %

(a) Revised actuarial assumptions.
(b) Retirement System was amended.

(5) The Funded Ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and, potentially, to re-evaluate the assumed rate of return.

(6) and (7) The ratios of assets and liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 5 and 7. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of pay. For systems that are closed to new hires, it is expected that these ratios will grow as payroll declines.

(8) The ratio of the unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 3 or 4 may indicate difficulty in discharging the unfunded liability within a reasonable time frame.