CHEIRON *Classic Values, Innovative Advice*

Delaware State Volunteer Firemen's Pension Plan

Actuarial Valuation as of June 30, 2017

Produced by Cheiron

January 2018

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January 29, 2018

Board of Pension Trustees
State of Delaware
McArdle Building
860 Silver Lake Boulevard, Suite 1
Dover, Delaware 19904

Dear Members of the Board:

At your request, we have conducted the annual actuarial valuation of the Delaware State Volunteer Firemen's Pension Plan (Plan) as of June 30, 2017. The results of this valuation are contained in this report. The purpose of the valuation is discussed in the Foreword.

This report contains information on plan assets and liabilities, as well as analyses combining asset and liability performance and projections. It also discloses employer contribution levels and required disclosures under the Governmental Accounting Standards Board (GASB) Statement No. 67.

In completing the valuation and preparing our report, we relied on information, some oral and some written, supplied by staff of the Office of Pensions. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The contribution results of this report are only applicable to the Delaware State Volunteer Firemen contributions for Fiscal Year (FY) 2018 and rely on future plan experience conforming to the underlying assumptions. Future experience may differ significantly from the current experience due to such factors as the following: program experience differing from that anticipated by the assumptions; changes in assumptions; and changes in program provisions or applicable law.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board, including the use of assumptions and methods for funding purposes that comply with the Actuarial Standards of Practice. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This report was prepared for the Delaware State Volunteer Firemen's Pension Plan for the purposes described herein and for the use by the Plan's auditor in completing an audit related to the matters herein. Other users of this valuation report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

Sincerely,
Cheiron

Fiona E. Liston, FSA, MAAA, EA
Principal Consulting Actuary

Elizabeth Wiley, FSA, FCA, MAAA, EA
Consulting Actuary

FOREWORD

Cheiron has performed the annual actuarial valuation of the Delaware State Volunteer Firemen's Pension Plan (Plan) as of June 30, 2017. The purpose of this report is to:

1) **Measure and disclose**, as of the valuation date, the financial condition of the Plan,

2) **Indicate trends** in the financial condition of the Plan,

3) **Determine the contribution rate** to be paid by the participating employers for Fiscal Year (FY) 2018, and

4) **Provide** accounting statement information.

An actuarial valuation establishes and analyzes plan assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the plan's investment performance as well as an analysis of liability gains and losses.

Section I presents a summary containing our findings and disclosing important trends experienced by the Plan in recent years.

Section II contains details on various asset measures, together with pertinent performance measurements.

Section III shows similar information on liabilities, measured for actuarial, accounting, and governmental reporting purposes.

Section IV presents the FY 2018 actuarially determined contribution for participating employers.

Section V includes required disclosures under Governmental Accounting Standards Board (GASB) Statement No. 67 and items recommended by the Government Finance Officers Association (GFOA).

The appendices to this report contain a summary of the Plan's membership at the valuation date, a summary of the major provisions of the Plan, and a summary of the actuarial methods and assumptions used in the valuation.

The actuarial assumptions reflect our understanding of the likely future experience of the Plan, and the assumptions individually and as a whole represent our best estimate for the future experience of the Plan. The results of this report rely on future plan experience conforming to the underlying assumptions and methods outlined in this report. To the extent that the actual plan experience deviates from the underlying assumptions and methods, or there are any changes in plan provisions, the true cost of the Plan would vary from our results.

SECTION I – BOARD SUMMARY

General Comments

The actuarially determined contribution (ADC) amount increased from $1,992,400 for FY 2017 to $2,016,900 for FY 2018.

During the year ended June 30, 2017, the Plan's assets earned 10.3% on a market value basis. However, due to the Plan's asset smoothing method, which recognizes portions of the investment gains and losses over time, the return on an actuarial value basis was 6.5%. This return was less than the assumed investment rate of return of 7.2% for last year, resulting in an actuarial loss on investments of $129,700.

The Plan experienced an actuarial loss on plan liabilities resulting from members retiring, terminating, becoming disabled, and dying at rates different from the actuarial assumptions. This liability gain decreased the actuarial liability by $5,800. This type of gain or loss is normal in the course of plan experience, as we cannot predict exactly how people will behave. In addition to the actuarial loss, the Plan's liabilities also increased by $634,300 due to a reduction in the assumed investment rate of return.

This valuation report also contains information to be reported in the June 30, 2017 Comprehensive Annual Financial Report (CAFR) of the Delaware Public Employees' Retirement System (Delaware PERS) under GASB Statement No. 67, as well as additional disclosure information recommended by the Government Finance Officers Association (GFOA). The GASB disclosures are based on the use of updated procedures to roll forward the 2016 actuarial valuation liability results. The calculation of net pension liability in Section V is shown as disclosed for the plan year ending June 30, 2017, based on the 2016 funding actuarial valuation liability results, updated to reflect the reduction in the assumed investment rate of return. We also present a projection of the June 30, 2018 disclosure in Section V, assuming all actuarial assumptions are met over the coming year, which is based on the 2017 funding actuarial valuation liability results.

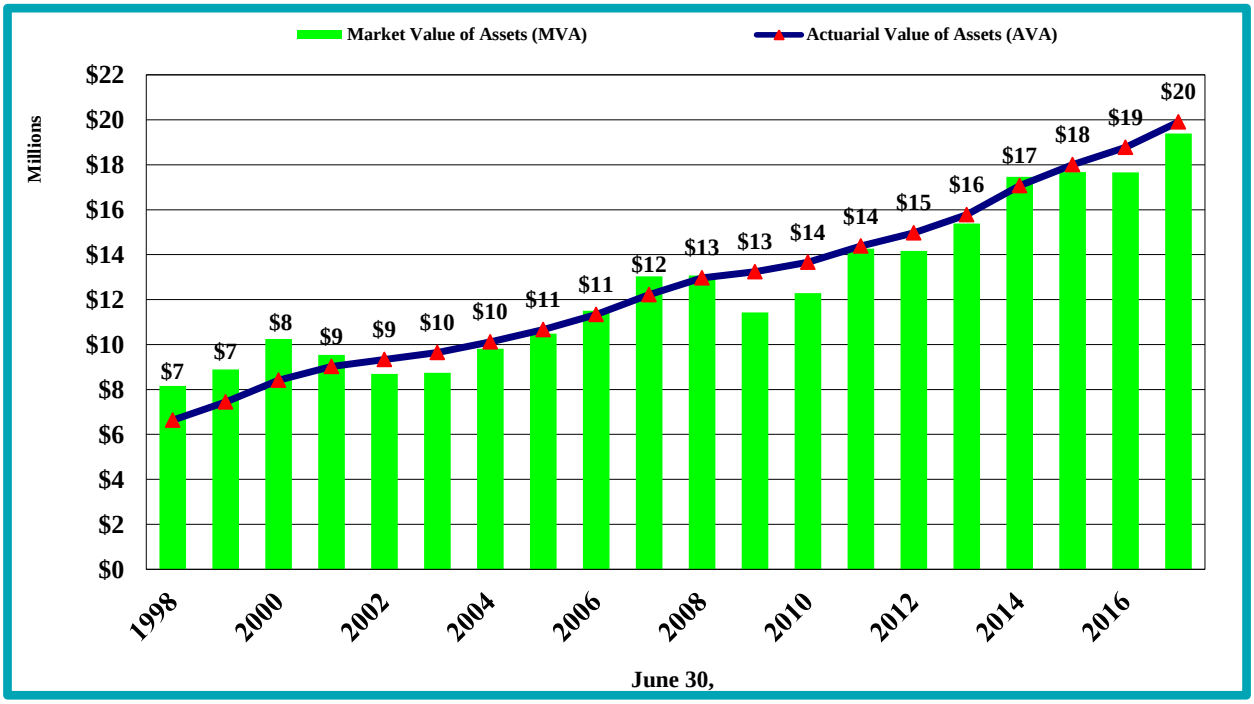
As of the June 30, 2017 funding actuarial valuation, the Plan's unfunded actuarial liability (UAL) was $14.4 million. This is a slight increase from the $14.2 million UAL in the funding valuation for the prior year.

SECTION I – BOARD SUMMARY

Trends

Asset Returns

The graph below shows measurements of the Plan's assets over the last 20 years based on both market values and actuarial values. The green bars represent the market value measurements, while the blue line shows the actuarial value measurements. The black numbers are the actuarial value of asset measurements as of the valuation date for each year in millions of dollars.



The market value of assets (MVA) returned 10.3% over the last year. The determination of the Plan's actuarial value of assets (AVA) for the current year reflects a portion of the return above the 7.2% assumed for the prior year, and continued recognition of prior years' gains and losses, and thus returned 6.5% over FY 2017.

Over the period July 1, 1998 to June 30, 2017, the Plan's assets measured using actuarial value of asset measurements returned a compound 8.0%, compared to the current valuation assumption of 7.0%. On a market value of asset basis, the Plan returned 6.7% over the same period.

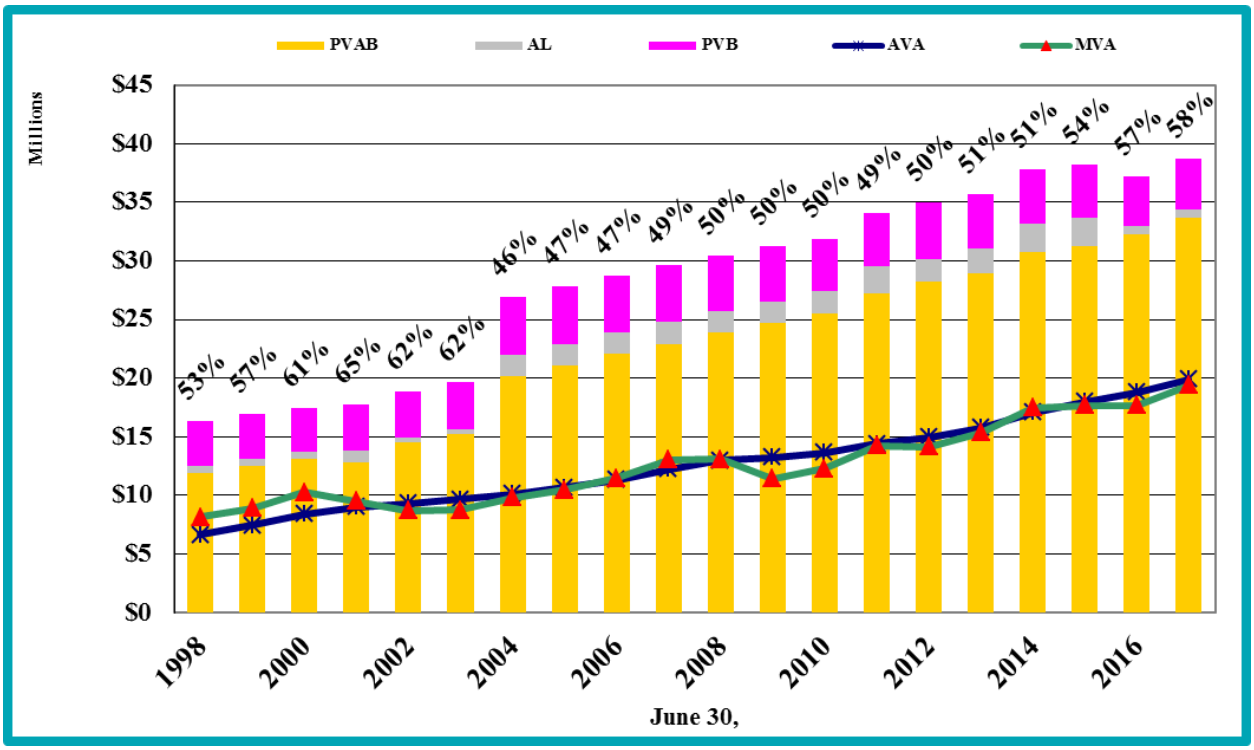
SECTION I – BOARD SUMMARY

Assets and Liabilities

The three colored bars below represent the three different measures of liability discussed in this report. The first measure is given by the yellow bars, the present value of accrued benefits (PVAB). The PVAB values represent the value of all benefits earned by current members through the valuation date. These values do not reflect any future additional service or salary increases for current members beyond the valuation date.

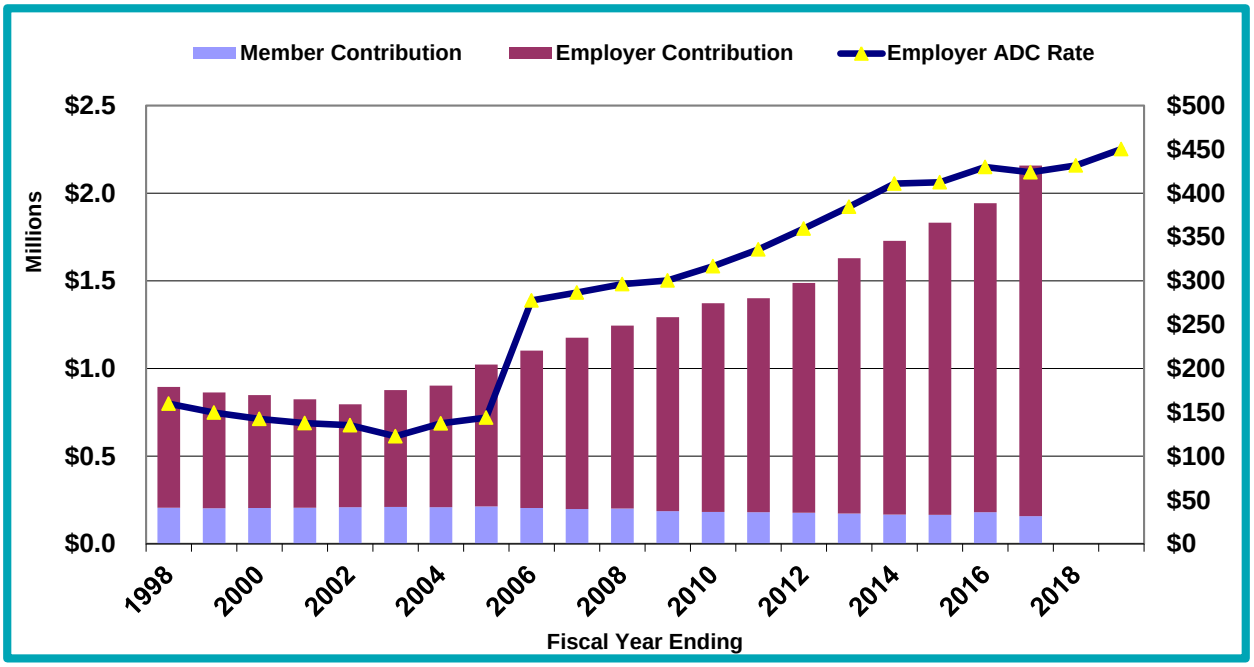
The second liability measure is the one currently used for the Plan's funding target, the actuarial liability (AL). These target amounts are represented by the top of the gray bars. This measurement is also the basis of the liability measure used in GASB 67. The funded ratios reported by the Plan are the percentages shown above the bars and are developed by comparing these target measurements of liability to the actuarial value of assets at each valuation date.

The amount represented by the top of the pink bars, the present value of future benefits (PVB), is the amount needed to provide all benefits for the current members and their beneficiaries, including reflection of assumed future service and pay increases. If the Plan had assets equal to the PVB as of a certain date, no additional contributions would, in theory, be needed to pay the benefits of the current members if all assumptions were exactly met from that point forward.



SECTION I – BOARD SUMMARY

Contribution Rates



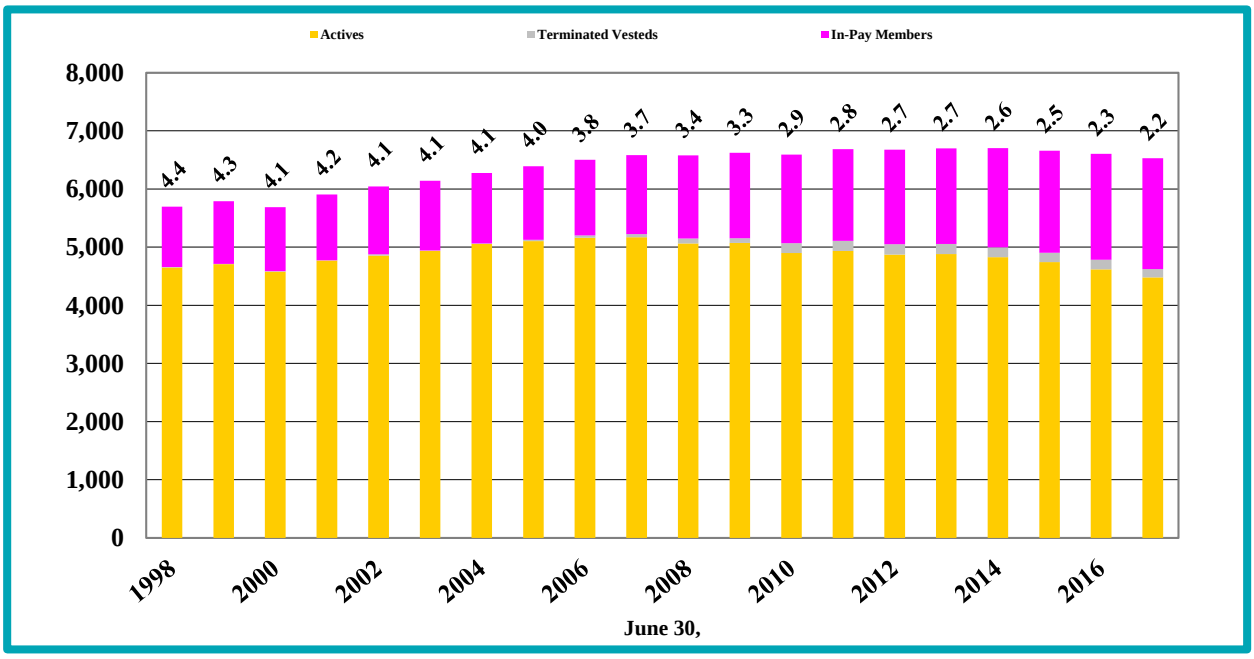
The stacked bars in the graph above show the dollar amounts of the contributions made by the participating employers and the members for each fiscal year and are read using the left-hand scale. The contribution amounts shown in the bars represent what was actually paid. The blue line shows the employers' per-head actuarially determined contribution (ADC) amount for each fiscal year (right-hand scale).

The member contribution rate is set by State law, based on the Plan in which the member participates. The participating employer ADC amount is set by the actuarial process.

SECTION I – BOARD SUMMARY

Participant Trends

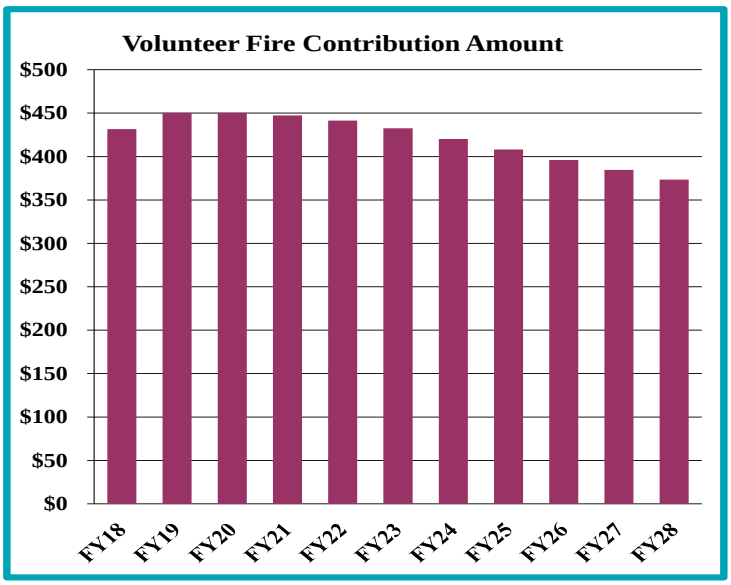
The bars below show the number of members as of each valuation date, divided between active members, terminated vested members, and retirees/beneficiaries. These bars are read using the left-hand scale. The graph below shows that the number of active members has been dropping in recent years, while there has been a slight increase in the number of inactives over recent years. The numbers that appear above each bar represent the ratio of active members to inactive members (retirees, beneficiaries, and terminated vested members) at each valuation date. The active-to-inactive ratio has decreased from 4.4 actives to each inactive in 1998 to 2.2 actives for each inactive in 2017.



SECTION I – BOARD SUMMARY

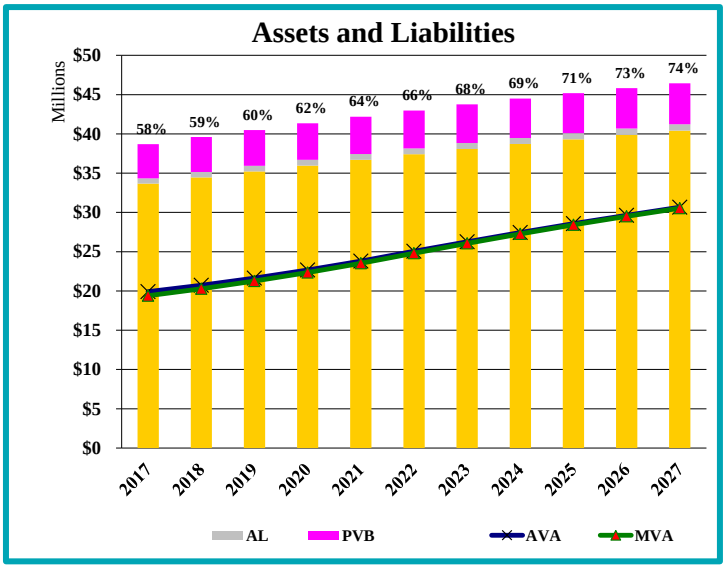
Future Outlook

Baseline Projections



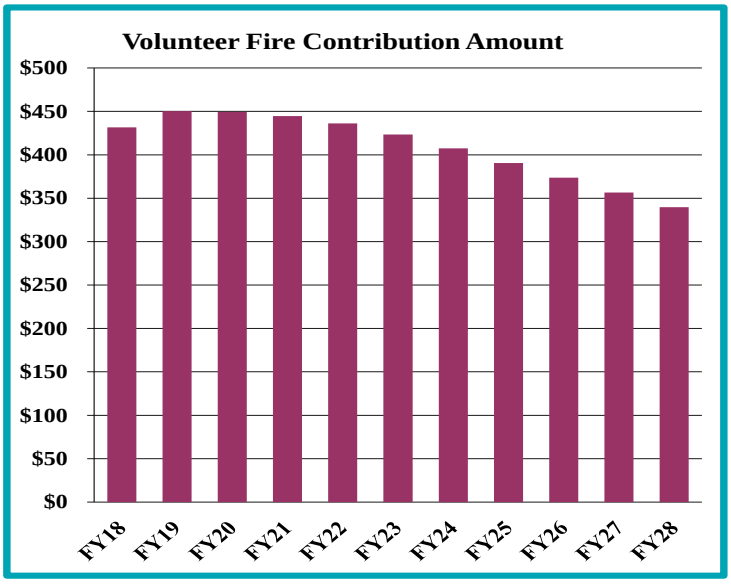
These graphs show the expected progress of the Plan over the next 10 years, assuming the Plan's assets earn 7.0% on a *market value* basis and assuming all other assumptions are exactly met, including that the actuarially determined contribution (ADC) amounts are made in full. The chart entitled "Volunteer Fire Contribution Amount" shows that after the employer ADC amount per head increases for FY 18, it is expected to decline.

The "Assets and Liabilities" graph under this scenario shows the projected funded ratios of the Plan over the 10-year projection period. The Plan's funded status is projected to improve annually, as the existing unfunded liability is paid down. As long as the amortization method remains open, the UAL will not be paid to zero.



SECTION I – BOARD SUMMARY

Projections with Asset Returns of 8.0%

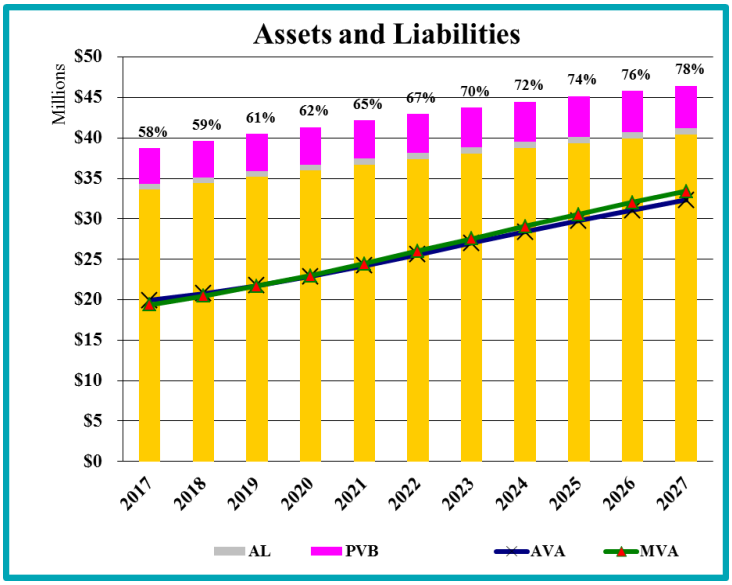


The Plan's investment earnings will affect the future funding status of the Plan. The two graphs on this page show what the next 10 years would be expected to look like if the Plan's investment performance is 8.0% each year, 1.0% higher than the valuation investment rate of return assumption.

These two graphs assume all other assumptions are exactly met, including employer contributions made equal to the full actuarially determined amounts.

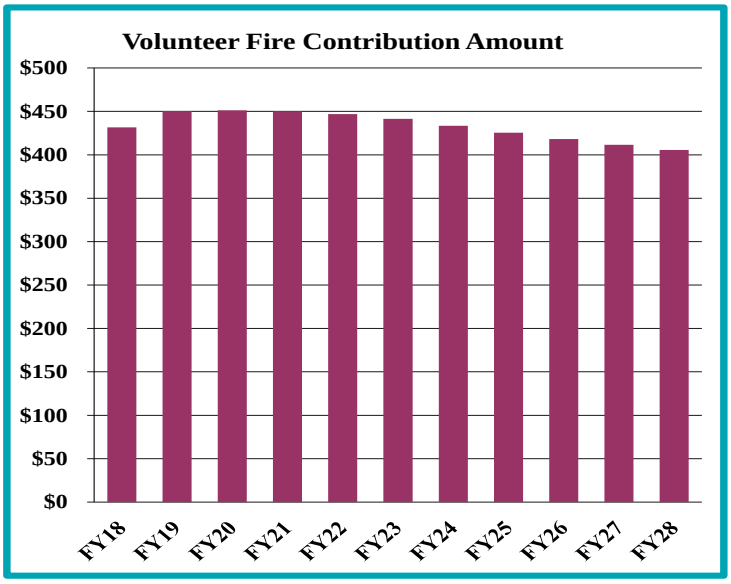
The "Volunteer Fire Contribution Amount" graph shows that under this scenario the employer ADC amount per head decreases even faster than it would in the base case.

The "Assets and Liabilities" graph shows that under this scenario the Plan would reach a 78% funded ratio by 2027, an improvement over the baseline scenario's ultimate level of 74%.



SECTION I – BOARD SUMMARY

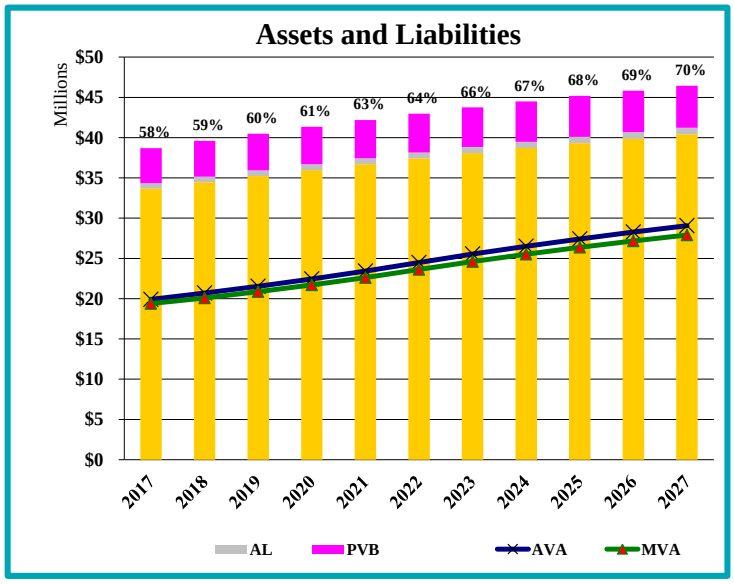
Projections with Asset Returns of 6.0%



The graphs on this page show projections of the Plan's funding status and contributions assuming that the Plan's investment performance is 6.0% each year of the projection, 1.0% lower than the valuation investment rate of return assumption.

Note that these projections assume all other assumptions are exactly met, including payment of participating employer contributions made equal to the full actuarially determined contribution.

The ultimate employer ADC amount still decreases, but to a level of approximately $406 per head by the end of the 10-year period, significantly greater than the $373 per head ultimate amount in the baseline projection under this scenario. Additionally, the funded ratio is projected to drop in this scenario, reaching 70% at the end of the 10-year period, significantly lower than the 74% ultimate ratio in the baseline scenario.



SECTION I – BOARD SUMMARY

Table I-1
Summary of Principal Plan Results

Valuation as of:	June 30, 2016	June 30, 2017	% Change
Member Counts			
Active Members	4,617	4,479	(2.99%)
Retirees and Members	1,823	1,901	4.28%
Terminated Vested Members	166	142	(14.46%)
Terminated Non-Vested Members	1	8	700.00%
Total Member Counts	**6,607**	**6,530**	(1.17%)
Annual Benefit Payments for Retirees, Disabled Members, and Beneficiaries	$ 1,961,400	$ 2,062,000	5.13%
Assets and Liabilities			
Actuarial Liability (AL)	$ 32,957,000	$ 34,340,800	4.20%
Actuarial Value of Assets (AVA)	18,772,700	19,911,300	6.07%
Unfunded AL (UAL)	$ 14,184,300	$ 14,429,500	1.73%
Funded Ratio on AVA Basis (AVA/AL)	57.0%	58.0%	
Funded Ratio on MVA Basis (MVA/AL)	53.6%	56.5%	
Present Value of Accrued Benefits (PVAB)	$ 32,234,600	$ 33,666,400	4.44%
Market Value of Assets (MVA)	17,660,000	19,392,600	9.81%
Unfunded PVAB	$ 14,574,600	$ 14,273,800	(2.06%)
Accrued Benefit Funded Ratio (MVA/PVAB)	54.8%	57.6%	
Employer Contribution Amount	**Fiscal Year 2017**	**Fiscal Year 2018**	
Entry Age Normal Cost	$ 436,000	$ 452,800	
UAL Amortization Payment	1,523,200	1,531,600	
Administrative Expense	33,200	32,500	
Actuarially Determined Contribution (ADC)	$ 1,992,400	$ 2,016,900	

SECTION II – ASSETS

Pension plan assets play a key role in the financial operation of the Plan and in the decisions that the Board of Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely affect benefit levels, employer actuarially determined contributions, and the ultimate security of members' benefits.

In this section, we present detailed information on the Plan's assets including:

- **Disclosure** of the Plan's assets at June 30, 2016 and June 30, 2017,
- Statement of the **changes** in market values during FY 2017,
- Development of the **actuarial value of assets**,
- An assessment of **investment performance**, and
- A projection of the Plan's expected **cash flows** for the next 10 years.

Market Value of Assets Disclosure

The market values of assets represent "snap-shot" or "cash-out" values that provide the principal basis for measuring financial performance from one year to the next. However, market values can fluctuate widely with swings in the marketplace, and as such, are usually not suitable for budgeting and long-range planning.

Table II-1 below shows the market values as of June 30, 2016 and June 30, 2017, along with the changes between the two.

Table II-1
Changes in Market Values of Assets

Market Value of Assets – June 30, 2016		**$ 17,660,000**
Additions		
Member Contributions	$ 156,800	
Employer Contributions	2,000,200	
Investment Returns	1,813,000	
Total Additions	**$ 3,970,000**	
Deductions		
Benefit Payments	$ 2,204,900	
Administrative Expenses	32,500	
Total Deductions	**$ 2,237,400**	
Market Value of Assets – June 30, 2017		**$ 19,392,600**

SECTION II – ASSETS

Actuarial Value of Assets

The actuarial value of assets represents a "smoothed" value developed by the actuary to reduce, or eliminate, erratic results that could develop from short-term fluctuations in the market value of assets. The actuarial value for this plan equals the expected actuarial value of assets, developed from the immediately prior valuation, plus 20% of the difference between the actual market value of assets and that expected actuarial value of assets at the valuation date. The table below illustrates the calculation of the actuarial value of assets as of June 30, 2017.

Table II-2
Development of Actuarial Value of Assets

1.	Actuarial Value of Assets at June 30, 2016	$ 18,772,700
2.	Amount in (1) with interest to June 30, 2017 at 7.20% per year	20,124,300
3.	Employer and member contributions for FY 2017	2,157,000
4.	Interest on contributions assuming payments made uniformly throughout the year to June 30, 2017 at 7.20% per year	77,700
5.	Disbursements from Trust except investment expenses, July 1, 2016 through June 30, 2017	2,237,400
6.	Interest on disbursements to June 30, 2017 at 7.20% per year	80,600
7.	Expected Actuarial Value of Assets at June 30, 2017 = (2) + (3) + (4) – (5) – (6)	$ 20,041,000
8.	Actual Market Value of Assets at June 30, 2017	$ 19,392,600
9.	Excess of (8) over (7)	$ (648,400)
10.	Actuarial Value of Assets at June 30, 2017 = (7) + 20% of (9)	$ 19,911,300

SECTION II – ASSETS

Investment Performance

The market value of assets (MVA) returned 10.3% during 2017, which is more than the prior year's assumed 7.2% investment rate of return. The actuarial value of assets (AVA) returned 6.5% over this same year, reflecting the asset smoothing method being utilized by the Plan for the measurement of the AVA. Since a maximum of 20% of the gain or loss from the performance of the Plan is typically recognized in a given year under the asset smoothing method, in periods of very good performance, the AVA can lag significantly behind the MVA, and in a period of negative returns, the AVA does not decline as rapidly as the MVA.

Projection of Cash Flows

Table II-3
Cash Flow Projections

Year Beginning July 1,	Expected Benefit Payments	Expected Contributions*
2017	$ 2,165,000	$ 2,202,000
2018	2,231,000	2,185,000
2019	2,303,000	2,185,000
2020	2,378,000	2,185,000
2021	2,453,000	2,185,000
2022	2,534,000	2,185,000
2023	2,608,000	2,185,000
2024	2,691,000	2,185,000
2025	2,772,000	2,185,000
2026	2,837,000	2,185,000

* Expected contributions include employer contributions and member contributions. For illustration purposes, we have assumed the employer contribution rate will remain level from FYE 2018.

Expected benefit payments are projected for the closed group valued at June 30, 2017. Projecting any further than 10 years using a closed group would not yield reliable projections due to the omission of new hires in the benefit payments, compounded by their inclusion in the expected contributions.

SECTION III – LIABILITIES

In this section, we present detailed information on the Plan's liabilities for funding purposes, including:

- **Disclosure** of the Plan's liabilities at June 30, 2016 and June 30, 2017, and
- Statement of **changes** in these liabilities during the year.

Disclosure

Three liability measurements are calculated and presented in this report. Each type is distinguished by the purpose, or purposes, for which they are used.

- **Present Value of Benefits (PVB):** Used for analyzing the financial outlook of plans, this represents the amount of money needed today to fund all future benefits and expenses of a plan, assuming current members continue to accrue benefits and there are no new entrants, and that all actuarial assumptions are met.

- **Actuarial Liability (AL):** Used for funding calculations for a plan and GASB disclosures, this liability is calculated by taking the present value of benefits (PVB) and subtracting the present value of future member contributions (PVFEEC) and the present value of future employer normal costs (PVFNC) under an acceptable actuarial funding method. The Plan uses the **Entry Age Normal** funding method.

- **Present Value of Accrued Benefits (PVAB):** Used for communicating the current level of liabilities, this liability represents the total amount of money needed today to fund the current accrued obligations of a plan, assuming no future accruals of benefits. These liabilities are also required for some accounting purposes of some plans (Topic No. 960) and are sometimes used as part of assessing whether a plan can meet its current benefit commitments. Note that the development of this amount also assumes that all actuarial assumptions are met, including the assets earning 7.0% per year.

None of the liability amounts disclosed in this report is appropriate for measuring a settlement of the Plan's liabilities.

The following table discloses each of these liabilities for the current and immediately prior funding valuations. With respect to each disclosure, a subtraction of an appropriate value of plan assets yields, for each respective type, either a net surplus or an unfunded amount.

SECTION III – LIABILITIES

Table III-1
Liabilities and Net (Surplus)/Unfunded Amounts

	June 30, 2016	June 30, 2017
Present Value of Benefits		
Active Member Benefits	$ 18,392,600	$ 18,908,800
Retiree, Beneficiary, Disabled, and Terminated Members Benefits	18,812,500	19,782,200
Present Value of Benefits (PVB)	**$ 37,205,100**	**$ 38,691,000**
Market Value of Assets (MVA)	$ 17,660,000	$ 19,392,600
Future Member Contributions	1,380,000	1,352,000
Future Employer Contributions	18,165,100	17,946,400
Total Resources	**$ 37,205,100**	**$ 38,691,000**
Actuarial Liability		
Present Value of Benefits (PVB)	$ 37,205,100	$ 38,691,000
Present Value of Future Employer Normal Costs (PVFNC)	2,868,100	2,998,200
Present Value of Future Member Contributions (PVFEEC)	1,380,000	1,352,000
Actuarial Liability (AL=PVB–PVFNC–PVFEEC)	**$ 32,957,000**	**$ 34,340,800**
Actuarial Value of Assets (AVA)	18,772,700	19,911,300
Net (Surplus)/Unfunded AL (AL – AVA)	**$ 14,184,300**	**$ 14,429,500**
Present Value of Accrued Benefits		
Present Value of Benefits (PVB)	$ 37,205,100	$ 38,691,000
Present Value of Future Benefit Accruals (PVFBA)	4,970,500	5,024,600
Present Value of Accrued Benefits (PVAB=PVB–PVFBA)	**$ 32,234,600**	**$ 33,666,400**
Market Value of Assets (MVA)	$ 17,660,000	$ 19,392,600
Net (Surplus)/Unfunded PVAB (PVAB – MVA)	**$ 14,574,600**	**$ 14,273,800**

SECTION III – LIABILITIES

Changes in Liabilities

Each of the liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New entrants since the last valuation
- Benefits accrued since the last valuation
- Plan amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial assumptions
- A change in actuarial method

Unfunded liabilities (or surpluses), developed from subtraction of an appropriate value of plan assets from these liability measures, will change because of all of the above as well as due to changes in plan assets measures resulting from:

- Employer contributions different than expected
- Investment earnings different than expected
- A change in the method used to measure plan assets

In each valuation, we report on those elements of change that are of particular significance, potentially affecting the long-term financial outlook of the Plan. Below, we present key changes in liabilities since the last valuation.

Table III-2
Liability Changes

(In Thousands)	Present Value of Benefits	Actuarial Liability	Present Value of Accrued Benefits
Liabilities June 30, 2016	$ 37,205	$ 32,957	$ 32,235
Liabilities June 30, 2017	38,691	34,341	33,666
Liability Increase/(Decrease)	1,486	1,384	1,431
Change Due to:			
Benefit Changes	0	0	0
Assumption Changes	971	634	845
Actuarial (Gain)/Loss	NC *	(6)	NC*
Benefits Accumulated and Other (Gain)/Loss	515	756	586

* NC = not calculated

SECTION III – LIABILITIES

Table III-3 below provides additional information about the liability measurements for funding purposes as of both the current and the immediately prior valuations.

Table III-3
Actuarial Liabilities for Funding

	June 30, 2016	June 30, 2017
1. Actuarial Liabilities		
Retiree, Beneficiary, Disabled, and Terminated Members	$ 18,812,500	$ 19,782,200
Active Members	14,144,500	14,558,600
Total Actuarial Liability (AL)	**$ 32,957,000**	**$ 34,340,800**
2. Actuarial Value of Assets (AVA)	$ 18,772,700	$ 19,911,300
3. Unfunded Actuarial Liability (UAL) [AL – AVA]	$ 14,184,300	$ 14,429,500

SECTION IV – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level, if any, of contributions are needed to properly maintain the funding status of the plan. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both fairly stable and predictable.

For this plan, the funding method employed is the **Entry Age Normal** actuarial funding method. Under this method, there are three components to the total contribution: the **normal cost contribution**, the **unfunded actuarial liability contribution** (UAL contribution), and the **administrative expense contribution**.

The employer normal cost contribution rate is determined in the following steps. First, for each active member an individual total normal cost rate is determined by taking the value, as of entry age into the Plan, of that member's projected future benefits and dividing it by the value, also at entry age, of the member's projected future service. Then, this individual total normal cost rate is reduced by the member's contribution rate to produce the employer normal cost amount for each member. This employer normal cost amounts for all active members equals the sum of the employer normal cost amounts for each active member.

The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal cost contributions or future member contributions. The difference between this liability and the funds accumulated as of the same date is referred to as the unfunded actuarial liability (UAL).

The UAL amortization payment rate is calculated by amortizing this UAL over a 15-year open period.

The current assumed administrative expense is equal to the actual administrative expenses charged in the prior year increased by 3%. This amount is intended to provide an allowance above the cost of funding the benefits to pay for the expense of operating the Plan.

The table below presents and compares the employer contribution amounts for the Plan based on this funding valuation and the immediately prior one.

Table IV-1
Employer Contribution Amounts

Valuation Date	**June 30, 2016**	**June 30, 2017**
FY Contribution Amount Payable	**FY 2017**	**FY 2018**
Entry Age Normal Cost Amount	$ 436,000	$ 452,800
UAL Amortization Payment Amount	1,523,200	1,531,600
Administrative Expense Amount	33,200	32,500
Actuarially Determined Contribution	$ 1,992,400	$ 2,016,900

SECTION IV – CONTRIBUTIONS

Table IV-2 below provides additional detail about the development of the expected employer contribution amount for FY 2018.

Table IV-2
Expected FY 2018
Employer Contributions

	In Dollars
1. Present Value of Projected Benefits Attributable to:	
a. Total Normal Cost	$ 632,000
b. Expected Member Contributions	179,200
c. Employer-Paid Normal Cost (a) – (b)	$ 452,800
2. Amortization of Unfunded Liability	1,531,600
3. Allowance for Administrative Expense	32,500
4. Total Employer Actuarially Determined Contribution Amount (1) + (2) + (3)	$ 2,016,900

SECTION V – ACCOUNTING STATEMENT INFORMATION

ASC Topic No. 960 of the Financial Accounting Standards Board (FASB) requires plans subject to it to disclose certain information regarding their funded status. This plan is not subject to this requirement, but this information is provided for informational purposes. Statement No. 67 of the Governmental Accounting Standards Board (GASB) establishes standards for disclosure of pension information by public employee retirement systems (PERS) and governmental employers in notes to financial statements and supplementary information.

Disclosures based on FASB ASC Topic No. 960 provide a quasi "snap shot" view of how the Plan's assets compare to its liabilities if contributions stopped and accrued benefit claims had to be satisfied. However, due to potential legal requirements and the possibility that alternative interest rates would have to be used to determine the liabilities, these values may not be a good indication of the amount of money it would take to buy the benefits for all members if the Plan were to terminate and should not be considered a settlement value.

FASB ASC Topic No. 960 specifies that a comparison of the present value of accrued (accumulated) benefits, with the market value of the assets as of the valuation date, must be provided. Again, this plan is not subject to this requirement, but the relevant amounts as of June 30, 2016 and June 30, 2017 are provided for informational purposes and are exhibited in Table V-1 which also includes a reconciliation of liabilities determined as of the prior valuation, July 1, 2016, to the liabilities as of June 30, 2017. These values are based on the funding liability results.

This valuation contains information reported in the June 30, 2017 Comprehensive Annual Financial Report (CAFR) of Delaware PERS under GASB Statement No. 67. Disclosures are based on the use of updated procedures to roll forward the 2016 funding valuation results. The calculation of Net Pension Liability in Table V-2 shows the amounts to be disclosed for FY 2017, based on the liabilities of the roll forward of the 2016 funding valuation, as well as a projection of the anticipated FY 2018 disclosures, based on the liabilities from the 2017 funding valuation, assuming all actuarial assumptions are met over the coming year. The actual disclosures for FY 2018 will be developed once the asset measure for GASB as of June 30, 2018 is known.

Tables V-3 through V-5 are exhibits to be used for the System's CAFR. Table V-3 is the Note to Required Supplementary Information, Table V-4 is a history of gains and losses in accrued liability, and Table V-5 is the Solvency Test, which shows the portion of accrued liability covered by the actuarial value of assets. The Government Finance Officers Association (GFOA) has named this exhibit the Solvency Test. None of the liabilities or assets shown is appropriate for settlement purposes. Furthermore, the Solvency Test does not accurately depict a plan's future financial condition but rather is a test developed by the GFOA to assess the level of funding that relies on the payroll for future hires to pay for the benefits that have already been accrued by the current population. This valuation does not contain the additional disclosures required by GASB Statement No. 68 only for the employers and the State's CAFR.

SECTION V – ACCOUNTING STATEMENT INFORMATION

Table V-1
Accounting Statement Disclosure and
Reconciliation of Present Value of Accrued Benefits

	June 30, 2016	June 30, 2017
FASB ASC Topic No. 960 Basis		
1. Present Value of Accrued Benefits (PVAB)		
a. Members Currently Receiving Payments	$ 17,169,300	$ 18,326,100
b. Former Vested Members	1,643,200	1,456,100
c. Active Members	13,422,100	13,884,200
2. Total PVAB [1(a) + 1(b) + 1(c)]	$ 32,234,600	$ 33,666,400
3. Market Value of Assets (MVA)	17,660,000	19,392,600
4. Unfunded PVAB [2 – 3]	$ 14,574,600	$ 14,273,800
5. Ratio of Market Value of Assets to Present Value of Benefits [3 / 2]	54.8%	57.6%
Reconciliation of PVAB		
PVAB at June 30, 2016		$ 32,234,600
Increase/(Decrease) During Year Attributable to:		
Passage of Time		2,241,500
Benefits Paid – FY 2017		(2,204,900)
Benefit Changes		0
Assumption Changes		844,700
Benefits Accrued, Other Gains/Losses		550,500
Net Increase/(Decrease)		1,431,800
PVAB at June 30, 2017		$ 33,666,400

SECTION V – ACCOUNTING STATEMENT INFORMATION

Table V-2
GASB Number 67 Disclosures

	June 30, 2017	Estimated June 30, 2018
Total Pension Liability (TPL)		
Service cost	$ 714,000	$ 717,000
Interest	2,276,000	2,308,000
Changes in benefit terms	0	0
Differences between expected and actual experience	(1,218,000)	(127,000)
Changes in assumptions	688,000	0
Benefit payments, including refunds of member contributions	(2,205,000)	(2,165,000)
Net change in TPL	**$ 255,000**	**$ 733,000**
TPL - beginning	**$ 33,189,000**	**$ 33,444,000**
TPL - ending (a)	**$ 33,444,000**	**$ 34,177,000**
Plan Fiduciary Net Position (FNP)		
Contributions - Employer	$ 2,000,000	$ 2,017,000
Contributions - Non-employer	0	0
Contributions - Member	157,000	179,000
Net investment income	1,813,000	1,357,000
Benefit payments, including refunds of member contributions	(2,205,000)	(2,165,000)
Administrative expenses	(32,000)	(32,000)
Net change in FNP	**$ 1,733,000**	**$ 1,356,000**
FNP - beginning	**$ 17,660,000**	**$ 19,393,000**
FNP - ending (b)	**$ 19,393,000**	**$ 20,749,000**
Plan Net Pension Liability/(Asset) - ending [(a)-(b)]	**$ 14,051,000**	**$ 11,382,000**

Items printed in red will be replaced with actual amounts once known at the end of FY 2018.

Note that GASB Statement No. 67 requires that the level percent of payroll version of Entry Age Normal calculations be used, even when benefits are not related to salary. For this reason, the figures shown for the GASB No. 67 disclosures above will not agree with those shown elsewhere in this report relating to funding.

SECTION V – ACCOUNTING STATEMENT INFORMATION

Table V-3
Analysis of Financial Experience
Gain and Loss in Accrued Liability During Years Ended June 30
Resulting from Differences Between Assumed Experience and Actual Experience

	Gain (or Loss) for Year ending June 30, (expressed in thousands)					
Type of Activity	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Investment Income on Actuarial Assets	$ (200)	$ (97)	$ 141	$ (83)	$ (278)	$ (130)
Combined Liability Experience	388	161	230	505	142	6
(Loss)/Gain During Year from Financial Experience	$ 188	$ 64	$ 371	$ 422	$ (136)	$ (124)
Non-Recurring Items	0	(28)	(1,287)	0	1,271	(634)
Composite Gain (or Loss) During Year	$ 188	$ 36	$ 916	$ 422	$ 1,135	$ (758)

Table V-4
Solvency Test
Aggregate Accrued Liabilities for

(expressed in thousands)

Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member State-Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liabilities Covered by Reported Assets (1)	(2)	(3)
2017	$ 5,302	$ 18,326	$ 10,713	$ 19,911	100%	80%	0%
2016	5,268	17,169	10,520	18,773	100	79	0
2015	5,282	15,850	12,507	18,002	100	80	0
2014	5,210	15,326	12,656	17,066	100	77	0
2013	5,087	14,291	11,663	15,773	100	75	0
2012	4,896	13,998	11,255	14,972	100	72	0

APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan
Data Reconciliation

	A	P-TDV	P-SUPP	P-RET	P-DIS	P-SR	P-SURV	Total
1. June 30, 2016 valuation	**4,617**	**166**	**0**	**1,823**	**0**	**0**	**0**	**6,606**
2. Additions								
(a) New entrants	232	1		10				243
(b) New Beneficiary/QDRO							3	3
(c) Total	232	1		10			3	246
3. Reductions								
(a) Terminated - not vested	(258)							(258)
(b) Paid Out/Expired/Death		(4)		(68)				(72)
(c) Total	(258)	(4)		(68)				(330)
4. Changes in status								
(a) P-TDV	(5)	5						
(b) P-SUPP		(7)	7					
(c) Returned to work	1	(1)						
(d) P-RET	(108)	(25)		133				
(e) PRET25								
(f) P-DIS								
(g) P-LTD								
(h) P-SURV								
(i) PSUR25								
(j) P-SR								
(k) Data corrections								
(l) Total	(112)	(28)	7	133				
5. June 30, 2017 valuation	**4,479**	**135**	**7**	**1,898**	**0**	**0**	**3**	**6,522**

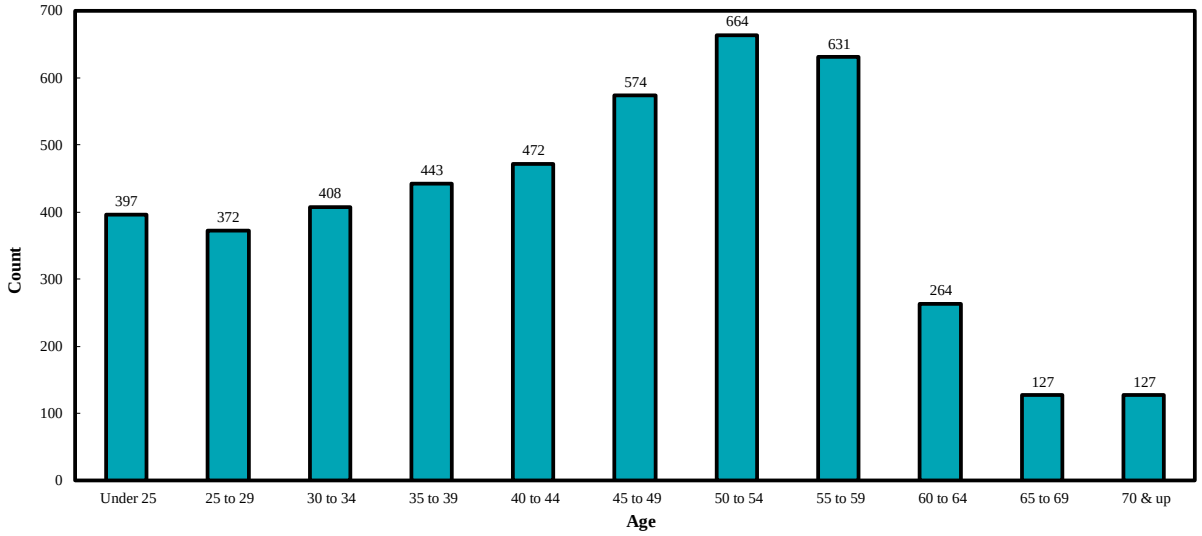
A=Active, P-TDV=Terminated Deferred Vested, P-SUPP=Terminated Deferred Vested, P-RET=Retired, P-DIS=Disabled, P-SR=Disabled, P-SURV=Surviving Beneficiary

APPENDIX A – MEMBERSHIP INFORMATION

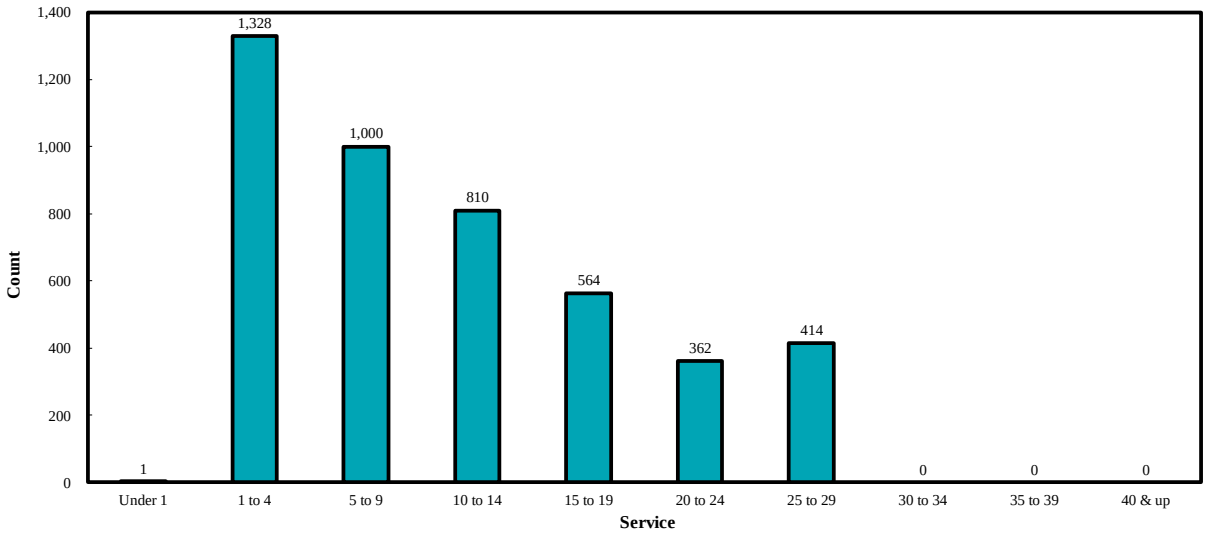
Delaware State Volunteer Firemen's Pension Plan Distribution of Active Members by Age and Service as of June 30, 2017											
Counts By Age/Service											
	Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	**Total**
Under 25	0	324	73	0	0	0	0	0	0	0	397
25 to 29	0	187	138	45	2	0	0	0	0	0	372
30 to 34	0	135	123	110	40	0	0	0	0	0	408
35 to 39	0	105	102	116	90	30	0	0	0	0	443
40 to 44	0	113	84	91	85	70	29	0	0	0	472
45 to 49	0	116	104	116	98	78	62	0	0	0	574
50 to 54	0	114	100	127	110	76	137	0	0	0	664
55 to 59	1	79	98	124	94	84	151	0	0	0	631
60 to 64	0	63	78	42	33	16	32	0	0	0	264
65 to 69	0	45	45	24	5	5	3	0	0	0	127
70 & up	0	47	55	15	7	3	0	0	0	0	127
Total	1	1,328	1,000	810	564	362	414	0	0	0	4,479

APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Distribution of Active Members by Age as of June 30, 2017



Delaware State Volunteer Firemen's Pension Plan Distribution of Active Members by Service as of June 30, 2017



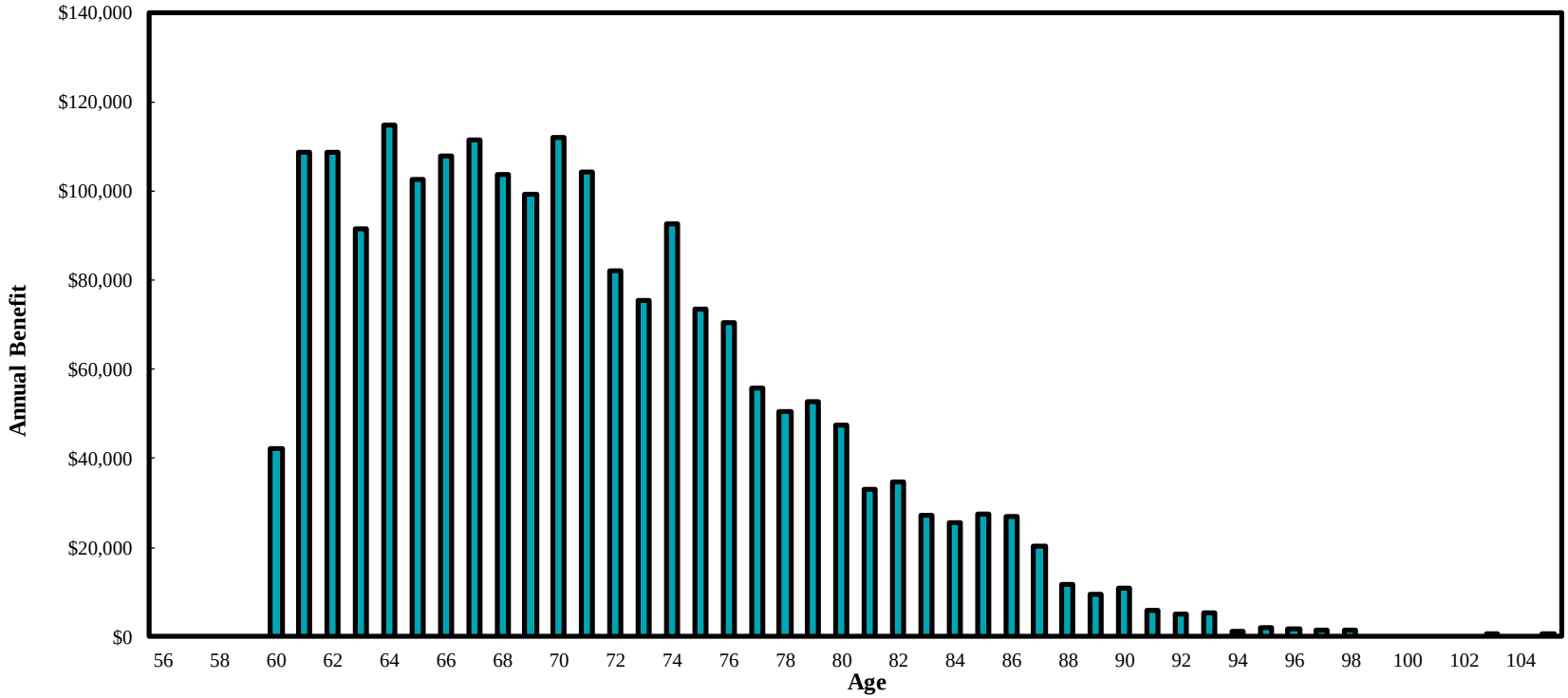
APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Annual Benefit Distribution of Retired Members and Beneficiaries as of June 30, 2017

Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	$0	73	69	$75,420
25	0	$0	74	81	$92,520
26	0	$0	75	67	$73,500
27	0	$0	76	68	$70,500
28	0	$0	77	55	$55,860
29	0	$0	78	54	$50,580
30	0	$0	79	58	$52,620
31	0	$0	80	49	$47,580
32	0	$0	81	36	$33,120
33	0	$0	82	40	$34,800
34	0	$0	83	32	$27,300
35	0	$0	84	32	$25,500
36	0	$0	85	34	$27,600
37	0	$0	86	35	$26,880
38	0	$0	87	28	$20,340
39	0	$0	88	16	$11,640
40	0	$0	89	14	$9,660
41	0	$0	90	15	$10,980
42	0	$0	91	8	$5,880
43	0	$0	92	8	$5,160
44	0	$0	93	8	$5,340
45	0	$0	94	2	$1,200
46	0	$0	95	3	$2,100
47	0	$0	96	2	$1,680
48	0	$0	97	2	$1,500
49	1	$525	98	2	$1,620
50	0	$0	99	0	$0
51	0	$0	100	0	$0
52	0	$0	101	0	$0
53	0	$0	102	0	$0
54	0	$0	103	1	$780
55	1	$357	104	0	$0
56	0	$0	105	1	$600
57	0	$0	106	0	$0
58	0	$0	107	0	$0
59	0	$0	108	0	$0
60	34	$42,336	109	0	$0
61	82	$108,720	110	0	$0
62	89	$108,780	111	0	$0
63	75	$91,500	112	0	$0
64	92	$114,660	113	0	$0
65	87	$102,540	114	0	$0
66	91	$107,820	115	0	$0
67	91	$111,540	116	0	$0
68	88	$103,680	117	0	$0
69	89	$99,120	118	0	$0
70	97	$111,960	119	0	$0
71	92	$104,160	120	0	$0
72	72	$82,020			
			Totals	1,901	$2,061,978

APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Annual Benefit Distribution of Retired Members and Beneficiaries as of June 30, 2017



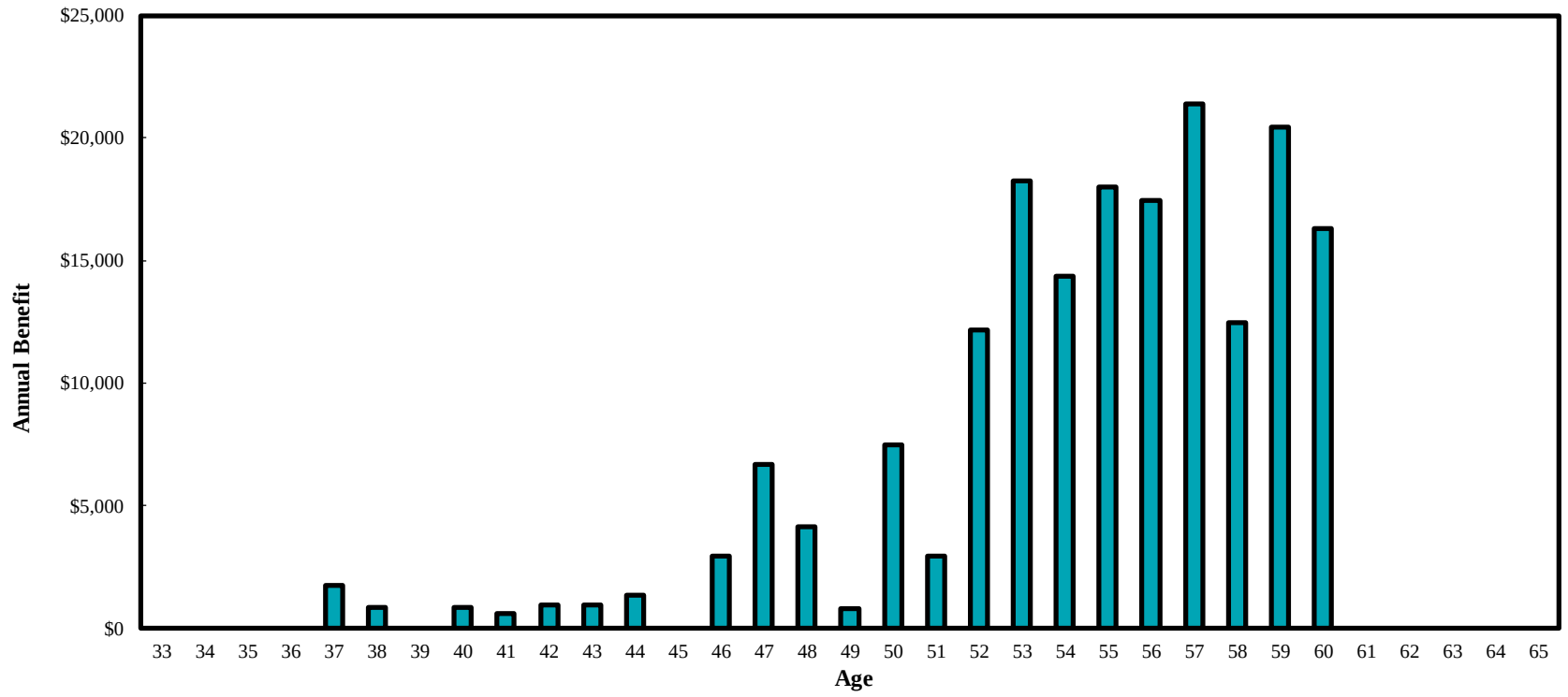
APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Annual Benefit Distribution of Vested Members as of June 30, 2017

Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	$0	73	0	$0
25	0	$0	74	0	$0
26	0	$0	75	0	$0
27	0	$0	76	0	$0
28	0	$0	77	0	$0
29	0	$0	78	0	$0
30	0	$0	79	0	$0
31	0	$0	80	0	$0
32	0	$0	81	0	$0
33	0	$0	82	0	$0
34	0	$0	83	0	$0
35	0	$0	84	0	$0
36	0	$0	85	0	$0
37	2	$1,740	86	0	$0
38	1	$840	87	0	$0
39	0	$0	88	0	$0
40	1	$840	89	0	$0
41	1	$600	90	0	$0
42	1	$960	91	0	$0
43	1	$960	92	0	$0
44	2	$1,320	93	0	$0
45	0	$0	94	0	$0
46	3	$2,940	95	0	$0
47	6	$6,660	96	0	$0
48	4	$4,140	97	0	$0
49	1	$780	98	0	$0
50	5	$7,500	99	0	$0
51	3	$2,940	100	0	$0
52	9	$12,180	101	0	$0
53	13	$18,240	102	0	$0
54	11	$14,340	103	0	$0
55	12	$18,000	104	0	$0
56	13	$17,460	105	0	$0
57	17	$21,420	106	0	$0
58	9	$12,480	107	0	$0
59	15	$20,460	108	0	$0
60	12	$16,320	109	0	$0
61	0	$0	110	0	$0
62	0	$0	111	0	$0
63	0	$0	112	0	$0
64	0	$0	113	0	$0
65	0	$0	114	0	$0
66	0	$0	115	0	$0
67	0	$0	116	0	$0
68	0	$0	117	0	$0
69	0	$0	118	0	$0
70	0	$0	119	0	$0
71	0	$0	120	0	$0
72	0	$0			
			Totals	142	$183,120

APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Annual Benefit Distribution of Vested Members as of June 30, 2017



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Long-Term Assumptions Used to Determine Plan Costs and Liabilities

1. Demographic Assumptions

a. Rates of Mortality

Mortality rates are based on the sex-distinct employee, healthy annuitant, and disabled annuitant mortality tables described below, including adjustment factors applied to the published tables for each group. Future mortality improvements are reflected by applying a custom projection scale on a generational basis to adjusted base tables from the base year shown below.

i. Sample Rates of Mortality for Active Healthy Lives at Selected Ages (number of deaths per 10,000 members):

(2017 Values Shown)		
Age	Male	Female
25	5	2
30	5	2
35	5	3
40	7	4
45	10	6
50	18	11
55	30	17
60	50	25
65	89	37
70	151	63
75	258	109
80	436	188

Rates are based on 110% and 100% of the RP-2014 Total Dataset Employee Mortality Table, respectively, for males and females, using the RP-2014 Total Dataset Healthy Annuitant Mortality Table rates after the end of the Employee Mortality Table, both projected from the 2006 base rates using the RPEC-2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0% for ages 115-120, and convergence to the ultimate rate in the year 2020. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

ii. Sample Rates of Mortality for Healthy Annuitant Lives at Selected Ages (number of deaths per 10,000 members):

(2017 Values Shown)		
Age	Male	Female
50	43	27
55	62	36
60	83	52
65	118	80
70	183	129
75	299	211
80	503	357
85	877	633
90	1,545	1,131
95	2,439	1,862
100	3,491	2,789

Rates are based on 110% and 100% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table, respectively, for males and females, using the RP-2014 Total Dataset Employee Mortality Table for ages prior to the start of the Healthy Annuitant Mortality Table, both projected from the 2006 base rates using the RPEC-2015 model, with an ultimate rate of 0.85% for ages 20-85 grading down to an ultimate rate of 0% for ages 115-120 and convergence to the ultimate rate in the year 2020. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

iii. Sample Rates of Mortality for Disabled Annuitant Lives at Selected Ages (number of deaths per 10,000 members):

(2017 Values Shown)		
Age	Male	Female
25	92	27
30	88	35
35	104	48
40	125	67
45	194	104
50	237	137
55	273	173
60	311	205
65	372	249
70	481	339
75	659	497
80	940	750
85	1,399	1,135
90	2,145	1,681
95	3,009	2,445
100	3,963	3,437

Rates are based on 120% of the RP-2014 Total Dataset Disabled Annuitant Mortality Table, projected from the 2006 base rates using the RPEC-2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0% for ages 115-120, and convergence to the ultimate rate in the year 2020. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

b. Rates of Active Disability

Rates of Active Disability	
Age	Rates
20	0.0522%
25	0.0522
30	0.1831
35	0.2694
40	0.3821
45	0.4643
50	0.6214
55	0.8579
60	1.0699

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

c. Termination of Employment (Prior to Normal Retirement Eligibility)

Rates of Termination	
Service	Rates
0-3	7.0%
4-5	6.0
6	5.0
7	4.0
8	3.0
9	9.0
10-25	1.0
26+	0.0

d. Retirement

Normal Retirement: eligible upon attaining age 60 with completion of 10 years of service

Rates of Retirement*	
Service	Rates
<60	0.0%
60	60.0
61-64	30.0
65-67	25.0
68-79	20.0
80+	100.0

* Rates only applicable if member meets eligibility.

e. Salary Increase

Not applicable. Salary is not a component of this Plan.

f. Service Accrual

2/3 of active members will accrue additional service and make member contributions.

2. Economic Assumptions

a.	Investment Rate of Return:	7.00%
b.	General Wage Increase Rate:	N/A
c.	Annual Assumed Cost-of-Living Increase Rate for Retirees:	0.00%
d.	Total Payroll Increase Rate (for Amortization):	N/A

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

e. Administrative Expenses:	Assume following year's expense will equal allocation of administrative expenses made in the prior year increased by 3%.

3. Rationale for Assumptions

The assumptions were adopted by the Board of Trustees upon the recommendation of the actuary, based on an experience study review performed in 2016 and covering the period July 1, 2010 through June 30, 2015. The Board continually reviews the investment rate of return assumption and adopted a reduced rate of 7.0% at the advice of its investment consultants, first effective for funding with the 2017 valuation.

4. Changes Since Last Valuation

The investment rate of return was reduced from 7.2% to 7.0%.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Funding Method

The Entry Age Normal funding method is used to determine costs. Under this funding method, a normal cost is determined as the level dollar amount for each active member. The normal cost plus member contributions will pay for projected benefits at retirement for each active plan participant. Member contributions are assumed to be made by two-thirds of the active population in each year.

The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and funds accumulated as of the same date is referred to as the unfunded actuarial liability.

The portion of the actuarial liability in excess of plan assets is amortized to develop an additional cost or savings that is added to each year's employer normal cost. Under this cost method, actuarial gains and losses are directly reflected in the size of the unfunded actuarial liability.

The portion of unfunded liability is amortized as a level dollar amount over a rolling 15-year period. The unfunded liability was being amortized by annual payments over a 40-year period from July 1, 1987 until July 1, 2013, at which time the funding method was moved to a 15-year open period. Use of a rolling amortization period means that the UAL amount is never anticipated to be fully paid off. This method was chosen to provide more level contributions over time.

For purposes of the GASB 67 disclosures, the Entry Age Normal funding method assuming a level percentage of pay is used. For this method, the pay increase assumption is the underlying inflation rate of 2.50%.

2. Actuarial Value of Assets

For purposes of determining the employer contribution rate to the Plan, we use an actuarial value of assets. The asset smoothing method dampens the volatility in asset values that could occur because of fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

The actuarial value of assets is a weighted average giving 20% weight to the current market value and 80% weight to the prior year's actuarial value increased by expected interest and contributions and decreased by benefit payments and expenses. This is mathematically equivalent to recognizing 100% of the actuarially assumed interest rate, plus contributions, less payment each year, and 20% of the portion of each year's returns that have not already been reflected in asset values.

3. Changes Since Last Valuation

None

APPENDIX C – SUMMARY OF PLAN PROVISIONS

This appendix provides a summary of the plan provisions. Where the Plan, as determined by the State Code and the Plan Rules and Regulations, and this summary differ, the Plan governs.

1. Membership

The Plan covers actively-participating volunteers of one of the State volunteer fire departments, ladies auxiliaries, and service organizations providing volunteer ambulance services.

2. Member Contributions

$60.00 per member per year
Interest is credited at the rate of 5% per year.

3. Credited Service

Service prior to July 1, 1986: one year of service for each three years of service

Service after June 30, 1986: all service as a volunteer as certified by a fire company

4. Normal Retirement

Eligibility: Age 60 with 10 years of credited service

Benefit: $5.00 per year of credited service, to a maximum of $125.00 per month

5. Survivor's Benefit

Eligibility: Death of a member, inactive member, or retired member

Benefit: Lump sum equal to the excess, if any, of the accumulated member contributions with interest over the total pension payments made, if any

6. Vesting

Eligibility: 10 years of credited service

Benefit: Normal retirement benefit payable at age 60 based on service at date of termination. In lieu of a pension, a member may receive a refund of accumulated employee contributions with interest. Upon application for a refund of contributions, a member's vested right to a monthly benefit shall be forfeited.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

7. Form of Payment

The normal form of payment is a single life annuity with a guarantee that at least member contributions will be paid out.

8. Changes Since Last Valuation

None

Classic Values, Innovative Advice