

TOWN OF COLCHESTER POLICE PENSION PLAN

ACTUARIAL VALUATION REPORT

JULY 1, 2018





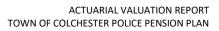


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Report Prepared By:

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Executive Summary

	July 1, 2018	July 1, 2016
Number of members		
Active employees	9	9
Terminated vested members	0	0
Retired, disabled and beneficiaries	0	0
Total	9	9
Covered employee payroll	705,453	695,499
Average plan salary	78,384	77,278
Actuarial present value of future benefits	4,540,847	4,161,332
Actuarial accrued liability	2,822,621	2,190,206
Plan assets		
Market value of assets	2,373,914	1,655,492
Actuarial value of assets	2,441,838	1,799,632
Unfunded accrued liability	380,783	390,574
Funded ratio	86.5%	82.2%
Actuarially determined employer contribution (ADEC)		
Fiscal year ending	2020	2018
ADEC	147,856	145,300
Fiscal year ending	2021	2019
ADEC	150,425	149,560



Valuation Results and Highlights

Purpose of the Valuation

The purpose of the valuation is to develop the Actuarially Determined Employer Contribution (ADEC).

The ultimate cost of a pension plan is based primarily on the level of benefits promised by the plan. The pension fund's investment earnings serve to reduce the cost of plan benefits and expenses. Thus,

Ultimate cost = Benefits Paid + Expenses Incurred – Investment Return – Employee Contributions

The actuarial cost method distributes this ultimate cost over the working lifetime of current plan participants. By means of this budgeting process, costs are allocated to both past and future years, and a cost is assigned to the current year. The current year's allocated cost, or normal cost, is the building block upon which the actuarially determined employer contribution is developed. The July 1, 2018 valuation produces the contributions for the fiscal years ending 2020 and 2021.

Information Available in the Valuation Report

The Executive Summary is intended to emphasize the notable results of the valuation from the perspective of the Plan Sponsor. Supporting technical detail is documented in Results of the Valuation, Supporting Exhibits and Description of Actuarial Methods and Assumptions. A concise summary of the principal provisions of the Plan is outlined in Summary of Plan Provisions.

Changes Reflected in the Valuation

This valuation reflects updates to the inflation and salary scale assumptions, as well as an update to the mortality improvement assumption. The impact of these changes is to reduce the Fiscal 2020 Actuarially Determined Employer Contribution (ADEC) by approximately \$10,000.

Cash Contribution for Fiscal Years Ending 2020 and 2021

The Town cost is:	2020 Fiscal Year	2021 Fiscal Year
	\$147,856	\$150,425

Liability Experience During Period Under Review

The plan experienced a net actuarial gain on liabilities of \$47,826 since the prior valuation.

Asset Experience During Period Under Review

	2017 Fiscal Year	2018 Fiscal Year
Market Value Basis	9.5%	5.3%
Actuarial Value Basis	4.8%	5.0%

The Actuarial Value of assets, rather than the Market Value, is used to determine plan contributions. The Actuarial Value spreads the asset volatility over 5 years, thereby smoothing out fluctuations that are inherent in the Market Value.



Certification

This report presents the results of the July 1, 2018 Actuarial Valuation for Town of Colchester Police Pension Plan (the Plan) for the purpose of estimating the funded status of the Plan and determining the Actuarially Determined Employer Contribution (ADEC) for the fiscal years ending June 30, 2020 and June 30, 2021. This report is intended to satisfy the requirements of Connecticut General Statute 7-450a. This report may not be appropriate for any other purpose.

The valuation has been performed in accordance with generally accepted actuarial principles and practices. It is intended to comply with all applicable Actuarial Standards of Practice.

I certify that the actuarial assumptions and methods that were selected by me and represent my best estimate of anticipated actuarial experience under the Plan.

In preparing this valuation, I have relied on employee data provided by the Plan Sponsor, and on asset and contribution information provided by the Trustee. I have audited neither the employee data nor the financial information, although I have reviewed them for reasonableness.

The results in this valuation report are based on the Plan as summarized in the *Summary of Plan Provisions* section of this report and the actuarial assumptions and methods detailed in the *Description of Actuarial Methods and Assumptions* section of this report.

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 this report, an analysis of the potential range of such future measurements has not been performed.

I have no relationship with the employer or the Plan that would impair, or appear to impair, my objectivity in performing the work presented in this report. I am a member of the American Academy of Actuaries and meet its Qualification Standards to render the actuarial opinion contained herein.

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Steve A. Lemanski, FSA, FCA, MAAA Enrolled Actuary 17-05506

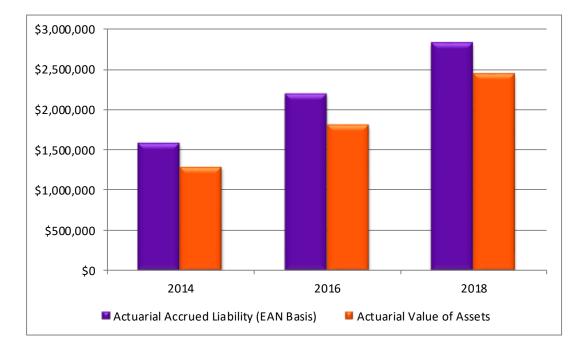
November 1, 2018



	July 1, 2018	July 1, 2016
Actuarial accrued liability for inactive members		
Retired, disabled and beneficiaries	\$0	\$0
Terminated vested members	0	0
Total	0	0
Actuarial accrued liability for active employees	2,822,621	2,190,206
Total actuarial accrued liability	2,822,621	2,190,206
Actuarial value of assets	2,441,838	1,799,632
Unfunded accrued liability	380,783	390,574
Funded ratio	86.5%	82.2%

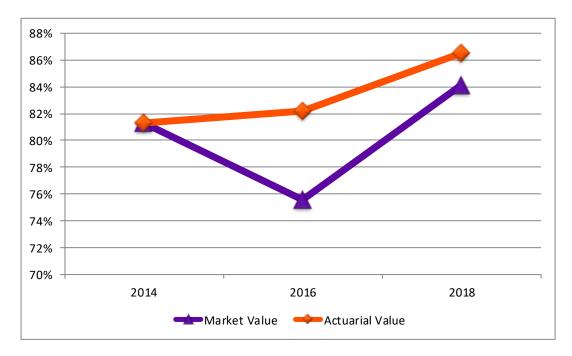
Development of Unfunded Accrued Liability and Funded Ratio





Actuarial Accrued Liability vs. Actuarial Value of Assets

Funded Ratio





Determination of Normal Cost and Actuarially Determined Employer Contribution

	July 1, 2018		July 1, 2	016
		Percent		Percent
	Cost	of payroll	Cost	of payroll
Gross normal cost	\$184,670	25.2%	\$179,785	27.0%
Estimated employee contributions	(91,609)	-12.5%	(86,937)	-13.1%
Town's normal cost	93,061	12.7%	92,848	14.0%
Amortization of unfunded accrued liability	47,458	6.5%	43,675	6.5%
Contribution before adjustment as of the valuation date	140,519	19.2%	136,523	20.5%
Estimated valuation year payroll for actives not yet at 100% assumed retirement age	732,871		665,300	
Fiscal year ending	2020		2018	
Adjustment for interest and inflation	7,337		8,777	
Actuarially determined employer contribution	147,856		145,300	
Fiscal year ending	2021		2019	
Adjustment for interest and inflation	2,569		4,260	
Actuarially determined employer contribution	150,425		149,560	



Determination of Actuarial Gain/Loss

The Actuarial Gain/Loss is the difference between the expected unfunded accrued liability and the actual unfunded accrued liability, without regard to any changes in actuarial methods, actuarial assumptions or plan provisions. This can also be referred to an Experience Gain/Loss, since it reflects the difference between what was expected and what was actually experienced.

Actuarial Gain / Loss		
Expected unfunded accrued liability July 1, 2018		
Expected unfunded accrued liability July 1, 2017		
Unfunded accrued liability July 1, 2016	\$390,574	
Gross normal cost July 1, 2016	179,785	
Town and employee contributions for 2016-2017	(206,956)	
Interest at 7.00% to July 1, 2017	32,315	
Expected unfunded accrued liability July 1, 2017	395,718	
Expected unfunded accrued liability July 1, 2018		
Expected unfunded accrued liability July 1, 2017	395,718	
Expected gross normal cost July 1, 2017	187,426	
Town and employee contributions for 2017-2018	(230,685)	
Interest at 7.00% to July 1, 2018	32,171	
Expected unfunded accrued liability July 1, 2018	384,630	
Actuarial (gain) / loss July 1, 2018	36,769	
Actual unfunded accrued liability July 1, 2018, prior to plan provision, assumption and method changes		421,399
Sources of (gain) / loss		
Assets	84,595	
Liabilities	(47,826)	
Total (gain) / loss	36,769	
Assumption and method changes since prior valuation	-	(40,616)
Actual unfunded accrued liability July 1, 2018, after plan provision, assumption and method changes		380,783

Summary of Fund Activity				
	Market Value	Actuarial Value		
1. Beginning value of assets July 1, 2017				
Trust assets	\$2,029,506	\$2,098,959		
2. Contributions				
Town contributions during year	142,578	142,578		
Employee contributions during year	88,107	88,107		
Total for plan year	230,685	230,685		
3. Disbursements				
Benefit payments during year	0	0		
Administrative expenses during year	0	0		
Total for plan year	0	0		
4. Net investment return				
Interest and dividends	113,723	N/A		
Realized and unrealized gain / (loss)	0	N/A		
Expected return	N/A	150,715		
Recognized gain / (loss)	N/A	(38,521)		
Required adjustment due to corridor	N/A	0		
Reversal of prior year required adjustment	N/A	0		
Investment-related expenses	0	N/A		
Total for plan year	113,723	112,194		
5. Ending value of assets July 1, 2018				
Trust assets: (1) + (2) - (3) + (4)	2,373,914	2,441,838		
6. Approximate rate of return	5.3%	5.0%		



Relationship of Actuarial Value to Market Value	
1. Market value 7/1/2018	\$2,373,914
2. Gain / (loss) not recognized in actuarial value 7/1/2018	(67,924)
3. Preliminary actuarial value 7/1/2018: (1) - (2)	2,441,838
4. Preliminary actuarial value as a percentage of market value: (3) ÷ (1)	102.9%
5. Gain / (loss) recognized for corridor minimum / maximum	N/A
6. Actuarial value 7/1/2018 after corridor minimum / maximum: (3) + (5)	2,441,838
7. Actuarial value as a percentage of market value: (6) \div (1)	102.9%

Development of Market Value Gain / Loss for 2017-2018 Plan Year			
1. Market value 7/1/2017	\$2,029,506		
2. Town contributions	142,578		
3. Employee contributions	88,107		
4. Benefit payments	0		
5. Administrative expenses	0		
6. Expected return at 7.00%	150,715		
7. Expected value 7/1/2018: (1) + (2) + (3) - (4) - (5) + (6)	2,410,906		
8. Market value 7/1/2018	2,373,914		
9. Market value gain / (loss) for 2017-2018 plan year: (8) - (7)	(36,992)		

Recognition of Gain / Loss in Actuarial Value					
	(a)	(b) Total recognized	(c) Recognized in current year:	(d) Total recognized as of 7/1/2018:	(e) Not recognized as of 7/1/2018:
Year	Gain / (loss)	as of 7/1/2017	20% of (a)	(b) + (c)	(a) - (d)
2013-2014	\$0	\$0	\$0	\$0	\$0
2014-2015	(76,004)	(45,603)	(15,201)	(60,804)	(15,200)
2015-2016	(123,173)	(49,270)	(24,635)	(73,905)	(49,268)
2016-2017	43,564	8,713	8,713	17,426	26,138
2017-2018	(36,992)	0	(7,398)	(7,398)	(29,594)
Total			(38,521)		(67,924)

Summary of Fund Activity			
	Market Value	Actuarial Value	
1. Beginning value of assets July 1, 2016			
Trust assets	\$1,655,492	\$1,799,632	
2. Contributions			
Town contributions during year	121,754	121,754	
Employee contributions during year	85,202	85,202	
Total for plan year	206,956	206,956	
3. Disbursements			
Benefit payments during year	0	0	
Administrative expenses during year	0	0	
Total for plan year	0	0	
4. Net investment return			
Interest and dividends	167,058	N/A	
Realized and unrealized gain / (loss)	0	N/A	
Expected return	N/A	123,494	
Recognized gain / (loss)	N/A	(31,123)	
Required adjustment due to corridor	N/A	0	
Reversal of prior year required adjustment	N/A	0	
Investment-related expenses	0	N/A	
Total for plan year	167,058	92,371	
5. Ending value of assets July 1, 2017			
Trust assets: (1) + (2) - (3) + (4)	2,029,506	2,098,959	
6. Approximate rate of return	9.5%	4.8%	



Relationship of Actuarial Value to Market Value				
1. Market value 7/1/2017	\$2,029,506			
2. Gain / (loss) not recognized in actuarial value 7/1/2017	(69,453)			
3. Preliminary actuarial value 7/1/2017: (1) - (2)	2,098,959			
4. Preliminary actuarial value as a percentage of market value: (3) \div (1)	103.4%			
5. Gain / (loss) recognized for corridor minimum / maximum	N/A			
6. Actuarial value 7/1/2017 after corridor minimum / maximum: (3) + (5)	2,098,959			
7. Actuarial value as a percentage of market value: (6) ÷ (1)	103.4%			

Development of Market Value Gain / Loss for 2016-2017 Plan Year				
1. Market value 7/1/2016	\$1,655,492			
2. Town contributions	121,754			
3. Employee contributions	85,202			
4. Benefit payments	0			
5. Administrative expenses	0			
6. Expected return at 7.00%	123,494			
7. Expected value 7/1/2017: (1) + (2) + (3) - (4) - (5) + (6)	1,985,942			
8. Market value 7/1/2017	2,029,506			
9. Market value gain / (loss) for 2016-2017 plan year: (8) - (7)	43,564			

Recognition of Gain / Loss in Actuarial Value						
Year	(a) Gain / (loss)	(b) Total recognized as of 7/1/2016	(c) Recognized in current year: 20% of (a)	(d) Total recognized as of 7/1/2017: (b) + (c)	(e) Not recognized as of 7/1/2017: (a) - (d)	
2012-2013		\$0	\$0	\$0	(d) (d) \$0	
2013-2014	0	0	0	0	0	
2014-2015	(76,004)	(30,402)	(15,201)	(45,603)	(30,401)	
2015-2016	(123,173)	(24,635)	(24,635)	(49,270)	(73,903)	
2016-2017	43,564	0	8,713	8,713	34,851	
Total			(31,123)		(69,453)	



Rate of Return on Market Value of Assets					
Period Ending	Avera	Average Annual Effective Rate of Return			
June 30	1 Year	3 Years	5 Years	10 Years	
2009	N/A	N/A	N/A	N/A	
2010	N/A	N/A	N/A	N/A	
2011	N/A	N/A	N/A	N/A	
2012	N/A	N/A	N/A	N/A	
2013	N/A	N/A	N/A	N/A	
2014	N/A	N/A	N/A	N/A	
2015	1.9%	N/A	N/A	N/A	
2016	-0.4%	N/A	N/A	N/A	
2017	9.5%	3.6%	N/A	N/A	
2018	5.3%	4.7%	N/A	N/A	

Rate of Return on Actuarial Value of Assets					
Period Ending	Avera	Average Annual Effective Rate of Return			
June 30	1 Year	3 Years	5 Years	10 Years	
2009	N/A	N/A	N/A	N/A	
2010	N/A	N/A	N/A	N/A	
2011	N/A	N/A	N/A	N/A	
2012	N/A	N/A	N/A	N/A	
2013	N/A	N/A	N/A	N/A	
2014	N/A	N/A	N/A	N/A	
2015	6.4%	N/A	N/A	N/A	
2016	4.8%	N/A	N/A	N/A	
2017	4.8%	5.3%	N/A	N/A	
2018	5.0%	4.9%	N/A	N/A	





Actual Rate of Return on Assets



Target Allocation and Expected Rate of Return July 1, 2018

	Target	Long-Term Expected Real	
Asset Class	Allocation	Rate of Return*	Weighting
Cash	4.00%	0.00%	0.00%
Equities	64.00%	5.25%	3.36%
Fixed Income	32.00%	2.00%	0.64%
	100.00%		4.00%
Long-Term Inflation Expectation			2.60%
Long-Term Expected Nominal Return			6.60%

*Long-Term Returns are provided by HHIA. The returns are geometric means.

The long-term expected rate of return on pension plan investments was determined using a building block method in which best-estimate ranges of expected future real rates of return are developed. Best estimates of the real rates of return for each major asset class are included in the pension plan's target asset allocation.

The information above is based on geometric means and does not reflect additional returns through investment selection, asset allocation and rebalancing. The results support a rate between 6.50% and 7.00%. An expected rate of return of 7.00% was used.



Amortization of Unfunded Liability

Schedule of Amortization Bases				
	Date established	Amortization installment	Years remaining	Present value of remaining installments as of July 1, 2018
2018 base	July 1, 2018	47,458	11	380,783



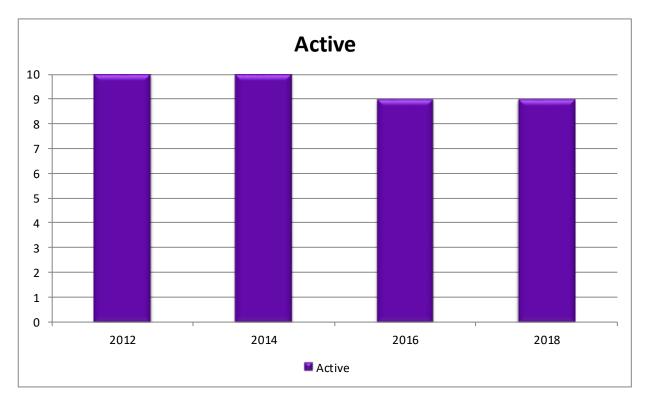
Member Data

The data reported by the Plan Sponsor for this valuation includes 9 active employees who met the Plan's minimum age and service requirements as of July 1, 2018.

Member Data					
	Active	Terminated vested	Members in pay status	Total	
Total members July 1, 2016	9	0	0	9	
Adjustments	0	0	0	0	
Retirements	0	0	0	0	
Disabilities	0	N/A	0	0	
Terminations					
Vested	0	0	N/A	0	
Lump sum payments	0	0	N/A	0	
Due contributions only	0	N/A	N/A	0	
Deaths					
With death benefit	0	0	0	0	
Without death benefit	0	0	0	0	
Transfers	0	0	N/A	0	
Rehires	0	0	N/A	0	
New beneficiaries	N/A	N/A	0	0	
New entrants	0	N/A	N/A	0	
Total members July 1, 2018	9	0	0	9	



Member Counts by Status





Member Data				
	Active	Terminated vested	Members in pay status	
Average age				
July 1, 2016	37.5	N/A	N/A	
July 1, 2018	39.5	N/A	N/A	
Average service				
July 1, 2016	12.0	N/A	N/A	
July 1, 2018	14.0	N/A	N/A	
Covered employee payroll				
July 1, 2016	\$695,499	N/A	N/A	
July 1, 2018	705,453	N/A	N/A	
Total annual benefits				
July 1, 2016	N/A	N/A	N/A	
July 1, 2018	N/A	N/A	N/A	



Description of Actuarial Methods

Asset Valuation Method

The Actuarial Value of assets used in the development of plan contributions phases in the recognition of differences between the actual return on Market Value and expected return on Market Value over a 5-year period at 20% per year. The Actuarial Value is adjusted, if necessary, to be within the range of 80% and 120% of the Market Value of assets.

Actuarial Cost Method

Changes in Actuarial Cost Method: None.

Description of Current Actuarial Cost Method: Entry Age Normal (level percentage of salary)

<u>Normal Cost</u>: Under this method, the total normal cost is the sum of amounts necessary to fund each active member's normal retirement benefit if paid annually from entry age to assumed retirement age. Entry age is the age at which the employee would have been first eligible for the plan, if it had always been in effect. The normal cost for each participant is expected to remain a level percentage of the employee's salary. The normal cost for the plan is the difference between the total normal cost for the year and the anticipated member contributions for that year.

<u>Past Service Liability</u>: The present value of future benefits that relates to service before the valuation date is the total past service liability. The unfunded past service liability is the difference between the total past service liability and any assets (including accumulated member contributions).

This amount is amortized over 11 years on a closed basis.

<u>Experience Gains and Losses</u>: All experience gains and losses (the financial effect of the difference between the actual experience during the prior period and the result expected by the actuarial assumptions for that prior period) appear directly in the past service liability and are amortized at the same rate the plan is amortizing the remaining unfunded past service liability.



Description of Actuarial Assumptions

Changes in Actuarial Assumptions

The valuation reflects changes in the actuarial assumptions listed below. (The assumptions used before and after these changes are more fully described in the next section.)

- Rate of Compensation increase (including inflation)
- Mortality
- Inflation

The assumptions indicated were changed to represent the Enrolled Actuary's current best estimate of anticipated experience of the plan.

Investment rate of return (net of investment-related and administrative expenses)

7.0%.

Rate of compensation increase

2.60% inflation plus Service Merit Scale.

Service	Rate
0	7.0%
1	6.0%
2	5.0%
3	4.5%
4	4.0%
5	3.5%
6	3.0%
7	2.5%
8	2.0%
9	1.5%
10-14	1.0%
<u>></u> 15	0.5%

(Prior: 2.75% inflation plus Service Merit Scale.)

The plan does not have statistically credible data on which to form a rate of compensation increase assumption. The assumption is based on input from the plan sponsor regarding future expectations, as well as knowledge that younger employees generally earn higher annual percentage increases than older employees.

Inflation

2.60%. (Prior: 2.75%)

This assumption is consistent with the Social Security Administration's current best estimate of the ultimate long-term (75-year horizon) annual percentage increase in CPI, as published in the 2017 OASDI Trustees Report.



Mortality

RP-2014 Adjusted to 2006 Blue Collar Mortality Table projected to valuation date with Scale MP-2018.

(Prior: RP-2014 Adjusted to 2006 Blue Collar Mortality Table projected to valuation date with Scale MP-2016.

Mortality Improvement

Projected to date of decrement using Scale MP-2018 (generational).

(Prior: Projected to date of decrement using Scale MP-2016 (generational).

We have selected this mortality assumption because it is based on the latest published pension mortality study released by the Society of Actuaries. The group composition of the Plan is consistent with the collar adjustment selected. At least 70 percent of the plan participants are either hourly or union.

The mortality assumption was updated to better reflect actual experience. The change in assumption decreased liabilities by about 1.4%.

Retirement age

Service based table

Service	Rate
20	10%
21-23	5%
24	60%
25	30%
26	40%
27	70%
<u>></u> 28	100%

Retirement rates were based on rates used for plans with similar demographics and plan provisions. The plan does not have any experience upon which to base retirement rates.

Termination prior to retirement

None.

Administrative expenses

Plan expenses are assumed to be paid by the Town outside of the pension plan.



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. To the extent that this summary does not accurately reflect the plan provisions, then the results of this valuation may not be accurate.

Effective Date of Plan

July 1, 2005.

Eligibility for Retirement

20 years of service.

Vesting

10 years of service.

Service

For eligibility, vesting and benefit accrual, no service is granted before 7/1/1999.

Average Salary

Average of the 3 highest years of base salary.

Pension Benefit

2.5% times average salary times years of service with a maximum pension of 60% of average salary.

Employee Contributions

Employee will contribute 12.5% of pay.

Post-retirement COLA

2.5%.

Normal Form of Pension

Life annuity.