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TSW
Actuary

VILLAGE OF CARPENTERSVILLE

CARPENTERSVILLE POLICE PENSION FUND

Actuarial Valuation Report

For the Year

Beginning January 1, 2017

And Ending December 31, 2017

Timothy W. Sharpe, Actuary, Geneva, IL (630) 262-0600

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INTRODUCTION

Police-sworn personnel of the Village of Carpentersville are covered by the Police Pension Plan that is a defined-benefit, single-employer pension plan. The purpose of this report is to provide to the Intended Users of this report, specifically the Intended Users are the Village Officials, the Pension Board and the Village and Pension Board auditors, the reporting requirements of the Illinois Pension Code, the GASB Statements No. 67 & 68 financial information and related actuarial information for the year stated in this report. This report is not intended for distribution or usage to or by anyone who is not an Intended User and should not be used for any other purpose.

The valuation results reported herein are based on the employee data, plan provisions and the financial data provided by the Village. The actuary has relied on this information and does not assume responsibility for the accuracy or completeness of this information. I hereby certify that to the best of my knowledge this report is complete and accurate and fairly presents the actuarial position of the Fund in accordance with generally accepted actuarial principles and procedures. In my opinion, the assumptions used are reasonably related to the experience of the Plan and to reasonable expectations. A reasonable request for supplementary information not included in this report should be directed to the undersigned actuary.

The actuary cautions the Intended Users of the possibility of uncertainty or risks in any of the results in this report.

I, Timothy W. Sharpe, am an Enrolled Actuary and a member of the American Academy of Actuaries, and I meet the Qualifications Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Timothy W. Sharpe, EA, MAAA
Enrolled Actuary No. 17-4384

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Date

SUMMARY OF RESULTS

There was a change with respect to Actuarial Assumptions from the prior year to reflect revised expectations with respect to mortality rates. The mortality rates have been changed to the RP 2014 Mortality Table (BCHA) projected to 2017 using improvement scale MP-2016 (previously improvement scale MP-2015).

As announced in the Mortality Improvement Scale MP-2015 Report, the Retirement Plans Experience Committee of the Society of Actuaries (RPEC) intends to publish annual updates to the RPEC_2014 model and corresponding mortality improvement scales. The resulting 2016 version of the model presented in this report reflects three additional years of historical U.S. Population mortality data (for 2012, 2013 and 2014) and modification of two input values designed to improve the model's year-over-year stability. Scale MP-2016 is based on this 2016 version of the RPEC_2014 model along with the committee-selected assumption set for 2016. For the ten years ending in 2009 the average annual age-adjusted mortality improvement rates in the United States for those between ages 50 and 95 were 1.93% for males and 1.46% for females. The corresponding averages for the five-year period ended in 2014 were 0.60% and 0.42%, respectively. As a result of this pattern, the Scale MP-2016 rates presented in this report are generally lower than Scale MP-2015 rates, which were lower than Scale MP-2014 rates.

There were no changes with respect to Plan Provisions or Actuarial Methods from the prior year.

Based on the plan sponsor's funding policy and future expected plan contributions and funded status, the plan is to be expected to produce adequate assets to make benefit payments when they are due.

The benefit payment default risk or the financial health of the plan sponsor was not deemed to be material.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; 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 actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

SUMMARY OF RESULTS (Continued)

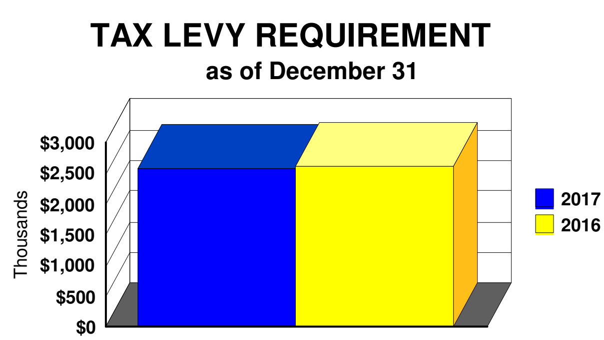
There were no unexpected changes with respect to the participants included in this actuarial valuation (2 new members, 1 termination, 4 retirements (1 deferred), 0 incidents of disability, annual payroll increase -4.0%, average salary increase 2.8%).

There were no unexpected changes with respect to the Fund's investments from the prior year (annual investment return 5.04%).

The Village's Tax Levy Requirement has decreased slightly from $2,615,965 last year to $2,592,631 this year (0.9%). The slight decrease in the Tax Levy is due to the changes to the assumptions, and was offset due to the increase in average salaries and the investment return was less than assumed. The Percent Funded has increased from 52.7% last year to 54.4% this year.

SUMMARY OF RESULTS (Continued)

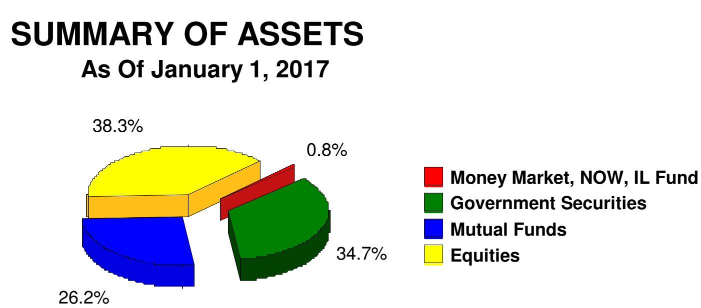
	For Year Ending December 31	
	2017	2016
Tax Levy Requirement	$ 2,592,631	$ 2,615,965
	as of January 1	
	2017	2016
Village Normal Cost	854,404	922,255
Anticipated Employee Contributions	539,967	562,174
Accrued Liability	70,517,378	68,223,666
Actuarial Value of Assets	38,359,343	35,924,580
Unfunded Accrued Liability/(Surplus)	32,158,035	32,299,086
Amortization of Unfunded Accrued Liability/(Surplus)	1,568,616	1,522,572
Percent Funded	54.4%	52.7%
Annual Payroll	$ 5,448,711	$ 5,672,798



ACTUARIAL VALUATION OF ASSETS

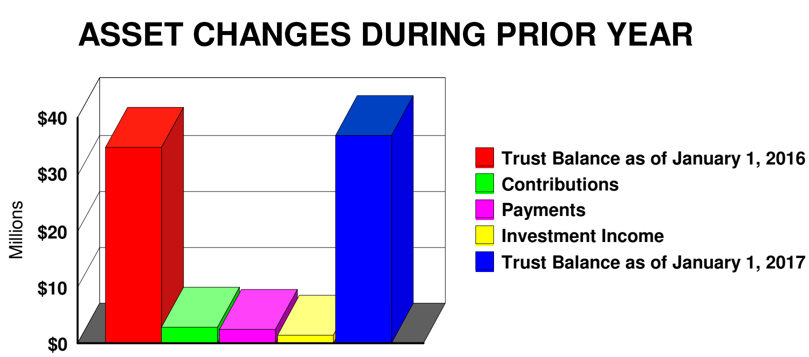
	as of January 1	
	2017	2016
Money Market, NOW, IL Fund	$ 294,856	$ 1,087,318
Government Securities	12,810,968	12,105,883
Mutual Funds	9,645,144	9,295,635
Common Stock	14,122,422	12,446,481
Interest Receivable	74,953	92,401
Miscellaneous Receivable/(Payable)	(2,045)	(2,340)
Market Value of Assets	36,946,297	35,025,378
Actuarial Value of Assets	$ 38,359,343	35,924,580

FYE 2013-2016 (Gain)/Loss: ($1,172,577); $17,991; $1,815,331; $688,958



ASSET CHANGES DURING PRIOR YEAR

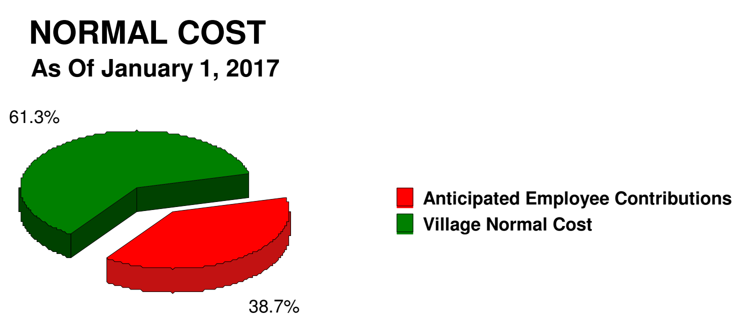
Trust Balance as of January 1, 2016		$	35,025,378
Contributions			
Village	2,346,705		
Employee	531,488		
Total			2,878,193
Payments			
Benefit Payments	2,689,679		
Expenses	35,761		
Total			2,725,439
Investment Income			1,768,165
Trust Balance as of January 1, 2017		$	36,946,297
Approximate Annual Rate of Return			5.04%



NORMAL COST

The Normal Cost is the actuarial present value of the portion of the projected benefits that are expected to accrue during the year based upon the actuarial valuation method and actuarial assumptions employed in the valuation.

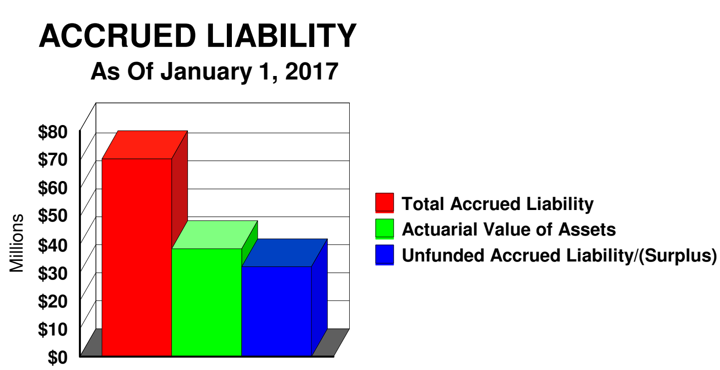
	as of January 1	
	2017	2016
Total Normal Cost	$ 1,394,371	$ 1,484,429
Anticipated Employee Contributions	539,967	562,174
Village Normal Cost	854,404	922,255
Normal Cost Payroll	$ 5,448,711	$ 5,672,798
Village Normal Cost Rate	15.68%	16.26%
Total Normal Cost Rate	25.59%	26.17%



ACCRUED LIABILITY

The Accrued Liability is the actuarial present value of the portion of the projected benefits that has been accrued as of the valuation date based upon the actuarial valuation method and actuarial assumptions employed in the valuation. The Unfunded Accrued Liability is the excess of the Accrued Liability over the Actuarial Value of Assets.

		as of January 1		
Accrued Liability		2017		2016
Active Employees	$	34,656,842	$	37,155,767
Children Annuities		0		0
Disability Annuities		6,495,902		6,856,853
Retirement Annuities		27,129,806		22,821,363
Surviving Spouse Annuities		843,183		358,786
Terminated Vested Annuities		1,391,645		1,030,897
Total Annuities		35,860,536		31,067,899
Total Accrued Liability		70,517,378		68,223,666
Actuarial Value of Assets		38,359,343		35,924,580
Unfunded Accrued Liability/(Surplus)	$	32,158,035	$	32,299,086
Percent Funded		54.4%		52.7%



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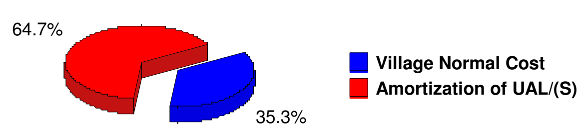
TAX LEVY REQUIREMENT

The Public Act 096-1495 Tax Levy Requirement is determined as the annual contribution necessary to fund the normal cost, plus the amount to amortize the excess (if any) of ninety percent (90%) of the accrued liability over the actuarial value of assets as a level percentage of payroll over a thirty (30) year period which commenced in 2011, plus an adjustment for interest. The 100% amortization amount is equal to the amount to amortize the unfunded accrued liability as a level percentage of payroll over a thirty (30) year period which commenced in 2011.

		For Year Ending December 31 2017		2016
Village Normal Cost as of Beginning of Year	$	854,404	$	922,255
Amortization of Unfunded Accrued Liability/(Surplus)		1,568,616		1,522,572
Interest for One Year		169,611		171,138
Tax Levy Requirement as of End of Year	$	2,592,631	$	2,615,965
Public Act 096-1495 Tax Levy Requirement				
1) Normal Cost (PUC)		1,154,455		1,200,867
2) Accrued Liability (PUC)		68,550,584		66,227,616
3) Amortization Payment		1,138,300		1,116,283
4) Interest for One Year		160,493		162,201
5) PA 096-1495 Tax Levy Requirement (1 + 3 + 4)	$	2,453,248		2,479,351

TAX LEVY REQUIREMENT
For Fiscal Year Ending December 31, 2017



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SUMMARY OF PLAN PARTICIPANTS

The actuarial valuation of the Plan is based upon the employee data furnished by the Village. The information provided for Active participants included:

Name
Sex
Date of Birth
Date of Hire
Compensation
Employee Contributions

The information provided for Inactive participants included:

Name
Sex
Date of Birth
Date of Pension Commencement
Monthly Pension Benefit
Form of Payment

Membership	2017	2017	2016	2016
Current Employees				
Vested	46		51	
Nonvested	14		12	
Total	60		63	
Inactive Participants		Annual Benefits		Annual Benefits
Children	0	$ 0	0	$ 0
Disabled Employees	9	445,695	10	463,705
Retired Employees	30	1,948,404	27	1,680,964
Surviving Spouses	3	105,858	2	50,889
Terminated Vesteds	1	74,306	2	72,038
Total	43	2,574,263	41	2,267,596
Annual Payroll		$ 5,448,711		$ 5,672,798

SUMMARY OF PLAN PARTICIPANTS (Continued)

Age and Service Distribution

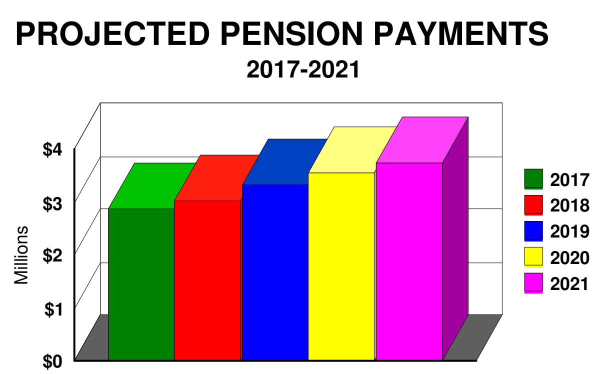
Service Age	0-4	5-9	10-14	15-19	20-24	25-29	30+	Total	Salary
20-24	2							2	64,327
25-29	6							6	68,696
30-34	1	2	2					5	87,459
35-39	1	4	4	1				10	86,499
40-44			7	6				13	94,708
45-49			3	5	4	3		15	98,298
50-54				3	2	2		7	99,331
55-59						1		1	90,486
60+							1	1	114,118
Total	10	6	16	15	6	6	1	60	90,812
Salary	67,078	89,984	91,243	97,343	94,408	106,239	114,118		

Average Age: 41.0 Average Service: 13.7 Average Future Service: 9.4

DURATION (years) Active Members: 18.8 Retired Members: 11.3 All Members: 15.0

PROJECTED PENSION PAYMENTS

2017	2018	2019	2020	2021
$2,886,712	$3,019,892	$3,320,777	$3,566,142	$3,771,671



SUMMARY OF PLAN PROVISIONS

The Plan Provisions have not been changed from the prior year.

The Village of Carpentersville Police Pension Fund was created and is administered as prescribed by "Article 3. Police Pension Fund - Municipalities 500,000 and Under" of the Illinois Pension Code (Illinois Compiled Statutes, 1992, Chapter 40). A brief summary of the plan provisions is provided below.

Employees attaining the age of (50) or more with (20) or more years of creditable service are entitled to receive an annual retirement benefit of (2.5%) of final salary for each year of service up to (30) years, to a maximum of (75%) of such salary.

Employees with at least (8) years but less than (20) years of credited service may retire at or after age (60) and receive a reduced benefit of (2.5%) of final salary for each year of service.

Surviving spouses receive the greater of (50%) of final salary or the employee's retirement benefit.

Employees disabled in the line of duty receive (65%) of final salary.

The monthly pension of a covered employee who retired with (20) or more years of service after January 1, 1977, shall be increased annually, following the first anniversary date of retirement and be paid upon reaching the age of at least (55) years, by (3%) of the originally granted pension. Beginning with increases granted on or after July 1, 1993, the second and subsequent automatic annual increases shall be calculated as (3%) of the amount of the pension payable at the time of the increase.

Employees are required to contribute (9.91%) of their base salary to the Police Pension Plan. If an employee leaves covered employment with less than (20) years of service, accumulated employee contributions may be refunded without accumulated interest.

For Employees hired after January 1, 2011, the Normal Retirement age is attainment of age 55 and completion of 10 years of service; Early Retirement age is attainment of age 50, completion of 10 years of service and the Early Retirement Factor is 6% per year; the Employee’s Accrued Benefit is based on the Employee’s final 8-year average salary not to exceed $106,800 (as indexed); Cost-of-living adjustments are simple increases (not compounded) of the lesser of 3% or 50% of CPI beginning the later of the anniversary date and age 60; Surviving Spouse’s Benefits are 66 2/3% of the Employee’s benefit at the time of death.

ACTUARIAL METHODS

The Actuarial Methods employed for this valuation are as follows:

Projected Unit Credit Cost Method (for years beginning on or after 2011 for PA 096-1495)

Under the Projected Unit Credit Cost Method, the Normal Cost is the present value of the projected benefit (including projected salary increases) earned during the year.

The Accrued Liability is the present value of the projected benefit (including projected salary increases) earned as of the actuarial valuation date. The Unfunded Accrued Liability is the excess of the Accrued Liability over the plan's assets. Experience gains or losses adjust the Unfunded Accrued Liability.

Entry Age Normal Cost Method

Under the Entry Age Normal Cost Method the Normal Cost for each participant is computed as the level percentage of pay which, if paid from the earliest age the participant is eligible to enter the plan until retirement or termination, will accumulate with interest to sufficiently fund all benefits under the plan. The Normal Cost for the plan is determined as the sum of the Normal Costs for all active participants.

The Accrued Liability is the theoretical amount that would have accumulated had annual contributions equal to the Normal Cost been paid. The Unfunded Accrued Liability is the excess of the Accrued Liability over the plan's assets. Experience gains or losses adjust the Unfunded Accrued Liability.

ACTUARIAL ASSUMPTIONS

The Actuarial Assumptions used for determining the Tax Levy Requirement and GASB Statements No. 67 & 68 Disclosure Information are the same (except where noted) and have been changed from the prior year (discussion on page 4). The methods and assumptions disclosed in this report may reflect statutory requirements and may reflect the responsibility of the Principal and its advisors. Unless specifically noted otherwise, each economic and demographic assumption was selected in accordance with Actuarial Standards of Practice 27 and 35 and may reflect the views and advice of advisors to the Principal. In the event a method or assumption conflicts with the actuary's professional judgment, the method or assumption is identified in this report. The Actuarial Assumptions employed for this valuation are as follows:

Valuation Date	January 1, 2017
Asset Valuation Method	5-year Average Market Value (PA 096-1495)
Investment Return	7.00% net of investment expenses.
Salary Scale	5.50%
Mortality	RP 2014 Mortality Table (BCHA) projected to 2017 using improvement scale MP-2016.
Withdrawal	Based on studies of the Fund and the Department of Insurance, Sample Rates below
Disability	Based on studies of the Fund and the Department of Insurance, Sample Rates below
Retirement	Based on studies of the Fund and the Department of Insurance, Sample Rates below (100% by age 70)
Marital Status	80% Married, Female spouses 3 years younger

ACTUARIAL ASSUMPTIONS *(Continued)*

Sample Annual Rates Per 100 Participants

Age	Withdrawal	Disability	Retirement
20	10.00	0.05	
25	7.50	0.05	
30	5.00	0.22	
35	3.00	0.26	
40	2.00	0.40	
45	2.00	0.65	
50	3.50	0.95	20.00
55	3.50	1.30	25.00
60	3.50	1.65	33.00
65	3.50	2.00	50.00
70			100.00

STATEMENTS NO. 67 & 68 DISCLOSURE INFORMATION

Plan Membership	December 31, 2016
Inactive plan members or beneficiaries currently receiving benefits	42
Inactive plan members entitled to but not yet receiving benefits	1
Active plan members	60
Total	103

Net Pension Liability of the Village	
Total pension liability	70,517,378
Plan fiduciary net position	36,946,297
Village's net pension liability	33,571,081
Plan fiduciary net position as a percentage of the total pension liability	52.39%

Actuarial Assumptions	
Inflation	2.50%
Salary increases	5.50%
Investment rate of return	7.00% net of expenses

The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that Village contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

	1% Decrease 6.00%	Current Discount Rate 7.00%	1% Increase 8.00%
Net Pension Liability	43,435,422	33,571,081	25,462,573

STATEMENTS NO. 67 & 68 DISCLOSURE INFORMATION (continued)

Schedule of Changes in the Village's Net Pension Liability and Related Ratios

Total Pension Liability	December 31, 2016
Service cost	1,588,339
Interest	4,681,518
Changes of benefit terms	0
Differences between expected and actual experience	(605,963)
Changes of assumptions	(680,503)
Benefit payments, including refunds of member contributions	2,689,679
Net change in total pension liability	2,293,712
Total pension liability - beginning	68,223,666
Total pension liability - ending	70,517,378
Plan Fiduciary Net Position	
Contributions - employer	2,346,705
Contributions - member	531,488
Net investment income	1,768,165
Benefit payments, including refunds of member contributions	2,689,679
Administrative expense	35,761
Other	0
Net change in plan fiduciary net position	1,920,919
Plan fiduciary net position - beginning	35,025,378
Plan fiduciary net position - ending	36,946,297
Village's net pension liability	33,571,081
Plan fiduciary net position as a percentage of the total pension liability	52.39%
Covered-employee payroll	5,448,711
Village's net pension liability as a percentage of covered-employee payroll	616.13%

STATEMENTS NO. 67 & 68 DISCLOSURE INFORMATION (continued)

Schedule of Village Contributions

	December 31, 2016
Actuarially determined contribution	1,530,352
Contributions in relation to the actuarially determined contribution	2,346,705
Contribution deficiency (Excess)	(816,353)
Covered-employee payroll	5,448,711
Contributions as a percentage of covered-employee payroll	43.07%

Notes to schedule

Valuation date	December 31, 2016
Methods and assumptions used to determine contribution rates:	
Actuarial cost method	Entry Age Normal
Amortization method	Level Percentage of Pay
Remaining amortization period	24 years
Asset valuation method	Market Value
Inflation	2.50%
Salary increases	5.50%
Investment rate of return	7.00%
Retirement age	50-70
Mortality	RP 2014 projected to 2017
Other	

Mortality rates were based on the RP 2014 Mortality Table (BCHA) projected to 2017 using improvement scale MP-2016. The other non-economic actuarial assumptions used in the December 31, 2016 valuation were based on the results of an actuarial experience study conducted by the Illinois Department of Insurance dated September 26, 2012.