



TOWN OF OLD SAYBROOK RETIREMENT PLAN

**Actuarial Valuation as of July 1, 2019
To Determine Funding for Fiscal Year 2020-21**

Prepared by

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Certification

We have performed an actuarial valuation of the Plan as of July 1, 2019 to determine funding for fiscal year 2020-21. This report presents the results of our valuation.

The ultimate cost of a pension plan is the total amount needed to provide benefits for plan members and beneficiaries and to pay the expenses of administering the plan. Pension costs are met by contributions and by investment return on plan assets. The principal purpose of this report is to set forth an actuarial recommendation of the contribution, or range of contributions, which will properly fund the plan, in accordance with applicable government regulations. In addition, this report provides:

- A valuation of plan assets and liabilities to review the year-to-year progress of funding.
- Information needed to meet disclosure requirements.
- Review of plan experience for the previous year to ascertain whether the assumptions and methods employed for valuation purposes are reflective of actual events and remain appropriate for prospective application.
- Assessment of the relative funded position of the plan, i.e., through a comparison of plan assets and projected plan liabilities.
- Comments on any other matters which may be of assistance in the funding and operation of the plan.

This report may not be used for purposes other than those listed above without Milliman's prior written consent. If this report is distributed to other parties, it must be copied in its entirety, including this certification section.

Milliman's work is prepared solely for the internal business use of the Town of Old Saybrook ("Town"). To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions: (a) the Town may provide a copy of Milliman's work, in its entirety, to the Town's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the Town; and (b) the Town may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law. No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

In preparing this report, we relied on employee census data and financial information as of the valuation date, furnished by the Town. We performed a limited review of the data used directly in our analysis for reasonableness and consistency and have found them to be reasonably consistent and comparable with data used for other purposes. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete and our calculations may need to be revised. If there are material defects in the data, it is possible that they would be uncovered by a detailed, systematic review and comparison of the data to search for data values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Certification

The calculations reported herein have been made on a basis consistent with our understanding of ERISA and the related sections of the tax code. Additional determinations may be needed for purposes other than meeting funding requirements, such as judging benefit security at plan termination or meeting employer accounting requirements. On the basis of the foregoing, we hereby certify that, to the best of our knowledge, this report is complete and accurate and all costs and liabilities were determined in conformance with generally accepted actuarial principles and practices.

We further certify that, in our opinion, each actuarial assumption, method and technique used is reasonable taking into account the experience of the Plan and reasonable expectations. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as, but not limited to, 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. Due to the limited scope of the actuarial assignment, we did not perform an analysis of the potential range of such future measurement.

The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.



Rebecca A. Sielman, FSA
Consulting Actuary

Section I - Executive Summary Changes Since the Prior Valuation

Plan Changes

None.

Changes in Actuarial Methods and Assumptions

This valuation reflects the adoption of the PUB-2010 general and public safety mortality tables with generational projection of future improvements in longevity per the MP Ultimate table. In addition, the interest rate assumption was lowered from 7.25% to 7.125% and the period for amortizing the Unfunded Accrued Liability was lengthened from 17 years to 20 years. Overall, the combined changes increased the Unfunded Accrued Liability by \$1.58 million and increased the Actuarially Determined Contribution by \$145,000.

Other Significant Changes

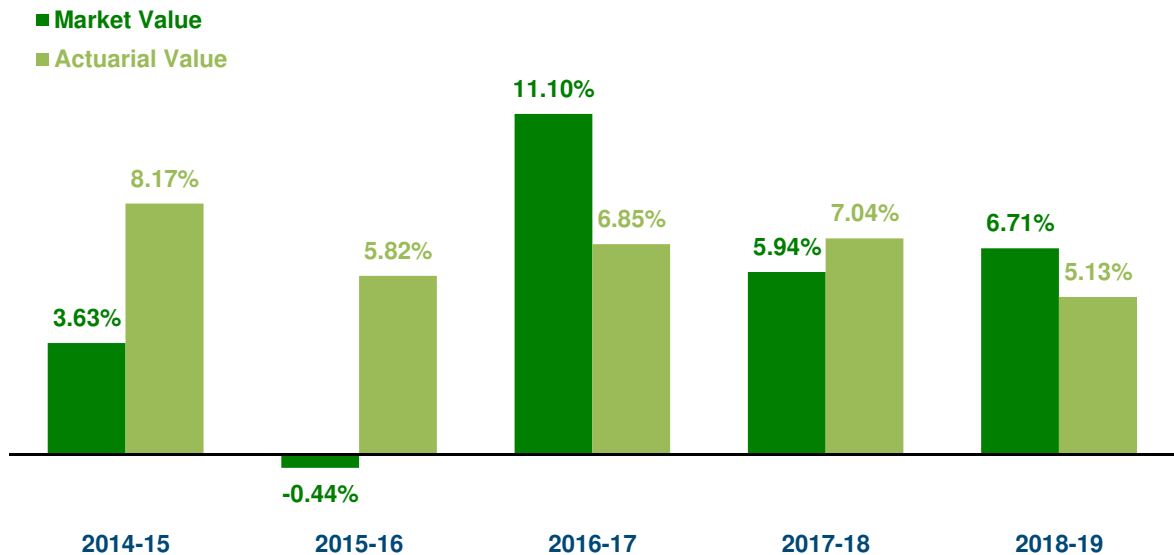
None.

Section I - Executive Summary Assets

There are two different measures of the plan's assets that are used throughout this report. The Market Value is a snapshot of the plan's investments as of the valuation date. The Actuarial Value is a smoothed asset value designed to temper the volatile fluctuations in the market by recognizing investment gains or losses non-asymptotically over five years.

	Market	Actuarial
Value as of July 1, 2018	\$22,528,019	\$23,178,423
Town and Member Contributions	886,778	886,778
Investment Income	1,483,398	1,167,341
Benefit Payments and Administrative Expenses	(1,733,802)	(1,733,802)
Value as of July 1, 2019	23,164,393	23,498,740

For fiscal year 2018-19, the plan's assets earned 6.71% on a Market Value basis and 5.13% on an Actuarial Value basis. The actuarial assumption for this period was 7.25%; the result is an asset loss of about \$119,000 on a Market Value basis and a loss of about \$482,000 on an Actuarial Value basis. Historical rates of return are shown in the graph below.

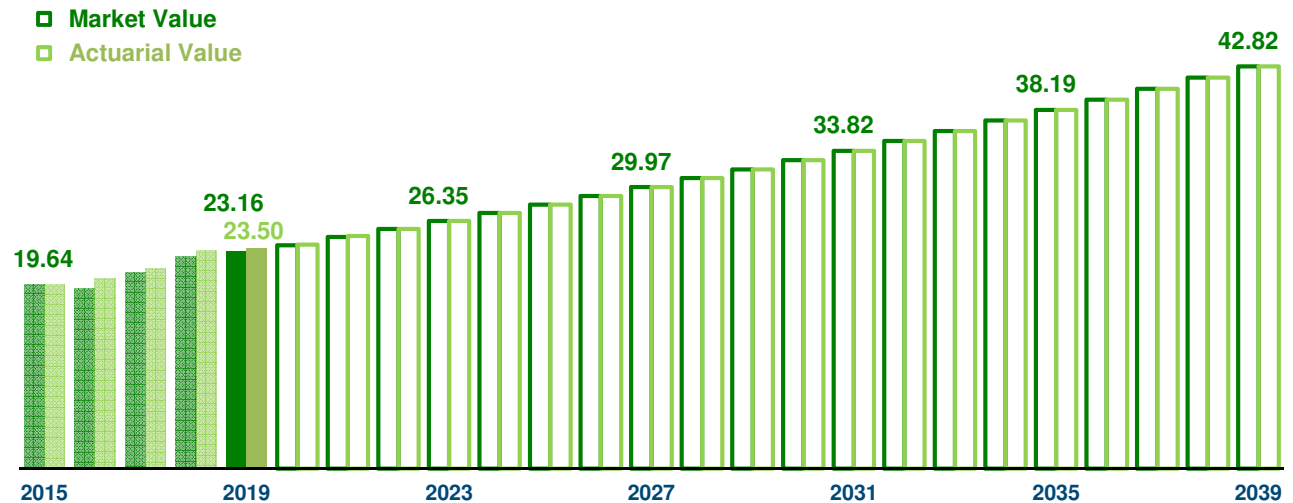


Please note that the Actuarial Value currently exceeds the Market Value by \$334,000. This figure represents investment losses that will be gradually recognized in future years. This process will exert upward pressure on the Town's contribution, unless there are offsetting market gains.

Section I - Executive Summary

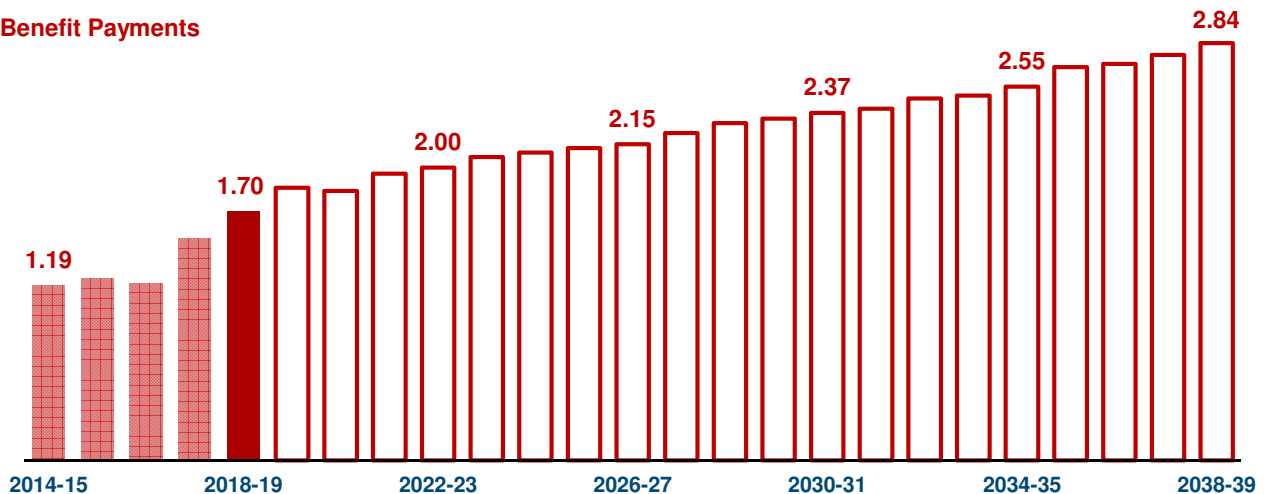
Assets (continued)

The graph below shows how this year's asset values compare to where the plan's assets have been over the past several years and how they are projected to change over the next 20 years. For purposes of this projection, we have assumed that the Town always contributes the Actuarially Determined Contribution and the investments always earn the assumed interest rate each year.



In 2018-19, the plan paid out \$1.7 million in benefits to members. Over the next 20 years, the plan is projected to pay out a total of \$46 million in benefits to members.

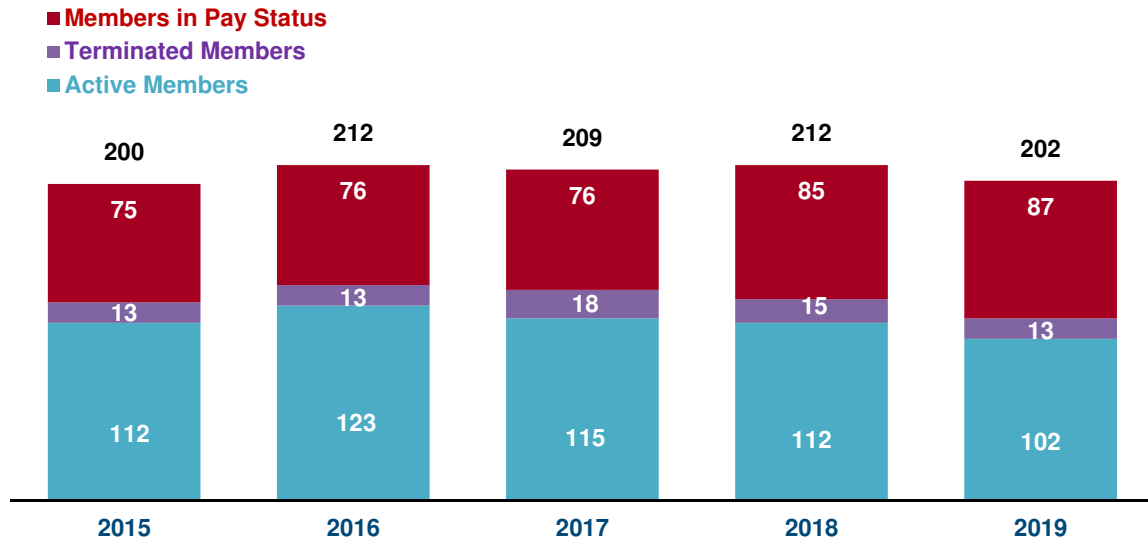
Benefit Payments



Section I - Executive Summary

Membership

There are three basic categories of plan members included in the valuation: (1) members who are receiving monthly pension benefits, (2) former employees who have a vested right to benefits but have not yet started collecting, and (3) active employees who have met the eligibility requirements for membership.

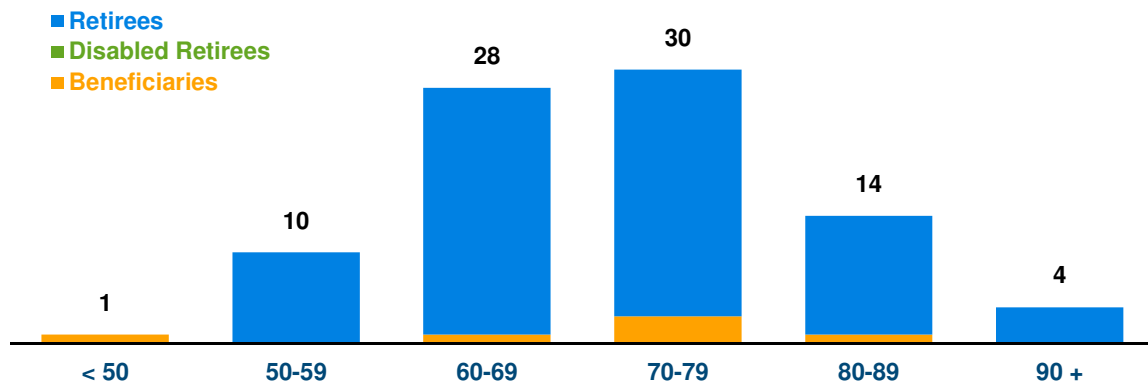


Members in Pay Status on July 1, 2019

Board of Education	7	Average Age	71.8
Police	4	Total Annual Benefit	\$1,559,104
Town	<u>76</u>	Average Annual Benefit	17,921
Total	<u>87</u>		

As of July 1, 2019, there were 81 Retirees, 0 Disabled Retirees, and 6 Beneficiaries.

The total in pay status fall across a wide distribution of ages:



Section I - Executive Summary

Membership (continued)

Terminated Vested Members on July 1, 2019

Board of Education	0	Average Age	48.6
Police	2	Total Annual Benefit	\$92,801
Town	<u>5</u>	Average Annual Benefit	13,257
Total	7		

Nonvested Members Due Refunds on July 1, 2019

Board of Education	1
Police	1
Town	<u>4</u>
Total	6

Active Members on July 1, 2019

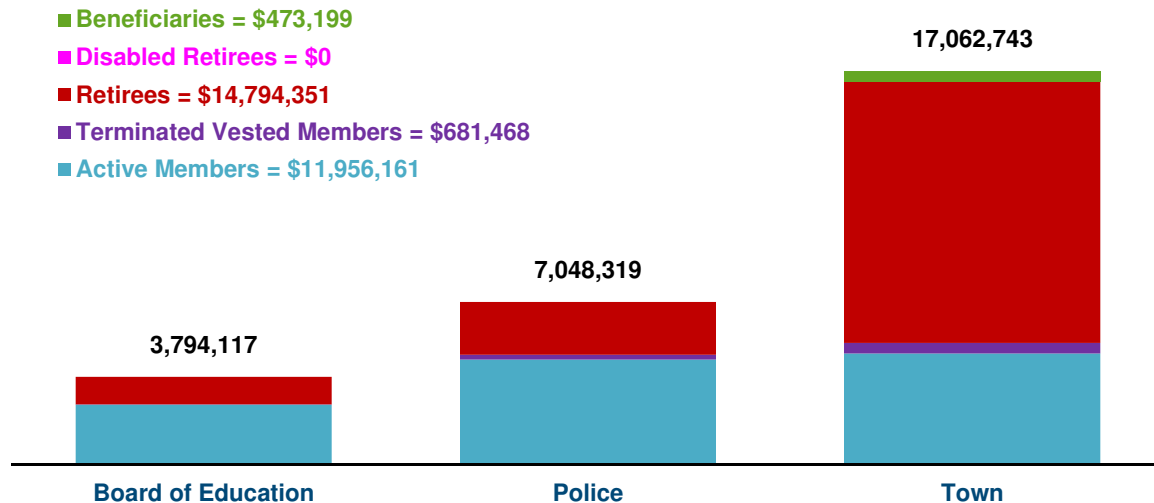
Board of Education	24	Average Age	47.5
Police	29	Average Service	11.0
Town	<u>49</u>	Payroll	\$6,628,087
Total	102	Average Payroll	64,981

The table below illustrates the age and years of service of the active membership:

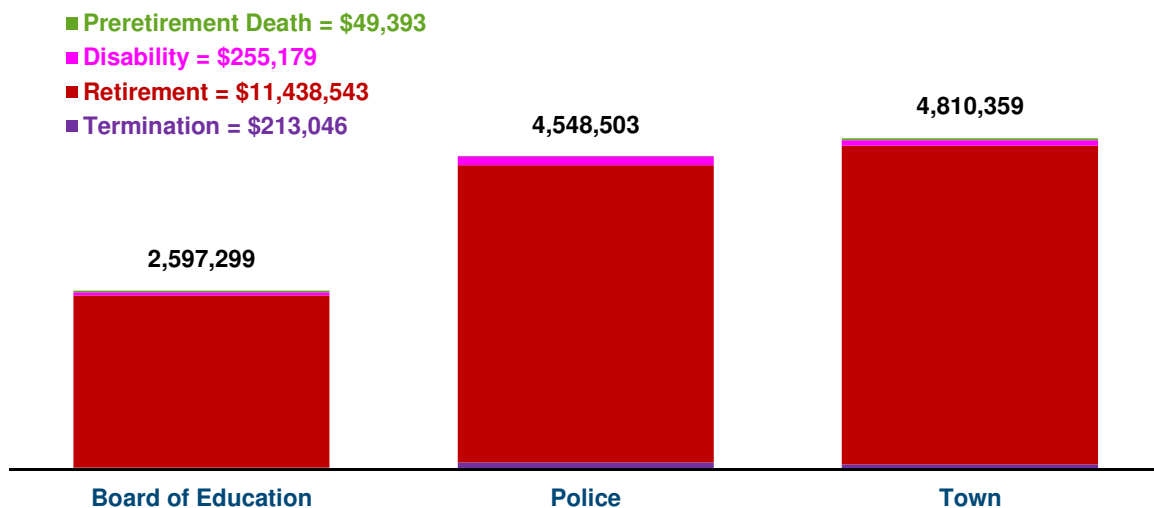
Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25	5							5
25-29	6	3						9
30-34	6	9						15
35-39	1	2	3					6
40-44	2		2	1	2			7
45-49	4	2		4	2			12
50-54		3	1	1	4	1		10
55-59	3	7	4	1	2	1	1	19
60-64	3	2	2	1	1			9
65+	1	4	1	1	1	1	1	10
Total	31	32	13	9	12	3	2	102

Section I - Executive Summary Accrued Liability

The Accrued Liability as of July 1, 2019 is \$27,905,179, which consists of the following pieces:



The Accrued Liability for active members can be broken down further by the different types of benefits provided by the plan:

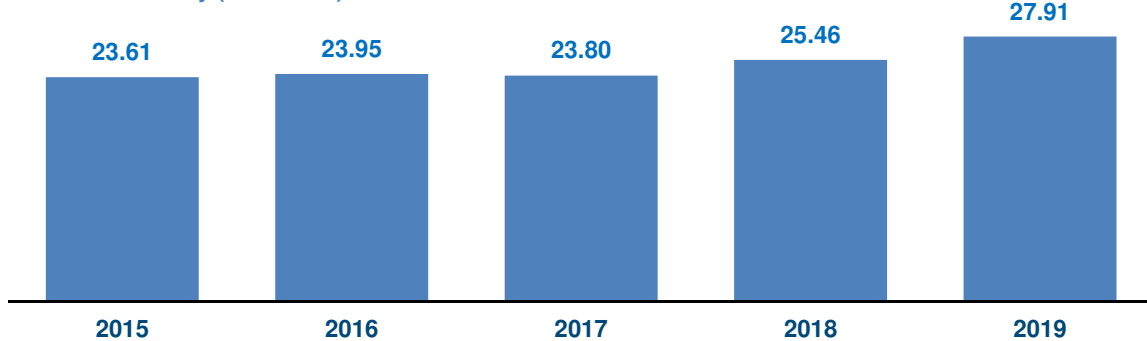


Section I - Executive Summary

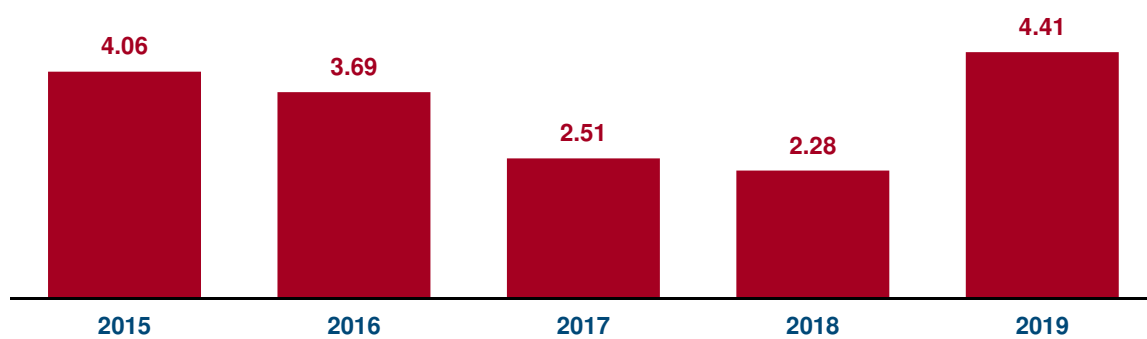
Funded Status

The Accrued Liability grows over time as active members earn additional benefits, and goes down over time as members receive benefits; it may also change when there are changes to the plan provisions or changes in the actuarial assumptions. The Unfunded Accrued Liability is the dollar difference between the Accrued Liability and the Actuarial Value of Assets; the Funded Ratio is the ratio of the two.

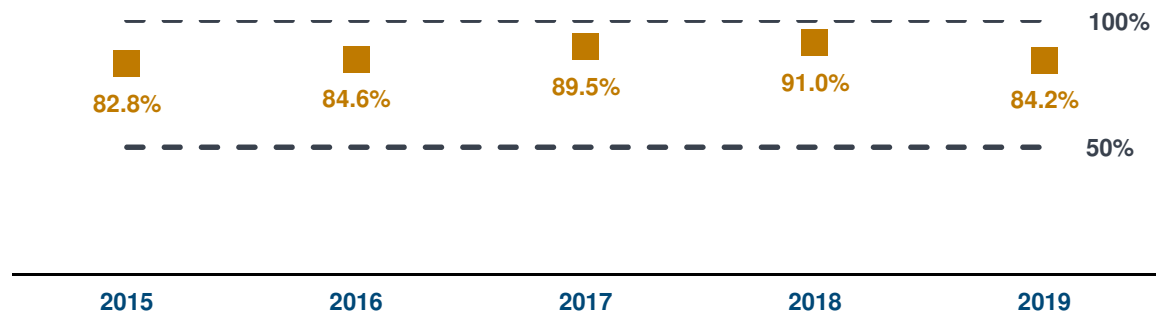
Accrued Liability (\$ millions)



Unfunded Accrued Liability (\$ millions)



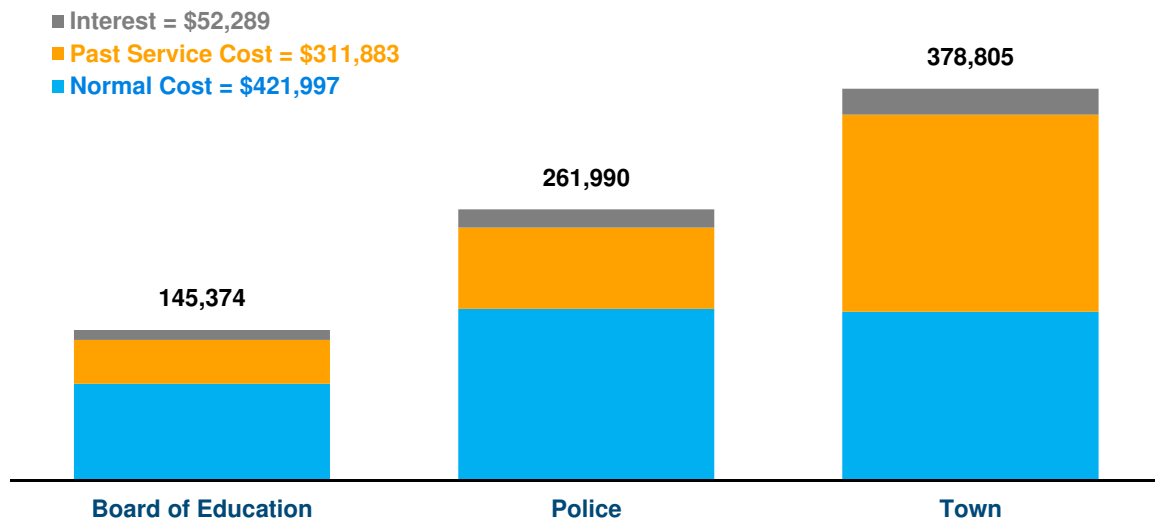
Funded Ratio



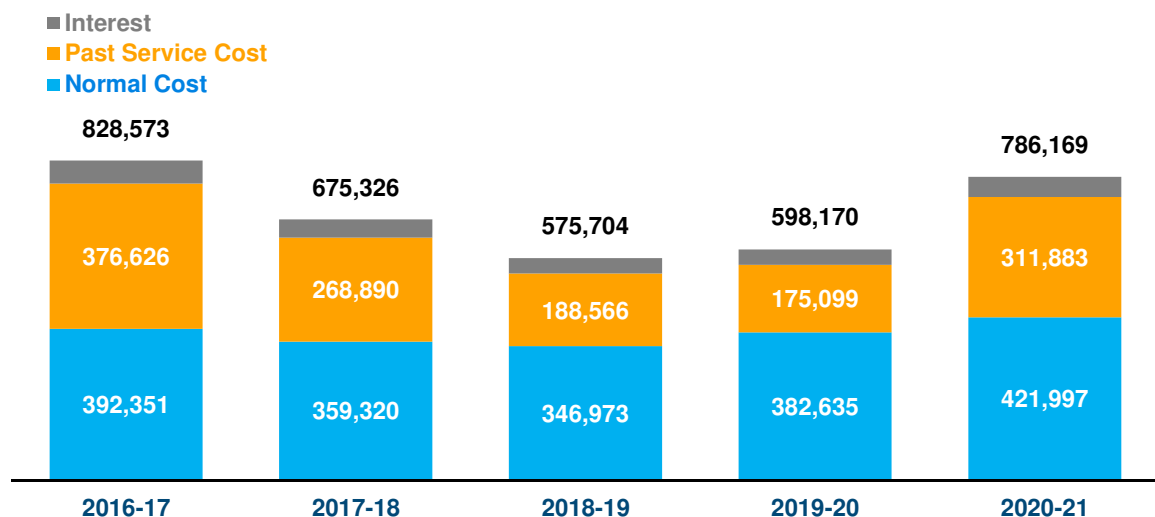
Section I - Executive Summary Actuarially Determined Contribution

The Actuarially Determined Contribution consists of three pieces: a Normal Cost payment to fund the benefits earned each year, a Past Service Cost to gradually reduce any unfunded or surplus liability, and Interest to reflect the timing of the contribution relative to the valuation date.

The Actuarially Determined Contribution for fiscal year 2020-21 is \$786,169:



The chart below shows the Actuarially Determined Contribution for the past five fiscal years. Note that the Normal Cost is relatively consistent from year to year, whereas the Past Service Cost tends to be more volatile since it reflects the impact of asset performance.

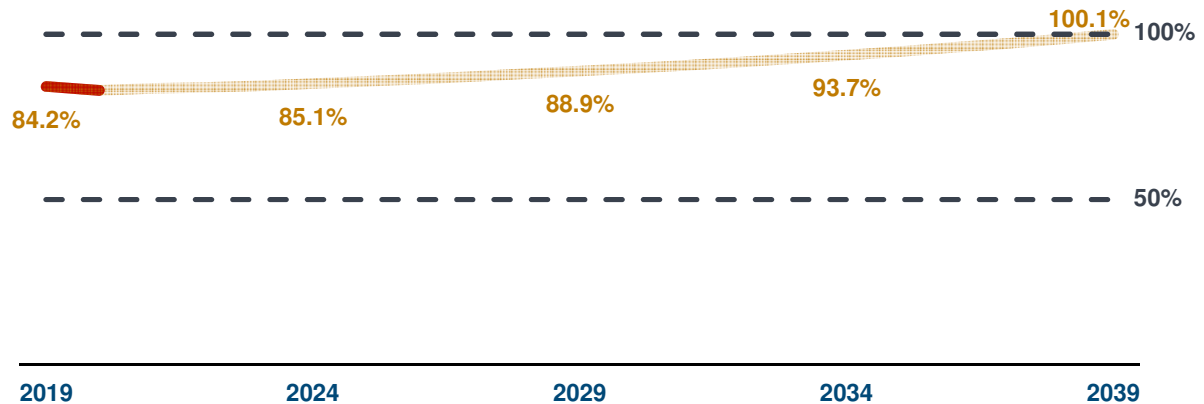


Section I - Executive Summary

Long-Range Forecast

If the Town pays the Actuarially Determined Contribution each year, the investments earn exactly the assumed interest rate each year, and there are no changes in the plan provisions or in the actuarial methods and assumptions, then we project the following changes in the plan's funded status and the long-range contribution levels:

Funded Ratio



Actuarially Determined Contribution (\$ millions)

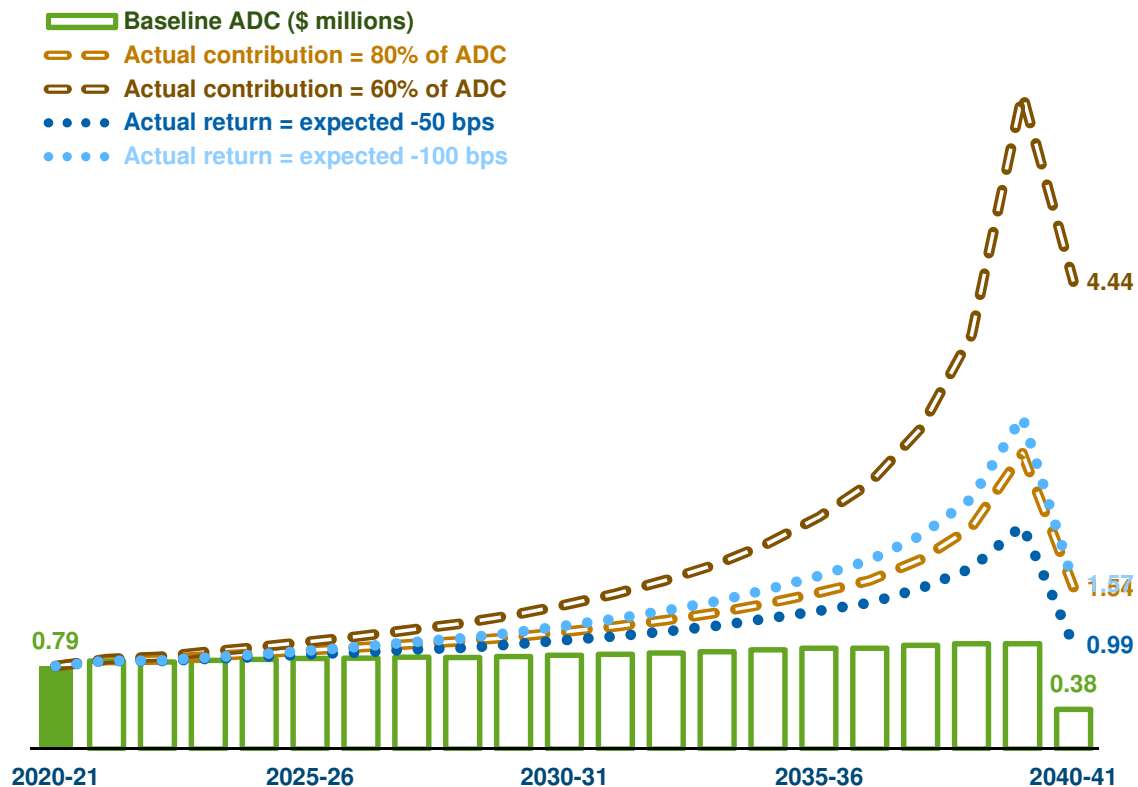


To the extent that there are future investment or liability gains or losses, changes in the actuarial assumptions or methods, or plan changes, the actual valuation results will differ from these forecasts. Please see Section III C for more details of the long range forecast.

Section I - Executive Summary

Long-Range Forecast (continued)

Pension benefits are paid for through a combination of contributions from the Town and from employees, and from investment income. If the Town pays less than the Actuarially Determined Contribution each year, or if the investments persistently earn less than the assumed interest rate, then the plan's funded status would suffer, and to compensate, the Town's contribution levels would be pushed higher. The risks of underfunding and underearning are illustrated in the hypothetical scenarios below:



The scenarios illustrated above are based on deterministic projections that assume emerging plan experience always exactly matches the actuarial assumptions; in particular that actual asset returns will be constant in every year of the projection period. Variation in asset returns, contribution amounts, and many other factors may have a significant impact on the long-term financial health of the plan, the liquidity constraints on plan assets, and the Town's future contribution levels. Stochastic projections could be prepared that would enable the Town to understand the potential range of future results based on the expected variability in asset returns and other factors. Such analysis was beyond the scope of this engagement.

Section I - Executive Summary Summary of Principal Results

Membership as of	July 1, 2018	July 1, 2019
Active Members	112	102
Terminated Members	15	13
Members in Pay Status	<u>85</u>	<u>87</u>
Total Count	212	202
Payroll	\$6,746,930	\$6,628,087
Assets and Liabilities as of	July 1, 2018	July 1, 2019
Market Value of Assets	\$22,528,019	\$23,164,393
Actuarial Value of Assets	23,178,423	23,498,740
Accrued Liability for Active Members	10,414,571	11,956,161
Accrued Liability for Terminated Members	758,592	681,468
Accrued Liability for Members in Pay Status	<u>14,289,855</u>	<u>15,267,550</u>
Total Accrued Liability	25,463,018	27,905,179
Unfunded Accrued Liability	2,284,595	4,406,439
Funded Ratio	91.0%	84.2%
Actuarially Determined Contribution for Fiscal Year	2019-20	2020-21
Normal Cost	\$382,635	\$421,997
Past Service Cost	175,099	311,883
Interest	<u>40,436</u>	<u>52,289</u>
Actuarially Determined Contribution	598,170	786,169
Allocation of Actuarially Determined Contribution		
Board of Education	118,057	145,374
Police	200,830	261,990
Town	<u>279,283</u>	<u>378,805</u>
Total	598,170	786,169

Section II - Plan Assets

A. Summary of Fund Transactions

Market Value as of July 1, 2018 \$22,528,019

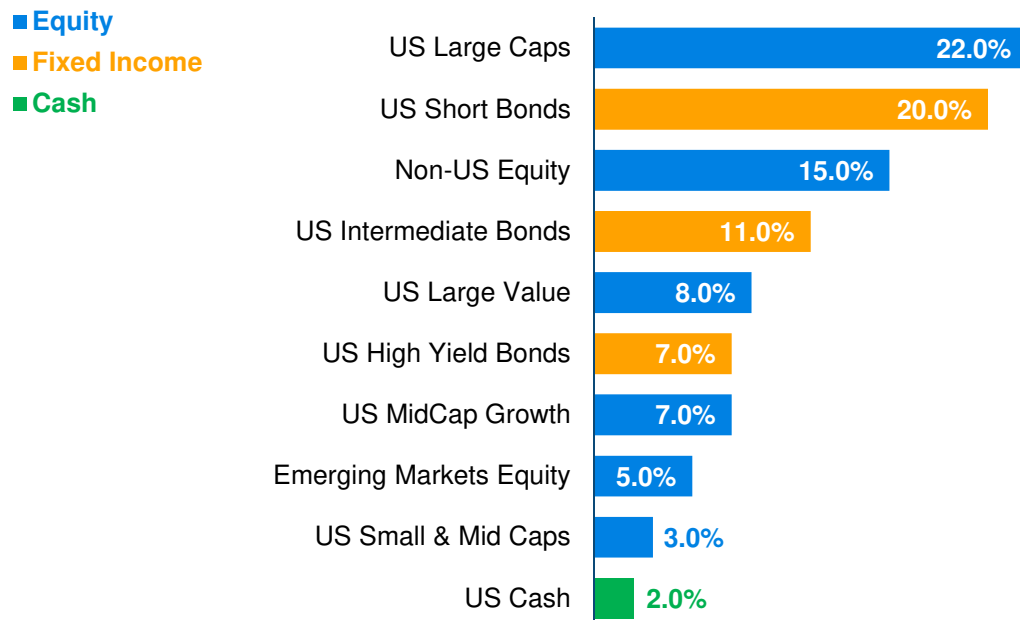
Town Contributions	558,125
Member Contributions	328,653
Net Investment Income	1,483,398
Benefit Payments	(1,697,716)
Administrative Expenses	(36,086)

Market Value as of June 30, 2019 23,164,393

Expected Return on Market Value of Assets	1,602,777
Market Value (Gain)/Loss	119,379
Approximate Rate of Return *	6.71%

* The rate shown here is not the dollar or time weighted investment yield rate which measures investment performance. It is an approximate net return assuming all activity occurred on average midway through the fiscal year.

Target Asset Allocation as of June 30, 2019



Section II - Plan Assets

B. Development of Actuarial Value of Assets

In order to minimize the impact of market fluctuations on the contribution level, we use an Actuarial Value of Assets that recognizes gains and losses in equal installments ('non-asymptotically') over a five year period. The Actuarial Value of Assets as of July 1, 2019 is determined below.

1.	Expected Market Value of Assets:	
a.	Market Value of Assets as of July 1, 2018	\$22,528,019
b.	Town and Member Contributions	886,778
c.	Benefit Payments and Administrative Expenses	(1,733,802)
d.	Expected Earnings Based on 7.25% Interest	<u>1,602,777</u>
e.	Expected Market Value of Assets as of July 1, 2019	23,283,772
2.	Actual Market Value of Assets as of July 1, 2019	23,164,393
3.	Market Value (Gain)/Loss: (1e) - (2)	119,379
4.	Delayed Recognition of Market (Gains)/Losses	
	Plan Year End	(Gain)/Loss
	06/30/2019	\$119,379
	06/30/2018	328,881
	06/30/2017	(683,047)
	06/30/2016	1,573,671
	Percent Not Recognized	Amount Not Recognized
	80%	\$95,503
	60%	197,329
	40%	(273,219)
	20%	<u>314,734</u>
		334,347
5.	Actuarial Value of Assets as of July 1, 2019: (2) + (4)	23,498,740
6.	Return on Actuarial Value of Assets: (5) - [(1a) + (1b) + (1c)]	1,167,341
7.	Approximate Rate of Return on Actuarial Value of Assets	5.13%
8.	Actuarial Value (Gain)/Loss	482,410

Section III - Development of Contribution

A. Past Service Cost

In determining the Past Service Cost, the Unfunded Accrued Liability is amortized as a level percent over a closed 20 year period starting July 1, 2019.

	Board of Education	Police	Town	Total
1. Accrued Liability				
Active Members	\$2,597,299	\$4,548,503	\$4,810,359	\$11,956,161
Terminated Members	3,874	212,676	464,918	681,468
Retirees	1,192,944	2,287,140	11,314,267	14,794,351
Disabled Retirees	0	0	0	0
Beneficiaries	<u>0</u>	<u>0</u>	<u>473,199</u>	<u>473,199</u>
Total Accrued Liability	3,794,117	7,048,319	17,062,743	27,905,179
2. Actuarial Value of Assets * (see Section IIB)	3,194,997	5,935,336	14,368,407	23,498,740
3. Unfunded Accrued Liability: (1) - (2)	599,120	1,112,983	2,694,336	4,406,439
4. Funded Ratio: (2) / (1)	84.2%	84.2%	84.2%	84.2%
5. Amortization Period	20	20	20	20
6. Amortization Growth Rate	3.00%	3.00%	3.00%	3.00%
7. Past Service Cost: (3) amortized over (5)	42,405	78,776	190,702	311,883

* Allocated to the individual groups in proportion to the Total Accrued Liability.

Section III - Development of Contribution

B. Actuarially Determined Contribution for FY 2020-21

	Board of Education	Police	Town	Total
1. Total Normal Cost	\$157,786	\$254,871	\$267,267	\$679,924
2. Expected Member Contributions	69,544	98,478	127,105	295,127
3. Expected Administrative Expenses*	5,058	9,396	22,746	37,200
4. Net Normal Cost: (1) - (2) + (3)	93,300	165,789	162,908	421,997
5. Past Service Cost (see Section IIIA)	42,405	78,776	190,702	311,883
6. Interest on (4) + (5) to start of next fiscal year	9,669	17,425	25,195	52,289
7. Actuarially Determined Contribution for FY 2020-21: (4) + (5) + (6)	145,374	261,990	378,805	786,169

* Allocated to the individual groups in proportion to the Total Accrued Liability.

Section III - Development of Contribution

C. Long Range Forecast

This forecast is based on the results of the July 1, 2019 actuarial valuation and assumes that the Town will pay the Actuarially Determined Contribution each year, the assets will return the assumed interest rate on a market value basis each year, and there are no future changes in the actuarial methods or assumptions or in the plan provisions. For purposes of this forecast the amortization period declines to 1 year to illustrate the progress of the plan towards becoming fully funded; in actual practice the amortization period will not be less than 10 years in order to shield the Town from contribution volatility. Actual results at each point in time will yield different values, reflecting the actual experience of the plan membership and assets.

Valuation Date	Values as of the Valuation Date				Fiscal Year	Cash Flows Projected to the Following Fiscal Year			
	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio		Town Contributions	Member Contributions	Benefit Payments	Net Cash Flows
7/1/2019	\$27,905,179	\$23,498,740	\$4,406,439	84.2%	2020-21	\$786,169	\$295,019	(\$1,835,082)	(\$753,894)
7/1/2020	28,719,000	23,844,000	4,875,000	83.0%	2021-22	835,000	282,000	(1,955,000)	(838,000)
7/1/2021	29,608,000	24,765,000	4,843,000	83.6%	2022-23	825,000	280,000	(1,996,000)	(891,000)
7/1/2022	30,406,000	25,524,000	4,882,000	83.9%	2023-24	841,000	276,000	(2,067,000)	(950,000)
7/1/2023	31,205,000	26,352,000	4,853,000	84.4%	2024-25	850,000	275,000	(2,097,000)	(972,000)
7/1/2024	31,974,000	27,204,000	4,770,000	85.1%	2025-26	859,000	270,000	(2,129,000)	(1,000,000)
7/1/2025	32,753,000	28,091,000	4,662,000	85.8%	2026-27	863,000	267,000	(2,154,000)	(1,024,000)
7/1/2026	33,538,000	29,012,000	4,526,000	86.5%	2027-28	870,000	257,000	(2,231,000)	(1,104,000)
7/1/2027	34,342,000	29,971,000	4,371,000	87.3%	2028-29	868,000	253,000	(2,297,000)	(1,176,000)
7/1/2028	35,101,000	30,915,000	4,186,000	88.1%	2029-30	878,000	247,000	(2,328,000)	(1,203,000)
7/1/2029	35,831,000	31,849,000	3,982,000	88.9%	2030-31	889,000	242,000	(2,368,000)	(1,237,000)
7/1/2030	36,570,000	32,820,000	3,750,000	89.7%	2031-32	898,000	233,000	(2,397,000)	(1,266,000)
7/1/2031	37,308,000	33,824,000	3,484,000	90.7%	2032-33	912,000	228,000	(2,465,000)	(1,325,000)
7/1/2032	38,058,000	34,869,000	3,189,000	91.6%	2033-34	923,000	230,000	(2,486,000)	(1,333,000)
7/1/2033	38,783,000	35,924,000	2,859,000	92.6%	2034-35	942,000	221,000	(2,547,000)	(1,384,000)
7/1/2034	39,540,000	37,045,000	2,495,000	93.7%	2035-36	957,000	208,000	(2,679,000)	(1,514,000)
7/1/2035	40,280,000	38,192,000	2,088,000	94.8%	2036-37	957,000	212,000	(2,701,000)	(1,532,000)
7/1/2036	40,915,000	39,284,000	1,631,000	96.0%	2037-38	984,000	205,000	(2,764,000)	(1,575,000)
7/1/2037	41,575,000	40,433,000	1,142,000	97.3%	2038-39	1,000,000	201,000	(2,843,000)	(1,642,000)
7/1/2038	42,208,000	41,617,000	591,000	98.6%	2039-40	999,000	202,000	(2,846,000)	(1,645,000)

Section III - Development of Contribution

D. History of Funded Status

Valuation Date	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
July 1, 2010	\$15,741,445	\$18,323,182	\$2,581,737	85.9%
July 1, 2011	16,333,130	19,249,102	2,915,972	84.9%
July 1, 2012	16,697,547	20,083,455	3,385,908	83.1%
July 1, 2013	17,394,679	21,066,367	3,671,688	82.6%
July 1, 2014	18,553,292	22,384,073	3,830,781	82.9%
July 1, 2015	19,552,975	23,612,554	4,059,579	82.8%
July 1, 2016	20,258,042	23,950,369	3,692,327	84.6%
July 1, 2017	21,294,870	23,800,533	2,505,663	89.5%
July 1, 2018	23,178,423	25,463,018	2,284,595	91.0%
July 1, 2019	23,498,740	27,905,179	4,406,439	84.2%

Section III - Development of Contribution

E. History of Town Contributions

Fiscal Year	Actuarially Determined Contribution	Actual Town Contribution	Payroll	Actual Contribution as a Percent of Payroll
2011-12	\$574,829	\$302,965	\$3,737,359	8.1%
2012-13	675,246	359,336	4,140,391	8.7%
2013-14	712,919	411,211	4,542,061	9.1%
2014-15	758,105	437,437	4,627,012	9.5%
2015-16	802,803	475,113	5,040,802	9.4%
2016-17	828,573	500,830	5,112,538	9.8%
2017-18	675,326	1,576,474	6,391,246	24.7%
2018-19	575,704	558,125	6,518,727	8.6%
2019-20	598,170	TBD	6,746,930	TBD
2020-21	786,169	TBD	6,628,087	TBD

Section IV - Membership Data

A. Reconciliation of Membership from Prior Valuation

Details of the changes in the Plan membership since the last valuation are shown below. Additional details on the Plan membership are provided in the remainder of Section IV.

	Active Members	Terminated Vested Members	Nonvested Members Due Refunds	Retirees	Disabled Retirees	Beneficiaries	Total
Count July 1, 2018	112	9	6	79	0	6	212
Terminated							
- no benefits due	-	-	-	-	-	-	0
- paid refund	(10)	(2)	(2)	-	-	-	(14)
- vested benefits due	(2)	-	2	-	-	-	0
Retired	(2)	-	-	2	-	-	0
Died							
- with beneficiary	-	-	-	-	-	-	0
- no beneficiary	-	-	-	-	-	-	0
Benefits expired	-	-	-	-	-	-	0
New member	4	-	-	-	-	-	4
Rehired	-	-	-	-	-	-	0
New Alternate Payee	-	-	-	-	-	-	0
Correction	-	-	-	-	-	-	0
Count July 1, 2019	102	7	6	81	0	6	202
Breakdown July 1, 2019							
Board of Education	24	0	1	7	0	0	32
Police	29	2	1	4	0	0	36
Town	<u>49</u>	<u>5</u>	<u>4</u>	<u>70</u>	<u>0</u>	<u>6</u>	<u>134</u>
Total	102	7	6	81	0	6	202

Section IV - Membership Data

B. Statistics of Active Membership

		As of July 1, 2018	As of July 1, 2019
Number of Active Members	Board of Education	28	24
	Police	29	29
	Town	<u>55</u>	<u>49</u>
	Total	112	102
Average Age	Board of Education	49.5	51.1
	Police	34.7	35.2
	Town	52.1	53.0
	Total	46.9	47.5
Average Service	Board of Education	10.7	13.1
	Police	8.5	9.1
	Town	10.4	11.2
	Total	10.0	11.0
Total Payroll	Board of Education	\$1,573,704	\$1,498,792
	Police	2,084,328	2,187,802
	Town	<u>3,088,898</u>	<u>2,941,493</u>
	Total	6,746,930	6,628,087
Average Payroll	Board of Education	\$56,204	\$62,450
	Police	71,873	75,441
	Town	56,162	60,030
	Total	60,240	64,981

Section IV - Membership Data

C. Distribution of Active Members as of July 1, 2019

Board of Education

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29								0
30-34	2	2						4
35-39								0
40-44								0
45-49	2	1		1	1			5
50-54		1	1		2	1		5
55-59	3	3	1	1		1		9
60-64								0
65+						1		1
Total	7	7	2	2	3	3	0	24

Police

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25	5							5
25-29	6	1						7
30-34	2	6						8
35-39								0
40-44					2			2
45-49		1		1	1			3
50-54					2			2
55-59							1	1
60-64			1					1
65+								0
Total	13	8	1	1	5	0	1	29

Town

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29		2						2
30-34	2	1						3
35-39	1	2	3					6
40-44	2		2	1				5
45-49	2			2				4
50-54		2		1				3
55-59		4	3		2			9
60-64	3	2	1	1	1			8
65+	1	4	1	1	1		1	9
Total	11	17	10	6	4	0	1	49

Section IV - Membership Data

D. Statistics of Inactive Membership

	As of July 1, 2018	As of July 1, 2019
Terminated Vested Members		
Number	9	7
Total Annual Benefit	\$125,193	\$92,801
Average Annual Benefit	13,910	13,257
Average Age	53.1	48.6
Nonvested Members Due Refunds		
Number	6	6
Retirees		
Number	79	81
Total Annual Benefit	\$1,471,504	\$1,515,859
Average Annual Benefit	18,627	18,714
Average Age	71.2	72.0
Disabled Retirees		
Number	0	0
Total Annual Benefit	\$0	\$0
Average Annual Benefit	0	0
Average Age	0.0	0.0
Beneficiaries		
Number	6	6
Total Annual Benefit	\$43,245	\$43,245
Average Annual Benefit	7,208	7,208
Average Age	68.5	69.5

Section IV - Membership Data

E. Distribution of Inactive Members as of July 1, 2019

	Age	Number	Annual Benefits
Terminated Vested Members	< 50	2	\$21,353
	50 - 59	4	57,696
	60 - 69	1	13,752
	70 - 79	0	0
	80 - 89	0	0
	90 +	<u>0</u>	<u>0</u>
	Total	7	92,801
Retirees	< 50	0	\$0
	50 - 59	10	337,714
	60 - 69	27	473,991
	70 - 79	27	400,599
	80 - 89	13	265,608
	90 +	<u>4</u>	<u>37,947</u>
	Total	81	1,515,859
Disabled Retirees	< 50	0	\$0
	50 - 59	0	0
	60 - 69	0	0
	70 - 79	0	0
	80 - 89	0	0
	90 +	<u>0</u>	<u>0</u>
	Total	0	0
Beneficiaries	< 50	1	\$18,545
	50 - 59	0	0
	60 - 69	1	7,774
	70 - 79	3	13,710
	80 - 89	1	3,216
	90 +	<u>0</u>	<u>0</u>
	Total	6	43,245

Section V - Analysis of Risk

A. Introduction

The results of this actuarial valuation are based on one set of reasonable assumptions. However, it is almost certain that future experience will not exactly match these assumptions. As an example, the plan's investments may perform better or worse than assumed in any single year and over any longer time horizon. It is therefore important to consider the potential impacts of these likely differences when making decisions that may affect the future financial health of the plan, or of the plan's members.

In addition, as plans mature they accumulate larger pools of assets and liabilities. The increase in size in turn increases the potential magnitude of adverse experience. As an example, the dollar impact of a 10% investment loss on a plan with \$1 billion in assets and liabilities is much greater than the dollar impact for a plan with \$1 million in assets and liabilities. Since pension plans make long-term promises and rely on long-term funding, it is important to consider how mature the plan is today, and how mature it may become in the future.

Actuarial Standard of Practice No. 51 (ASOP 51) directs actuaries to provide pension plan sponsors with information concerning the risks associated with the plan:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

This section of the report uses the framework of ASOP 51 to communicate important information about significant risks to the plan, the plan's maturity, and relevant historical plan data.

Please see Section III C for more information on the basis for the projected results shown on the following pages.

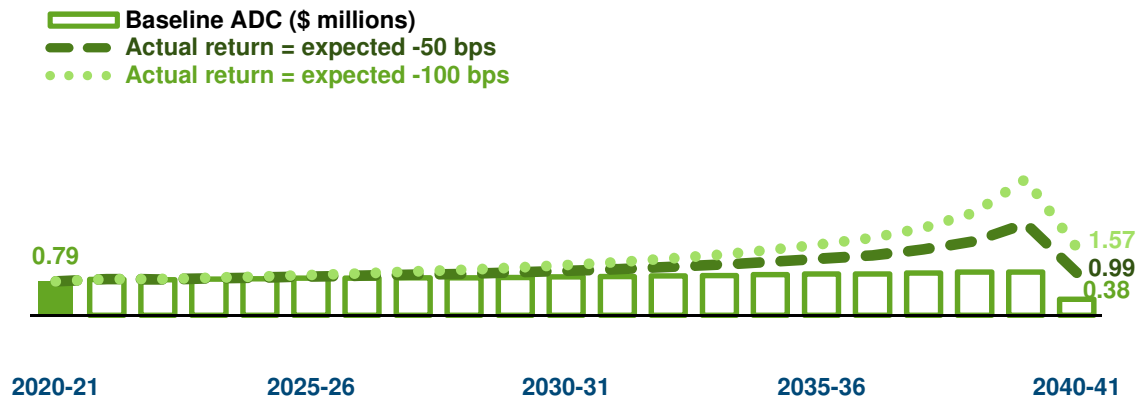
Section V - Analysis of Risk

B. Risk Identification and Assessment

Investment Risk

Definition: This is the potential that investment returns will be different than expected.

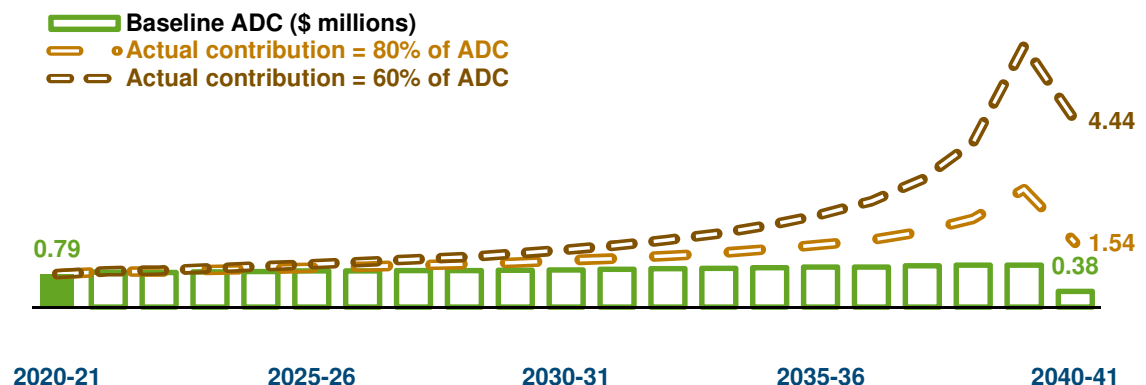
Identification: To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. The consequences of persistent underperformance on future Actuarially Determined Contribution levels are illustrated below:



Contribution Risk

Definition: This is the potential that actual future contributions will be less than the Actuarially Determined Contribution.

Identification: Over the past 8 years, actual contributions have been 82.5% of the Actuarially Determined Contribution in total. The consequences of persistent underfunding on future Actuarially Determined Contribution levels are illustrated below:



Section V - Analysis of Risk

B. Risk Identification and Assessment

Liquidity Risk

Definition: This is the potential that assets must be liquidated at a loss earlier than planned in order to pay for the plan's benefits and operating costs. This risk is heightened for plans with negative cash flows, in which contributions are not sufficient to cover benefit payments plus expenses.

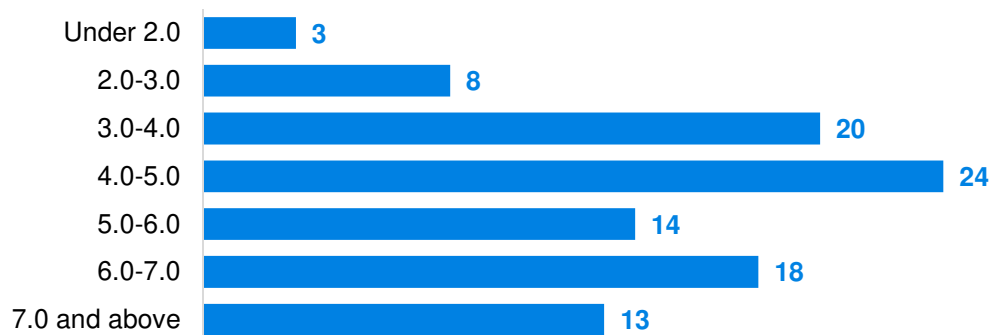
Identification: In 2018-19, the plan had negative cash flow, with town and member contributions to the plan of \$886,778 compared to \$1,733,802 of benefit payments and administrative expenses paid out of the plan. We suggest that you consult with your investment advisors with respect to the liquidity characteristics of the plan's investment holdings.

Maturity Risk

Definition: This is the potential for total plan liabilities to become more heavily weighted toward inactive liabilities over time, and for plan assets and/or liabilities to become larger relative to the active member liability.

Identification: The plan is subject to maturity risk because as plan assets and liabilities continue to grow, the dollar impact of any gains or losses on the assets or liabilities also becomes larger.

Assessment: As of July 1, 2019, the plan's Asset Volatility Ratio (the ratio of the market value of plan assets to payroll) is 3.5. According to Milliman's 2018 Public Pension Funding Study, the 100 largest US public pension plans have the following range of Asset Volatility Ratios:



Inflation Risk

Definition: This is the potential for a pension to lose purchasing power over time due to inflation.

Identification: The members of pension plans without fully inflation-indexed benefits are subject to the risk that their purchasing power will be reduced over time due to inflation.

Assessment: This plan does not contain a mechanism to regularly increase benefits after retirement, so members bear all of the inflation risk.

Section V - Analysis of Risk

B. Risk Identification and Assessment

Insolvency Risk

Definition: This is the potential that a plan will become insolvent; that is, assets will be fully depleted.

Identification: If a plan becomes insolvent, contractually required benefits must be paid from the plan sponsor's other remaining assets.

Assessment: Under the GASB 68 depletion date methodology, if current funding levels are maintained the plan is projected to become insolvent in 35-40 years. Please see the June 30, 2019 GASB 68 report for more details on the underlying analysis.

Demographic Risks

Definition: This is the potential that mortality, turnover, retirement, or other demographic experience will be different than expected.

Identification: The pension liabilities reported herein have been calculated by assuming that members will follow patterns of demographic experience as described in Appendix B. If actual demographic experience or future demographic assumptions are different from what is assumed to occur in this valuation, future pension liabilities, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. Formal Experience Studies performed on a regular basis are helpful in ensuring that the demographic assumptions reflect emerging plan experience.

Retirement Risk

Definition: This is the potential for members to retire and receive subsidized benefits that are more valuable than expected.

Identification: This plan permits members to retire with unreduced benefits at relatively young ages. If members retire at earlier ages than are anticipated by the actuarial assumptions, this will put upward pressure on subsequent Actuarially Determined Contributions.

Pensionable Earnings Risk

Definition: This is the potential for active members to add items to their pensionable earnings and receive pension benefits that are higher than expected.

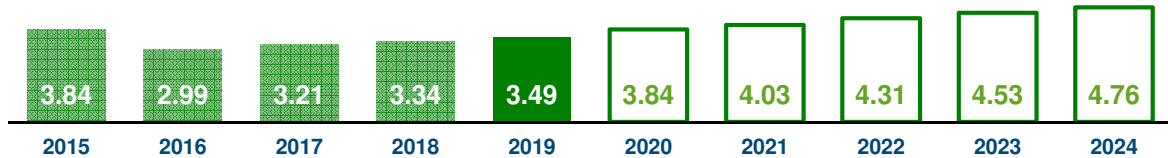
Identification: Benefits provided by this plan are calculated using base pay; overtime pay is excluded. This plan therefore does not run the risk that benefits will be unexpectedly high due to unusual amounts of overtime worked just prior to retirement.

Section V - Analysis of Risk

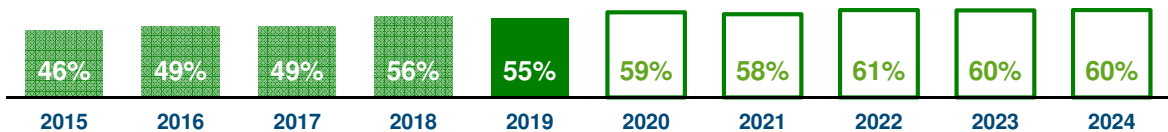
C. Maturity Measures

The metrics presented below are different ways of understanding the plan's maturity level, both in the past and as it is expected to change in the coming years.

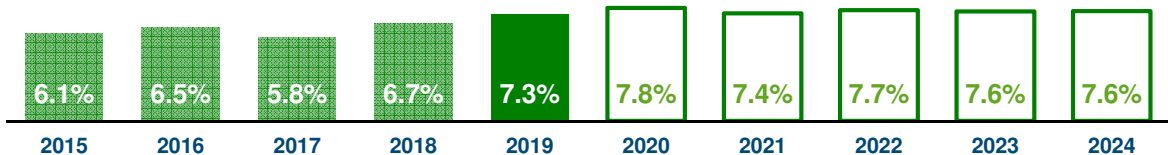
Asset Volatility Ratio: Market Value of Assets compared to Payroll



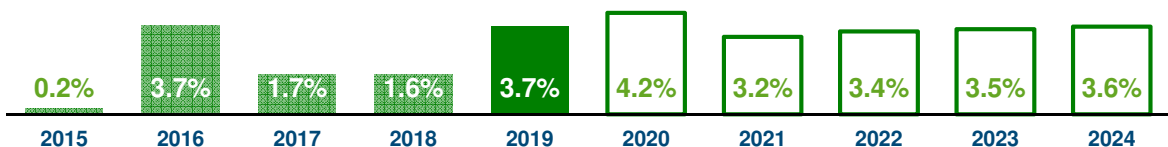
Accrued Liability for members in pay status compared to total Accrued Liability



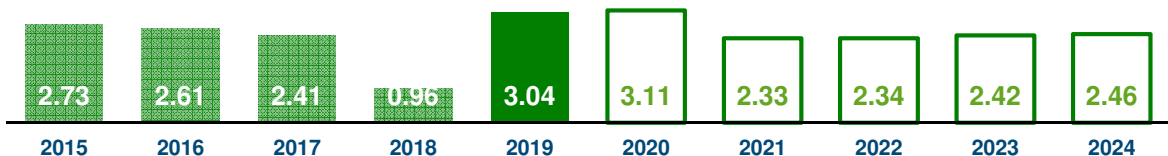
Benefit Payments compared to Market Value of Assets



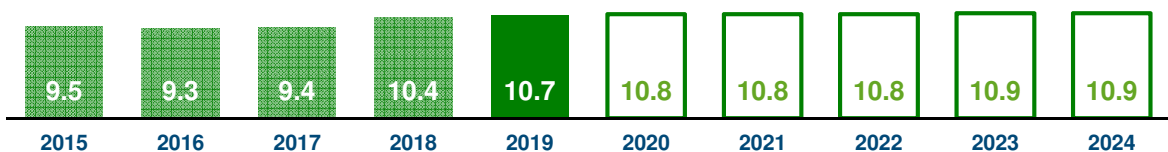
Net Cash Flows compared to Market Value of Assets



Benefit Payments compared to Town Contributions



Duration of Accrued Liability (based on GASB 68 sensitivity disclosures)



Appendix A - Actuarial Funding Method

The actuarial funding method used in the valuation of this Plan is known as the Entry Age Normal Method. The Actuarially Determined Contribution consists of three pieces: Normal Cost plus a Past Service Cost payment to gradually eliminate the Unfunded Accrued Liability plus Interest to reflect the timing of the contribution relative to the valuation date.

The Normal Cost is determined by calculating the present value of future benefits for present active Members that will become payable as the result of death, disability, retirement or termination. This cost is then spread as a level percentage of earnings from entry age to termination as an Active Member. If Normal Costs had been paid at this level for all prior years, a fund would have accumulated. Because this fund represents the portion of benefits that would have been funded to date, it is termed the Accrued Liability. In fact, it is calculated by adding the present value of benefits for Retired Members and Terminated Vested Members to the present value of benefits for Active Members and subtracting the present value of future Normal Cost contributions.

The funding cost of the Plan is derived by making certain specific assumptions as to rates of interest, mortality, turnover, etc. which are assumed to hold for many years into the future. Since actual experience may differ somewhat from the assumptions, the costs determined by the valuation must be regarded as estimates of the true costs of the Plan.

The Unfunded Accrued Liability is the excess of the Accrued Liability over the assets which have been accumulated for the plan. This Unfunded Accrued Liability is amortized as a level percent over a closed 20 year period starting July 1, 2019. The amortization period will decrease each year until it reaches 10 years, after which time it will remain at 10 years.

The Actuarial Value of Assets is determined by recognizing market gains and losses non-asymptotically over a five year period.

The long-range forecasts included in this report have been developed by assuming that members will terminate, retire, become disabled, and die according to the actuarial assumptions with respect to these causes of decrement, and that pay increases, cost of living adjustments, and so forth will likewise occur according to the actuarial assumptions. For those unions whose new employees are eligible to participate in this plan, members who are projected to leave active employment are assumed to be replaced by new active members with the same age, service, gender, and pay characteristics as those hired in the past few years.

Appendix B - Actuarial Assumptions

Each of the assumptions used in this valuation was set based on industry standard published tables and data, the particular characteristics of the plan, relevant information from the plan sponsor or other sources about future expectations, and our professional judgment regarding future plan experience. We believe the assumptions are reasonable for the contingencies they are measuring, and are not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Interest Rate	7.125% (prior: 7.25%)	
Inflation	2.75%	
Amortization Growth Rate	3.00%	
Expenses	Prior year actual administrative expenses increased by 3% and rounded to the nearest \$100.	
Salary Scale	Age	Rate
	25	5.25%
	30	4.50%
	35	4.00%
	40	3.75%
	45	3.50%
	50	3.25%
	55	3.00%
	60+	2.75%
Turnover	Service	Rate
	0-5	8.00%
	6-9	4.00%
	10+	2.00%
Healthy Mortality	Pub-2010 Mortality Table for Employees and Healthy Annuitants with generational projection of future improvements in longevity per the MP Ultimate Scale. For Police, the PubS-2010 Mortality was used instead of the Pub-2010 Mortality Table. (prior: RP-2000 Combined Healthy Mortality Table, Male and Female, with generational projection of future mortality improvements per Scale AA.)	
Disabled Mortality	Pub-2010 Mortality Table for Disabled Annuitants with generational projection of future improvements in longevity per the MP Ultimate Scale. For Police, the PubS-2010 Mortality was used instead of the Pub-2010 Mortality Table. (prior: RP-2000 Disabled Life Mortality Table, Male and Female)	
Percent Married	All members are assumed to have an eligible spouse with females 3 years younger than males.	

Appendix B - Actuarial Assumptions

Retirement

Police: 100% are assumed to retire at the earlier of age 60 or the completion of 25 years of service.

All Others:	Age	Rate
	55	5%
	56-61	3%
	62	15%
	63-64	15%
	65	15%
	66-69	25%
	70+	100%

All members older than the latest assumed retirement age as of the valuation date are assumed to retire immediately.

Disability

Age	Police	All Others
25	0.13%	0.06%
30	0.19%	0.06%
35	0.28%	0.08%
40	0.41%	0.12%
45	0.63%	0.23%
50	1.02%	0.52%
55	1.74%	0.00%
60+	2.42%	0.00%

Appendix C - Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan. It is not intended to be, nor should it be interpreted as a complete statement of all plan provisions. All eligibility requirements and benefit amounts shall be determined in strict accordance with the plan document itself. To the extent that this summary does not accurately reflect the plan provisions, then the results of this valuation may not be accurate.

Eligibility	Any individual employed by the Town of Old Saybrook who has completed 6 months (12 months prior to January 1, 2008) of continued employment and who elects to make the necessary contributions. The contributions begin as of the date the participant enters the Plan. The individuals covered include those individuals employed by the Town of Old Saybrook, the Board of Education, and Police.
Employee Contributions	<p>5% of Earnings.</p> <p>No contributions will be required after 35 years of service or after Normal Retirement Date.</p> <p>Employee Contributions will be credited with interest at the rate of 5% per year.</p> <p>A refund of Employee Contributions with interest to the date of termination of employment or death is paid, unless the employee is eligible for a deferred retirement benefit.</p>
Credited Service	Whole years and full months from date of hire and while contributing, else from date of participation, but not greater than 35 years.
Final Average Earnings	Highest average base earnings received in any 3 years.
Normal Retirement Date	<p>Police - The earlier of age 60 or 25 years of Credited Service.</p> <p>All Others - The earlier of age 62 or 5 years of Credited Service.</p>
Normal Retirement Benefit	<p>Police - 2% of Final Average Earnings multiplied by Credited Service up to 35 years. If completes less than 25 years of Credited Service, benefit is based on 2% between age 60 to age 62 and then 1½% after age 62.</p> <p>All Others - 1½% of Final Average Earnings multiplied by Credited Service prior to July 1, 1988 plus 2% of Final Average Earnings multiplied by Credited Service after July 1, 1988. Total Credited Service is limited to 35 years with service after July 1, 1988 counted first.</p>

Appendix C - Summary of Plan Provisions

Early Retirement Date	The later of age 55 and the completion of 15 years of Credited Service.
Early Retirement Benefit	Benefit is based on Credited Service and Final Average Earnings to actual retirement date reduced by 6% for each year by which Early Retirement Date precedes Normal Retirement Date.
Deferred Retirement Date	Members may continue to work beyond Normal Retirement.
Deferred Retirement Benefit	Benefit based on Credited Service and Final Average Earnings to actual date of retirement.
Normal Form of Annuity	Modified Cash Refund.
Preretirement Death Benefit	A monthly survivor benefit payable on behalf of a member who has attained age 55 and completed 15 years of Credited Service, and who has a surviving spouse to whom the member has been married at least one year. The benefit will be 50% of the monthly retirement benefit which such member would have received had he or she retired on the day before death and elected a 50% Joint & Survivor Annuity.
Disability Eligibility	Police - 5 years of Credited Service. All Others - 15 years of Credited Service.
Disability Benefit	Benefit calculated using Credited Service and Final Average Earnings through Date of Disability, reduced by any payments received under the Worker's Compensation Act.
Vesting	A member is 100% vested after 10 years of Credited Service or upon attainment of Normal Retirement.
Termination Benefit	Normal Retirement Benefit calculated using Credited Service and Final Average Earnings through Date of Termination. All benefits are forfeited upon withdrawal of Employee Contributions.

Appendix D - Glossary

Actuarial Cost Method - This is a procedure for determining the Actuarial Present Value of Benefits and allocating it to time periods to produce the Actuarial Accrued Liability and the Normal Cost.

Accrued Liability - This is the portion of the Actuarial Present Value of Benefits attributable to periods prior to the valuation date by the Actuarial Cost Method (i.e., that portion not provided by future Normal Costs).

Actuarial Assumptions - With any valuation of future benefits, assumptions of anticipated future events are required. If actual events differ from the assumptions made, the actual cost of the plan will vary as well. Some examples of key assumptions include the interest rate, salary scale, and rates of mortality, turnover and retirement.

Actuarial Present Value of Benefits - This is the present value, as of the valuation date, of future payments for benefits and expenses under the Plan, where each payment is: a) multiplied by the probability of the event occurring on which the payment is conditioned, such as the probability of survival, death, disability, termination of employment, etc.; and b) discounted at the assumed interest rate.

Actuarial Value of Assets - This is the value of cash, investments and other property belonging to the plan, typically adjusted to recognize investment gains or losses over a period of years to dampen the impact of market volatility on the Actuarially Determined Contribution.

Actuarially Determined Contribution ("ADC") - This is the employer's periodic contributions to a defined benefit plan, calculated in accordance with actuarial standards of practice.

Attribution Period - The period of an employee's service to which the expected benefit obligation for that employee is assigned. The beginning of the attribution period is the employee's date of hire and costs are spread across all employment.

Interest Rate - This is the long-term expected rate of return on any investments set aside to pay for the benefits. In a financial reporting context (e.g., GASB 68) this is termed the Discount Rate.

Normal Cost - This is the portion of the Actuarial Present Value of Benefits allocated to a valuation year by the Actuarial Cost Method.

Past Service Cost - This is a catch-up payment to fund the Unfunded Accrued Liability over time (generally 10 to 30 years). A closed amortization period is a specific number of years counted from one date and reducing to zero with the passage of time; an open amortization period is one that begins again or is recalculated at each valuation date. Also known as the Amortization Payment.

Return on Plan Assets - This is the actual investment return on plan assets during the fiscal year.

Unfunded Accrued Liability - This is the excess of the Accrued Liability over the Actuarial Value of Assets.