



CITY OF NORWICH VOLUNTEER FIREFIGHTERS' PENSION PLAN

ACTUARIAL VALUATION REPORT

JANUARY 1, 2018





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## Executive Summary

	January 1, 2018	January 1, 2016
<b>Number of members</b>		
Active Volunteers	54	47
Terminated vested Volunteers	1	1
Volunteers with assumed Return of Contributions	73	81
Retired, disabled and beneficiaries	52	47
Total	180	176
<b>Covered employee payroll</b>	N/A	N/A
<b>Average plan salary</b>	N/A	N/A
<b>Actuarial present value of future benefits</b>	6,713,850	6,370,951
<b>Actuarial accrued liability</b>	6,210,023	5,877,178
<b>Plan assets</b>		
Market value of assets	2,771,076	2,308,178
Actuarial value of assets	2,771,076	2,308,178
<b>Unfunded accrued liability</b>	3,438,947	3,569,000
<b>Funded ratio</b>	44.6%	39.3%
<b>Actuarially determined employer contribution (ADEC)</b>		
Fiscal year ending	2019	2017
ADEC	365,469	373,322
Fiscal year ending	2020	2018
ADEC	365,469	373,322



## 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,

$$\text{Ultimate cost} = \text{Benefits Paid} + \text{Expenses Incurred} - \text{Investment Return} - \text{Employee Contributions}$$

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 January 1, 2018 valuation produces the contributions for the fiscal years ending 2019 and 2020.

### 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

The mortality assumption was changed to use the latest published pension mortality projection scale released by the Society of Actuaries.

### Cash Contribution for Fiscal Years Ending 2019 and 2020

The City cost is:	2019 Fiscal Year	2020 Fiscal Year
	\$365,469	\$365,469

### Liability Experience During Period Under Review

The plan experienced a net actuarial loss on liabilities of approximately \$95,000 since the prior valuation, mainly due to service purchases and additional benefit accruals for members in payment status, partially offset by gains due to mortality and other decrements.

### Asset Experience During Period Under Review

The plan's assets provided the following rates of return during the past two years:

	2016	2017
Market Value Basis	7.2%	14.4%

The Market Value of assets is used to determine plan contributions.



## Certification

This report presents the results of the January 1, 2018 Actuarial Valuation for City of Norwich Volunteer Firefighters' 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, 2019 and June 30, 2020. 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.

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

March 22, 2018

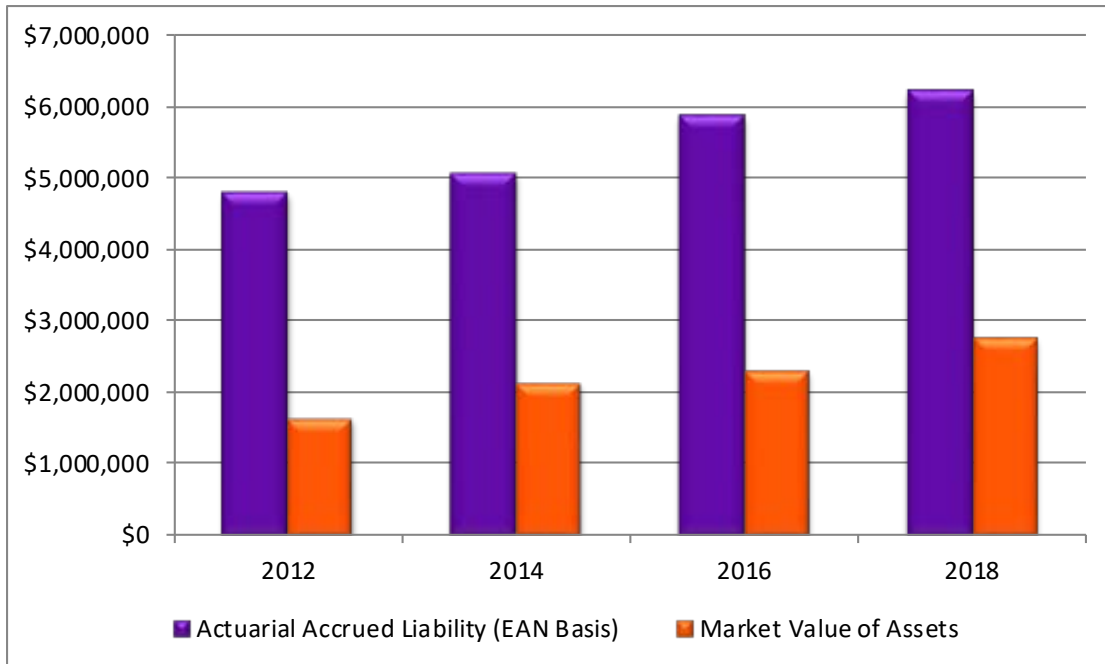


## Development of Unfunded Accrued Liability and Funded Ratio

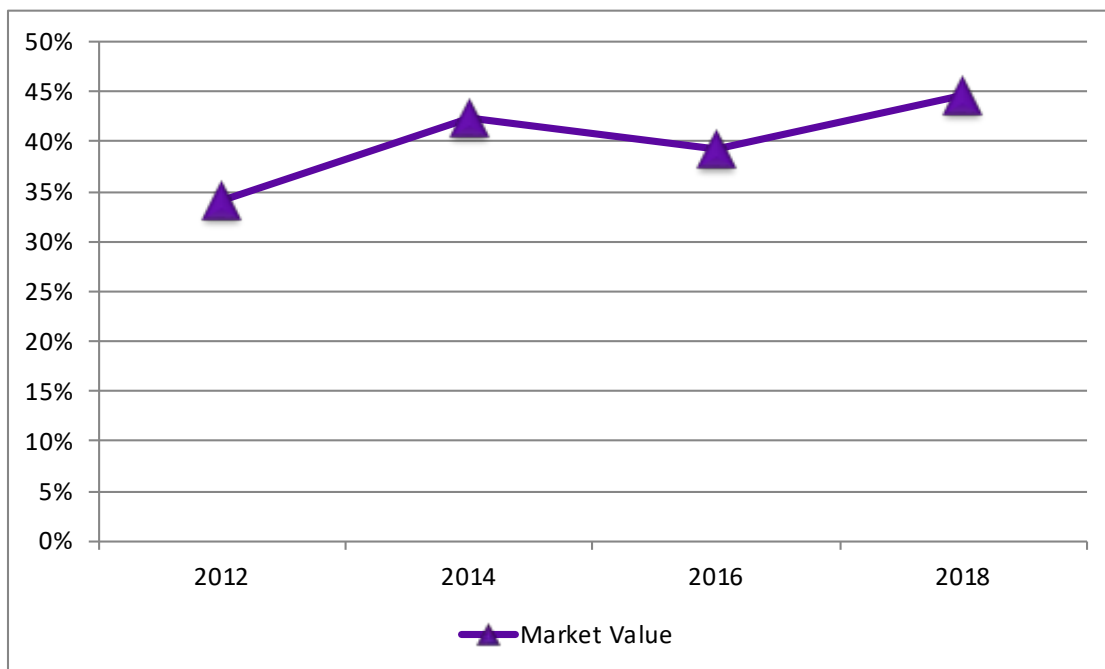
	January 1, 2018	January 1, 2016
Actuarial accrued liability for inactive Volunteers		
Retired, disabled and beneficiaries	\$3,598,844	\$3,179,570
Terminated vested Volunteers	43,798	112,228
Volunteers with assumed Return of Contributions	797,062	927,864
Total	4,439,704	4,219,662
Actuarial accrued liability for active Volunteers	1,770,319	1,657,516
Total actuarial accrued liability	6,210,023	5,877,178
Actuarial value of assets	2,771,076	2,308,178
Unfunded accrued liability	3,438,947	3,569,000
Funded ratio	44.6%	39.3%



### Actuarial Accrued Liability vs. Market Value of Assets



### Funded Ratio





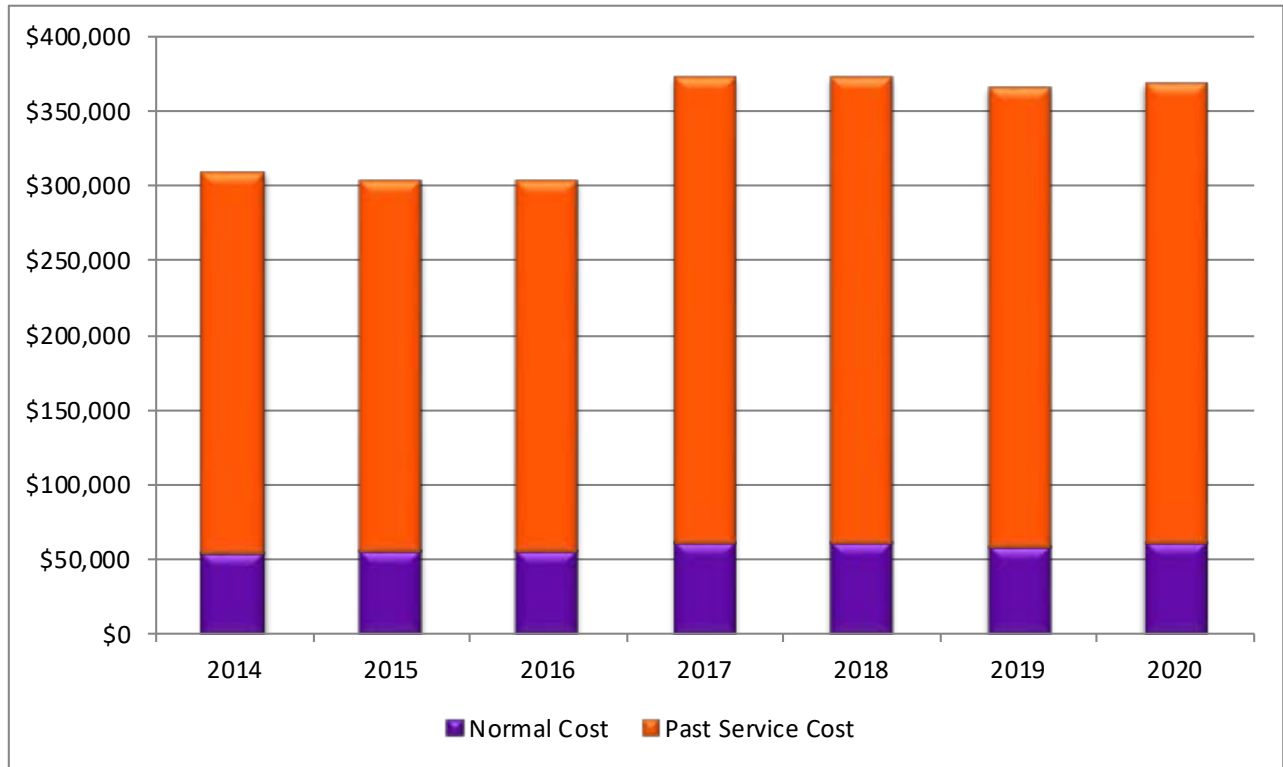
## Determination of Normal Cost and Actuarially Determined Employer Contribution

	January 1, 2018	January 1, 2016
Gross normal cost	\$64,004	\$65,405
Estimated Volunteer contributions	(14,256)	(12,408)
Estimated administrative expenses	<u>6,000</u>	<u>6,000</u>
City's normal cost	55,748	58,997
Amortization of unfunded accrued liability	<u>297,631</u>	<u>301,986</u>
Contribution before adjustment as of the valuation date	353,379	360,983
Fiscal year ending	2019	2017
Adjustment for interest and inflation	12,090	12,339
Actuarially determined employer contribution	365,469	373,322
Fiscal year ending	2020	2018
Adjustment for interest and inflation	0	0
Actuarially determined employer contribution	365,469	373,322





### Actuarially Determined Employer Contribution





## 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.

<b>Actuarial Gain / Loss</b>	
<b>Expected unfunded accrued liability January 1, 2018</b>	
Expected unfunded accrued liability January 1, 2017	
Unfunded accrued liability January 1, 2016	\$3,569,000
Gross normal cost January 1, 2016	71,405
City and employee contributions for 2016	(388,898)
Interest at 7.00% to January 1, 2017	<u>241,028</u>
Expected unfunded accrued liability January 1, 2017	3,492,535
Expected unfunded accrued liability January 1, 2018	
Expected unfunded accrued liability January 1, 2017	3,492,535
Expected gross normal cost January 1, 2017	73,367
City and employee contributions for 2017	(200,389)
Interest at 7.00% to January 1, 2018	<u>242,384</u>
Expected unfunded accrued liability January 1, 2018	3,607,897
<b>Actuarial (gain) / loss January 1, 2018</b>	<u>(94,026)</u>
<b>Actual unfunded accrued liability January 1, 2018, prior to plan provision, assumption and method changes</b>	3,513,871
<b>Sources of (gain) / loss</b>	
Assets	(189,561)
Liabilities	<u>95,535</u>
Total (gain) / loss	(94,026)
<b>Assumption and method changes since prior valuation</b>	<u>(74,924)</u>
<b>Actual unfunded accrued liability January 1, 2018, after plan provision, assumption and method changes</b>	3,438,947



## Development of Asset Values

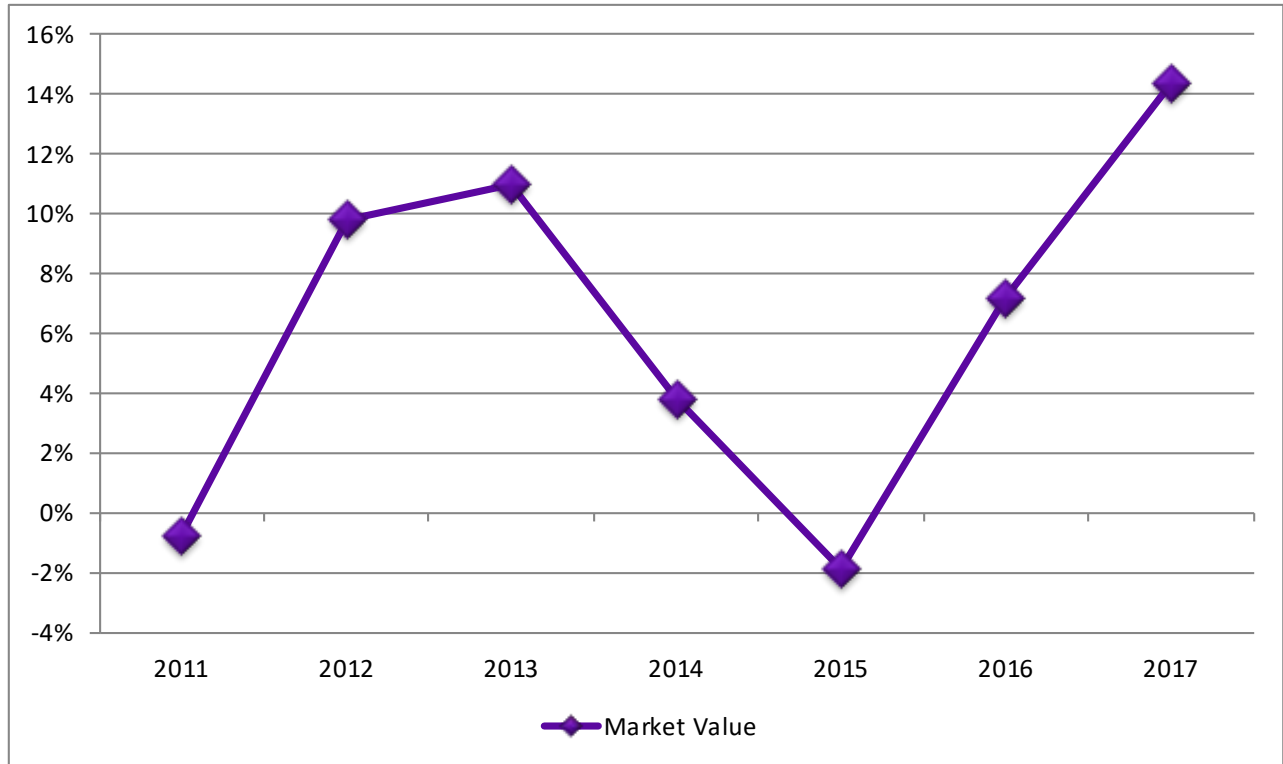
Summary of Fund Activity		
	January 1, 2016 - December 31, 2016	January 1, 2017 - December 31, 2017
<b>1. Beginning market value of assets</b>		
Trust assets	\$2,308,178	\$2,539,914
<b>2. Contributions</b>		
City contributions during year	373,322	186,661
Volunteer contributions during year	15,576	13,728
Total for plan year	388,898	200,389
<b>3. Disbursements</b>		
Benefit payments during year	315,690	324,928
Administrative expenses during year	9,224	0
Total for plan year	324,914	324,928
<b>4. Net investment return</b>		
Interest and dividends	90,193	105,809
Realized and unrealized gain / (loss)	86,962	258,386
Investment-related expenses	(9,403)	(8,494)
Total for plan year	167,752	355,701
<b>5. Ending market value of assets</b>		
Trust assets: (1) + (2) - (3) + (4)	2,539,914	2,771,076
<b>6. Approximate rate of return</b>	7.2%	14.4%



<b>Rate of Return on Market Value of Assets</b>				
<b>Period Ending December 31</b>	<b>Average Annual Effective Rate of Return</b>			
	<b>1 Year</b>	<b>3 Years</b>	<b>5 Years</b>	<b>10 Years</b>
2008	N/A	N/A	N/A	N/A
2009	N/A	N/A	N/A	N/A
2010	11.1%	N/A	N/A	N/A
2011	-0.8%	N/A	N/A	N/A
2012	9.8%	6.6%	N/A	N/A
2013	11.0%	6.5%	N/A	N/A
2014	3.8%	8.2%	6.9%	N/A
2015	-1.9%	4.2%	4.2%	N/A
2016	7.2%	3.0%	5.9%	N/A
2017	14.4%	6.3%	6.7%	N/A



### Actual Rate of Return on Assets





## Target Allocation and Expected Rate of Return January 1, 2018

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*	Weighting
Large Cap	26.00%	4.65%	1.21%
Mid/Small Cap	15.00%	5.50%	0.83%
International	21.00%	5.50%	1.16%
Intermediate Bond	34.00%	1.95%	0.66%
Short Term Bond/Cash	1.00%	0.00%	0.00%
Specialty / Alts	3.00%	5.00%	0.15%
	100.00%		4.01%
Long-Term Inflation Expectation			<u>2.75%</u>
Long-Term Expected Nominal Return			6.76%

*\*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 6.75% and 7.25%. 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 January 1, 2018
Initial base	January 1, 2014	\$252,006	21	\$2,921,763
2018 base	January 1, 2018	<u>45,625</u>	20	<u>517,184</u>
<b>Total</b>		297,631		3,438,947



## Member Data

The data reported by the Plan Sponsor for this valuation includes 54 active Volunteers who met the Plan's minimum age and service requirements as of January 1, 2018.

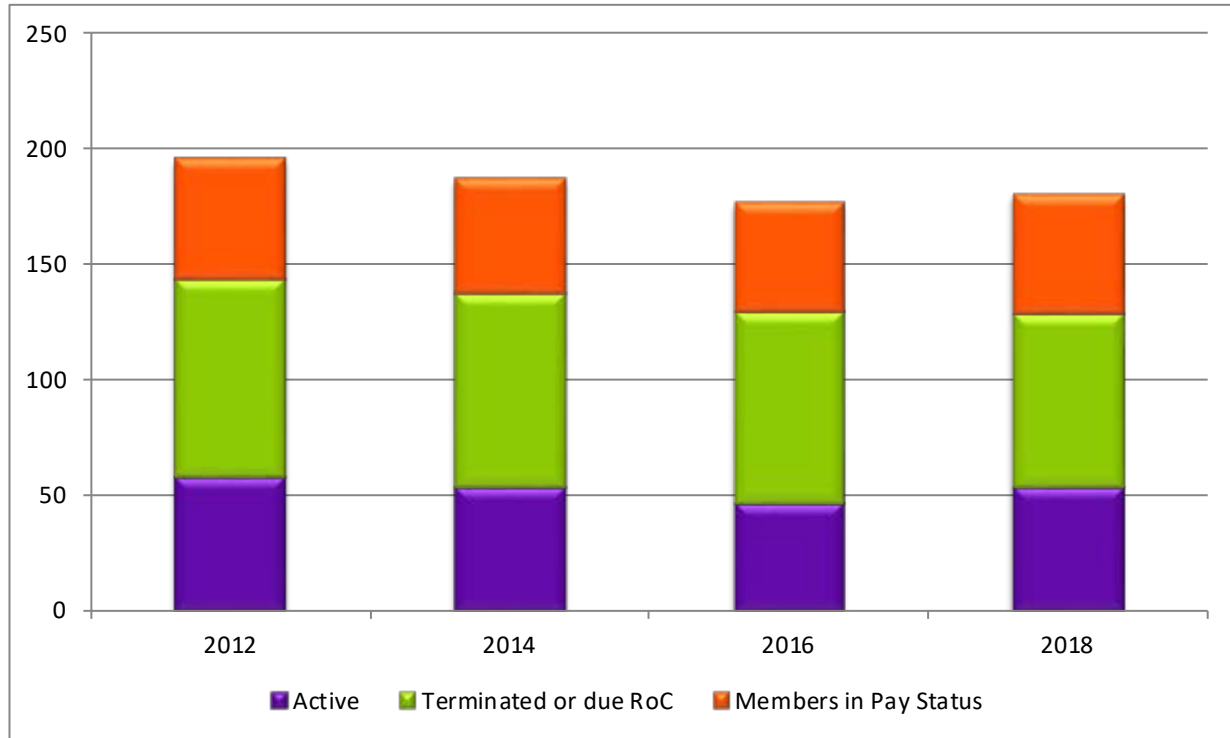
Member Data					
	Active	Terminated vested	Assumed return of contributions	Members in pay status	Total
<b>Total members January 1, 2016</b>	47	1	81	47	176
Adjustments	+6	0	-8	+2	0
Retirements	-2	-1	N/A	+3	0
Disabilities	0	N/A	N/A	0	0
Terminations					
Vested	-1	+1	N/A	N/A	0
Lump sum payments	-2	0	-1	N/A	-3
Due contributions only	-3	N/A	+3	N/A	0
Deaths					
With death benefit	0	0	0	0	0
Without death benefit	0	0	0	-1	-1
Transfers	0	0	0	N/A	0
Rehires	+2	0	-2	N/A	0
New beneficiaries	N/A	N/A	N/A	+1	+1
New entrants	+7	N/A	0	N/A	+7
<b>Total members January 1, 2018</b>	54	1	73	52*	180

\* Includes 2 alternate payees receiving benefits





### Member Counts by Status





<b>Member Data</b>				
	<b>Active</b>	<b>Terminated vested</b>	<b>Assumed return of contributions</b>	<b>Members in pay status</b>
<b>Average age</b>				
January 1, 2016	44.0	55.0	44.7	67.5
January 1, 2018	42.3	47.6	46.9	67.7
<b>Average service</b>				
January 1, 2016	14.5	N/A	N/A	N/A
January 1, 2018	14.5	N/A	N/A	N/A
<b>Total annual benefits</b>				
January 1, 2016	N/A	\$8,424	N/A	\$286,332
January 1, 2018	N/A	6,072	N/A	329,907



## Description of Actuarial Methods

### Asset Valuation Method

Plan Assets equal 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)

Normal Cost: 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.

Past Service Liability: 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).

Unfunded accrued liabilities as of July 1, 2014 were amortized over a closed 25-year period. Future changes in the unfunded accrued liability will be amortized separately, assuming a new 20-year amortization each valuation.

Experience Gains and Losses: 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.)

- Mortality

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

### Interest Return

7.0%.

### Inflation

2.75% (Prior: 3.0%)

This assumption is based on long term (1926-2013) historical inflation numbers. While near term averages have been lower, we do not believe this trend will continue indefinitely and expect that there will be a reversion to the long term average.

### Mortality

Current: RPH-2014 Adjusted to 2006 Blue Collar Mortality Table projected to valuation date with Scale MP-2017 (Total Dataset for beneficiaries).

Prior Valuation: RPH-2014 Adjusted to 2006 Blue Collar Mortality Table projected to valuation date with Scale MP-2015 (Total Dataset for beneficiaries).

### Mortality Improvement

Current: Projected to date of decrement using Scale MP-2017 (generational mortality).

Prior: Projected to date of decrement using Scale MP-2015 (generational mortality).

We have selected this mortality assumption because it is based on the latest published pension mortality study released by the Society of Actuaries.

### Retirement Age

100% at Normal Retirement Date. Active participants who are past their Normal Retirement Date are assumed to retire immediately.



## Turnover

Volunteers who do not currently meet the Plan's eligibility requirements are excluded from the costs. In addition, termination rates based on the following scale are assumed:

Age	Rate
25	5.00%
35	2.50%
45	0.75%
55	0.00%

Proportionate rates apply to intermediate ages. The above turnover is applied to all active volunteers to reflect the impact of turnover on the plan costs.

## Rates of Disability Table Class 1

Age	Male	Female
25	.038%	.047%
35	.069%	.136%
45	.202%	.303%
55	.722%	.952%

The actuarial assumptions in regards to rates of decrement shown above are based on standard tables modified for certain plan features such as eligibility for full and early retirement where applicable and input from the plan sponsor. The plan does not have sufficient data on which to perform an experience study.

## Administrative Expenses

The estimate is based on actual expenses from the trust in past years.

## Death Benefits, Disability Benefits and Return of Contribution

Valued explicitly using the underlying Actuarial Cost Method.

## Percent of Active Employees Married

80% of males and 80% of females.

## Spouse's Age

Husbands are assumed to be 3 years older than wives.



## 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**

January 1, 1988, Amended as of January 1, 2011 and January 1, 2015.

### **Eligibility**

Volunteers who have at least one year of service as of January 1, 1988 become eligible for membership on January 1, 1988.

Volunteers after January 1, 1987 shall become Members on the first of the year following completion of 12 months of continuous volunteer service.

### **Normal Retirement Date**

Hired before January 1, 2015: Age 55 with 20 years of Credited Service.

Hired on or after January 1, 2015: Age 55 with 25 years of Credited Service.

### **Normal Retirement Benefit**

Hired on or after January 1, 2015: \$22.00 per month multiplied by years of Credited Service to Normal Retirement Date maximized at 30 years (Hired before January 1, 2015: Credited Service is maximized at 40 years).

### **Deferred Retirement**

A member who is satisfactorily able to perform his duties may remain in active volunteer service after Normal Retirement Date. A member may begin to receive benefits at Normal Retirement Date even though he continues volunteer service; benefits will be adjusted annually to reflect the additional year of credit and to reflect any change in benefit level.

### **Form of Annuity**

90% Joint and Survivor Annuity.

### **Disability**

Totally and permanently disabled in the line of duty, benefit based on 30 years of service. (Hired before January 1, 2015: Benefit based on 40 years of service.)

### **Termination**

A refund of volunteer contributions with interest at 3%.

### **Pre-Retirement Death Benefits Spouse's Benefit**

Upon the death of an active Member who dies as a result of volunteer service to the City, his surviving spouse shall receive \$660 a month. A refund of volunteer contributions with interest shall be payable to a beneficiary if there is no surviving spouse.



### **Post-Retirement Death Benefits**

The surviving spouse shall receive (until death or remarriage) 90% of the pension the deceased member was receiving. If there is no surviving spouse, or the spouse dies or remarries payments shall be made to the then living children until they attain age 24.

### **Member's Contributions**

\$22.00 per month. No contributions after completion of 30 years of service. (Hired before January 1, 2015: No contributions after completion of 40 years of service.)