

Delaware State Volunteer Firemen's Pension Plan

**Actuarial Valuation
as of June 30, 2016**

Produced by Cheiron

March 2017

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March 10, 2017

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, 2016. 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) 2017 and rely on future Plan experience conforming to the underlying assumptions. To the extent that actual Plan experience deviates from the underlying assumptions, the results would vary accordingly.

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. 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 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
Principal Consulting Actuary



Elizabeth Wiley, FSA, EA
Consulting Actuary

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

FOREWORD

Cheiron has performed the annual actuarial valuation of the Delaware State Volunteer Firemen's Pension Plan (Plan) as of June 30, 2016. 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) 2017, 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 2017 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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION I - BOARD SUMMARY

General Comments

The actuarially determined contribution (ADC) amount decreased from \$2,010,300 for FY 2016 to \$1,992,400 for FY 2017.

During the year ended June 30, 2016, the Plan's assets earned 1.3% on a market value basis. However, due to the Plan's asset smoothing method, which recognizes only a portion of the investment gains and losses, the return on an actuarial value basis was 5.6%. 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 \$278,000.

The Plan experienced an actuarial gain 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 \$142,400. 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 gain, the Plan's liabilities also decreased by \$1,270,800 due to changes in assumptions as recommended in an experience study performed in 2016.

This valuation report also contains information to be reported in the June 30, 2016 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 2015 actuarial valuation liability results. The calculation of net pension liability in Section V is shown as disclosed for the plan year ending June 30, 2016, based on the 2015 funding actuarial valuation liability results, updated to reflect the assumption changes adopted by the Board of Trustees as recommended in the recent experience study. We also present a projection of the June 30, 2017 disclosure in Section V, assuming all actuarial assumptions are met over the coming year, which is based on the 2016 funding actuarial valuation liability results.

The decrease in the Plan's UAL was less than what would otherwise be expected due to employers contributing less than the ADC amount for the year. The anticipated ADC for the fiscal year ending June 30, 2016 was \$2,010,000. Employers actually made contributions totaling \$1,764,000. This will remain a source of future losses as long as the employer contributions are less than the ADC.

As of the June 30, 2016 funding actuarial valuation, the Plan's unfunded actuarial liability (UAL) was \$14.2 million. This is a decrease from the \$15.6 million UAL in the funding valuation for the prior year.

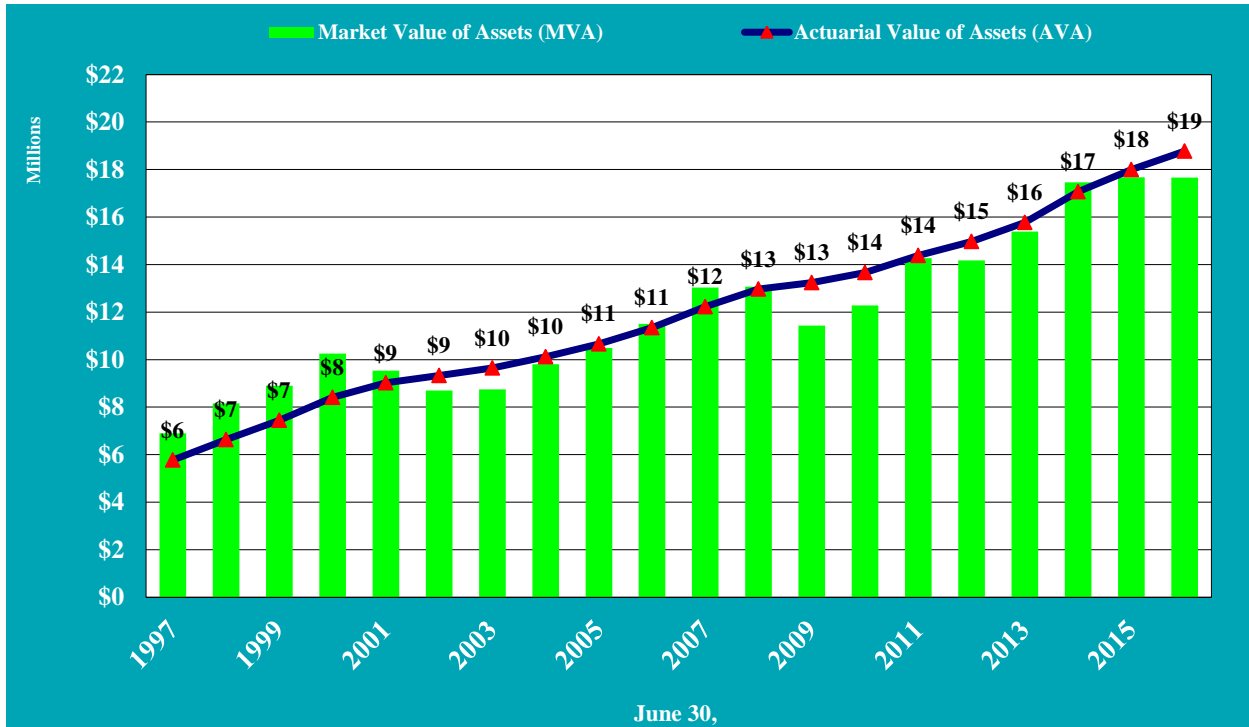
DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016

SECTION I - BOARD SUMMARY

Trends

Growth in Assets

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 1.3% 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 below the 7.2% assumed for the year, and continued recognition of prior years' gains and losses, and thus returned 5.6% over FY 2016.

Over the period July 1, 1997 to June 30, 2016, the Plan's assets have had an approximately 8.4% annual average geometric return on an actuarial value basis, compared to the current valuation assumption of 7.2%.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

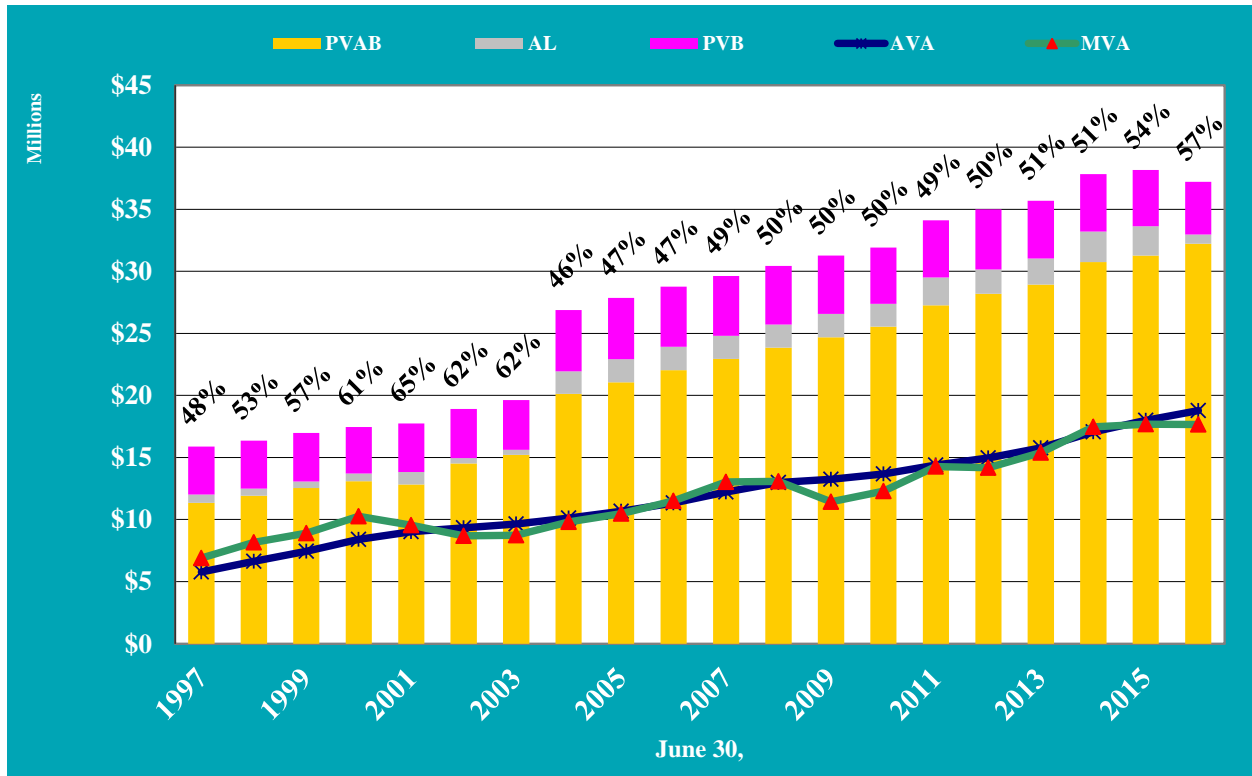
SECTION I - BOARD SUMMARY

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.

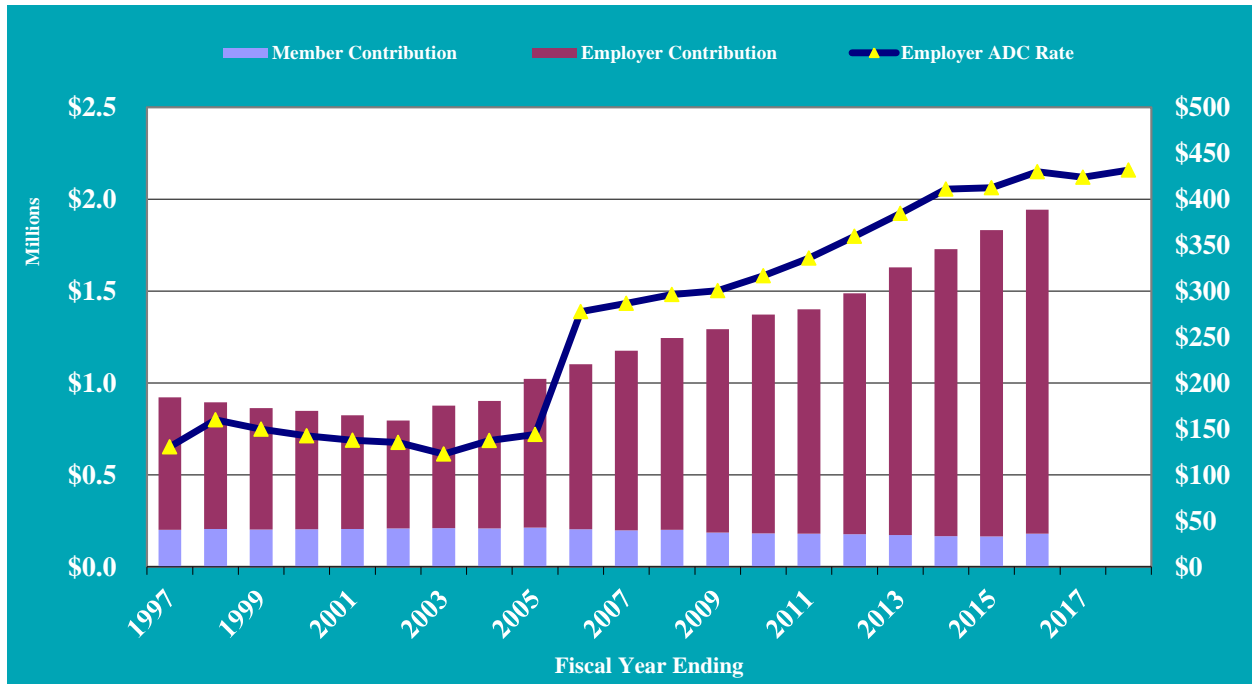
The amount represented by the top of the pink bars, the present value of future benefits (PVB), is the amount needed to provide all benefits for the current members and their beneficiaries, including reflection of assumed future service and pay increases. If the Plan had assets equal to the PVB as of 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.



DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016

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).

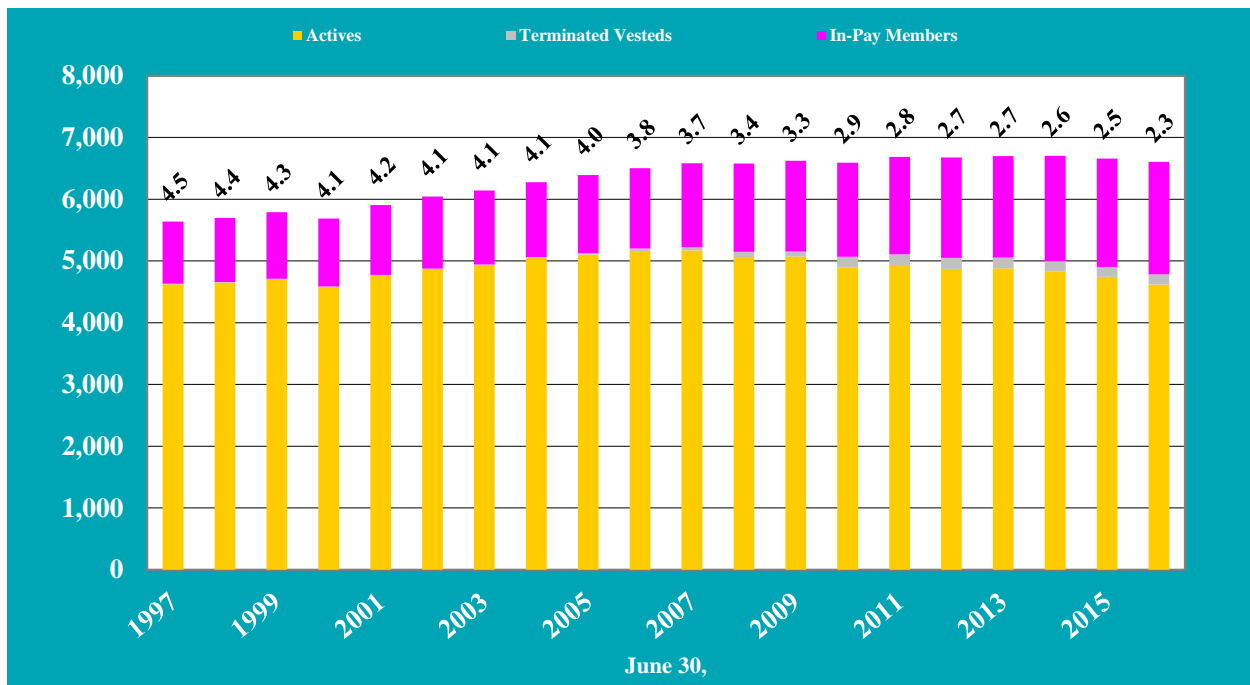
The member contribution rate is set by State law, based on the Plan in which the member participates. The participating employer ADC amount is set by the actuarial process.

DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016

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 4.5 actives to each inactive in 1997 to 2.3 actives for each inactive in 2016.

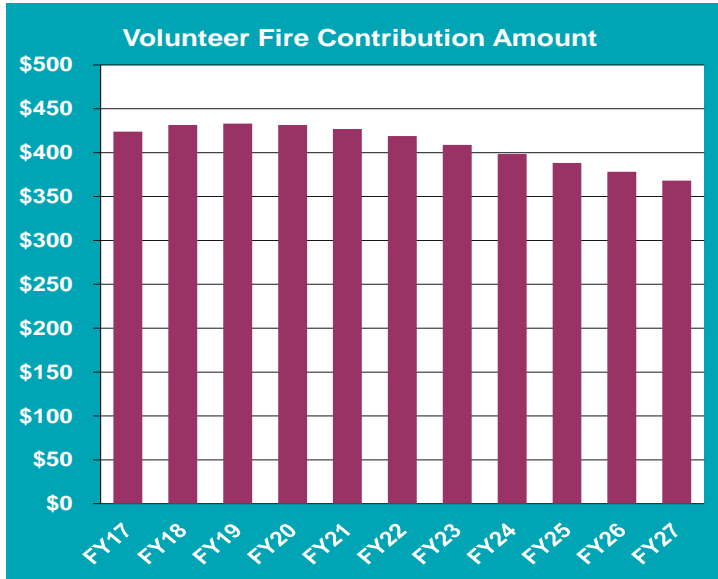


**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION I - BOARD SUMMARY

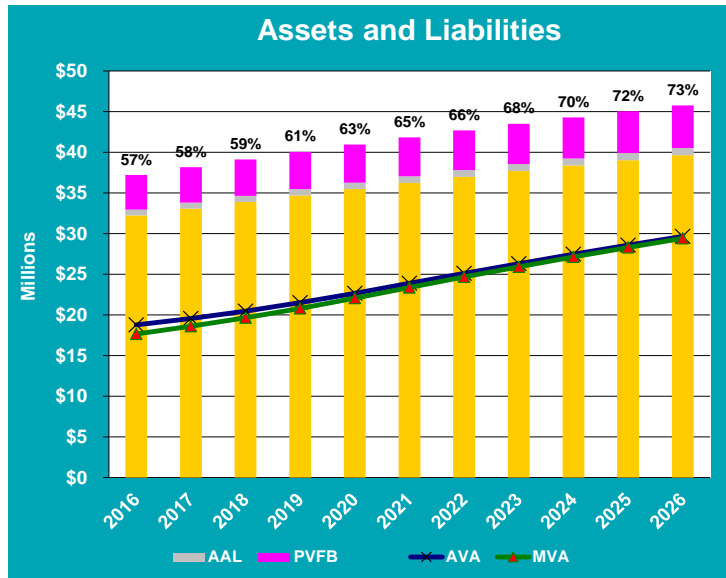
Future Outlook

Baseline Projections



These graphs show the expected progress of the Plan over the next 10 years, assuming the Plan's assets earn 7.2% on a *market value* basis and assuming all 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 the employer ADC amount per head is expected to increase in the short-term, as stored investment losses are recognized by the asset smoothing method. Then the contribution amount stabilizes and begins to decline.

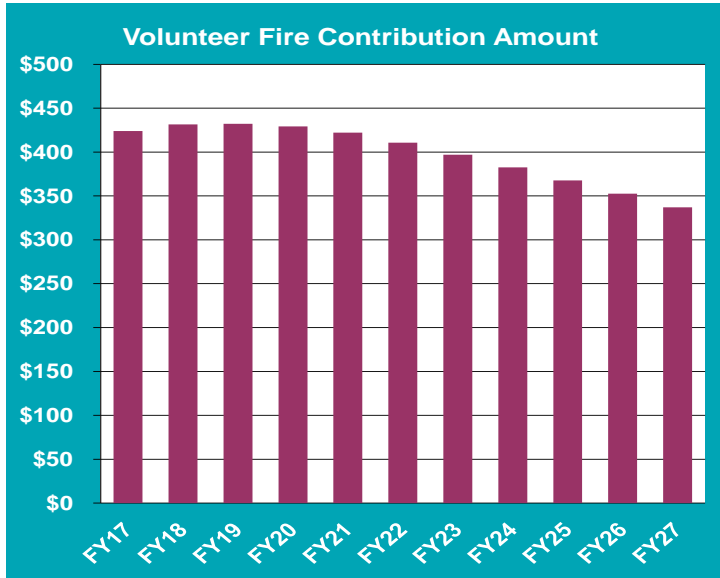
The "Assets and Liabilities" graph under this scenario shows the projected funded ratios of the Plan over the 10-year projection period. The Plan's funded status is projected to improve annually, as the existing unfunded liability is paid off. This pattern for the ultimate funding level and contribution amount may be impacted by the phase-in to employer contributions equal to the full actuarially determined rates.



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION I - BOARD SUMMARY

Projections with Asset Returns of 8.2%

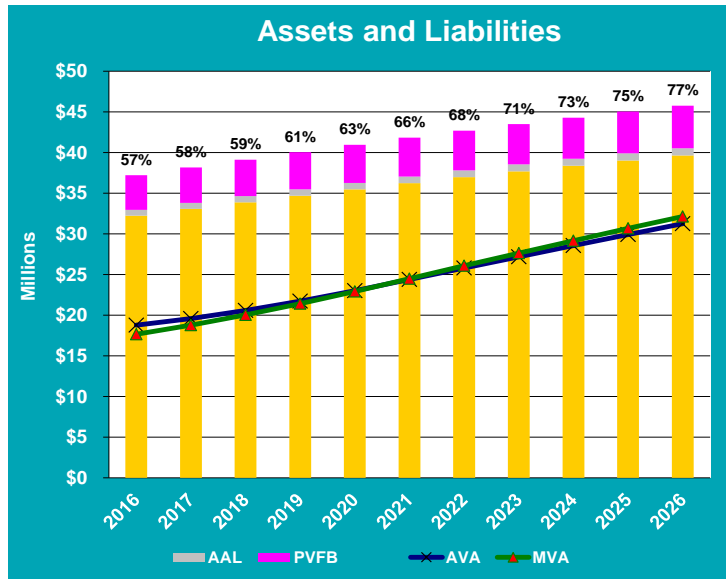


The Plan's investment earnings will affect the future funding status of the Plan. The two graphs on this page show what the next 10 years would be expected to look like if the Plan's investment performance is 8.2% each year, 1.0% higher than the valuation investment rate of return assumption.

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

The "Volunteer Fire Contribution Amount" graph shows that under this scenario the employer ADC amount per head would continue to increase for a couple of years beyond the FY 2017 rate determined by this valuation, as the stored investment losses are recognized by the asset smoothing method.

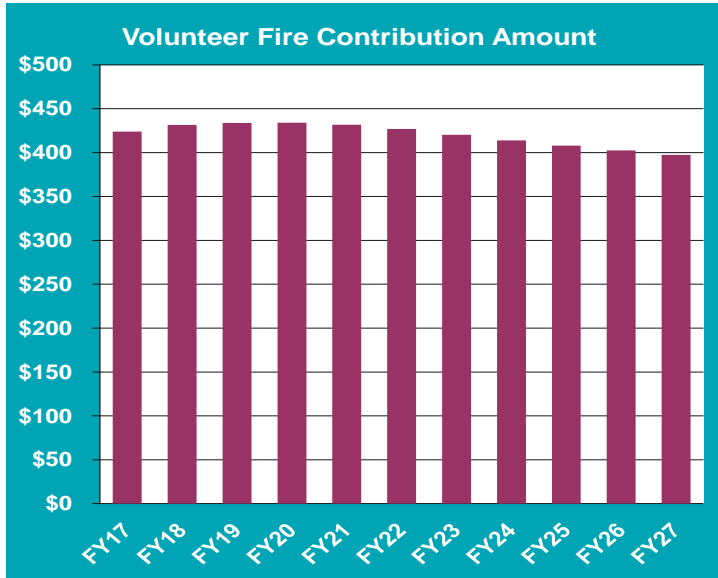
The "Assets and Liabilities" graph shows that under this scenario the Plan would reach a 77% funded ratio by 2026, an improvement over the baseline scenario's ultimate level of 73%.



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
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SECTION I - BOARD SUMMARY

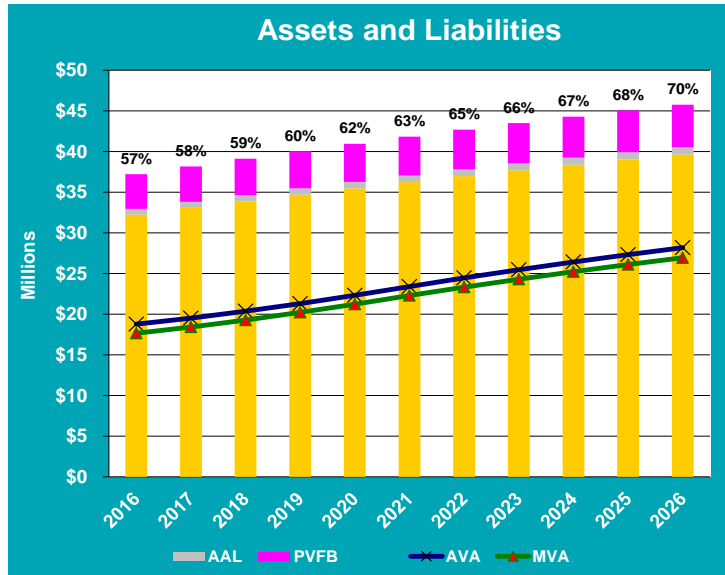
Projections with Asset Returns of 6.2%



The graphs on this page show projections of the Plan's funding status and contributions assuming that the Plan's investment performance is 6.2% 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 equal to the full actuarially determined contribution.

Under this scenario, the ultimate employer ADC amount increases to approximately \$397 per head by the end of the 10-year period, significantly greater than the \$368 per head ultimate amount in the baseline projection. 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 73% ultimate ratio in the baseline scenario.



The projection of this scenario shows an increase in the Plan's funded status from 57% to 70% by the end of the 10-year period. The improvement in funded status is driven by the assumption that contributions are being made towards paying down the UAL. If actual contributions continue to come in at less than the ADC amount, this improvement may not occur.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION I - BOARD SUMMARY

**Table I-1
Summary of Principal Plan Results**

Valuation as of:	June 30, 2015	June 30, 2016	% Change
<u>Member Counts</u>			
Active Members	4,742	4,617	(2.64%)
Retirees and Members	1,749	1,823	4.23%
Terminated Vested Members	160	166	3.75%
Terminated Non-Vested Members	<u>9</u>	<u>1</u>	(88.89%)
Total Member Counts	6,660	6,607	(0.80%)
Annual Benefit Payments for Retirees, Disabled Members, and Beneficiaries	\$ 1,870,300	\$ 1,961,400	4.87%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 33,638,900	\$ 32,957,000	(2.03%)
Actuarial Value of Assets (AVA)	<u>18,001,800</u>	<u>18,772,700</u>	4.28%
Unfunded AL (UAL)	\$ 15,637,100	\$ 14,184,300	(9.29%)
Funded Ratio on AVA Basis (AVA/AL)	53.5%	57.0%	
Funded Ratio on MVA Basis (MVA/AL)	52.5%	53.6%	
Present Value of Accrued Benefits (PVAB)	\$ 31,279,600	\$ 32,234,600	3.05%
Market Value of Assets (MVA)	<u>17,671,200</u>	<u>17,660,000</u>	(0.06%)
Unfunded PVAB	\$ 13,608,400	\$ 14,574,600	7.10%
Accrued Benefit Funded Ratio (PVAB/MVA)	56.5%	54.8%	
<u>Employer Contribution Amount</u>			
	Fiscal Year 2016	Fiscal Year 2017	
Entry Age Normal Cost	\$ 298,700	\$ 436,000	
UAL Amortization Payment	1,679,200	1,523,200	
Administrative Expense	<u>32,400</u>	<u>33,200</u>	
Actuarially Determined Contribution (ADC)	\$ 2,010,300	\$ 1,992,400	

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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, 2015 and June 30, 2016,
- Statement of the **changes** in market values during FY 2016,
- 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, 2015 and June 30, 2016, along with the changes between the two.

Table II-1 Changes in Market Values of Assets		
Market Value of Assets – June 30, 2015		\$ 17,671,200
<u>Additions</u>		
Member Contributions	\$ 179,700	
Employer Contributions	1,763,600	
Investment Returns	<u>227,200</u>	
Total Additions	\$ 2,170,500	
<u>Deductions</u>		
Benefit Payments	\$ 2,148,500	
Administrative Expenses	<u>33,200</u>	
Total Deductions	\$ 2,181,700	
Market Value of Assets – June 30, 2016		\$ 17,660,000

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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, 2016.

Table II-2 Development of Actuarial Value of Assets		
1.	Actuarial Value of Assets at June 30, 2015	\$ 18,001,800
2.	Amount in (1) with interest to June 30, 2016 at 7.50% per year	\$ 19,297,900
3.	Employer and member contributions for the Plan Year ended June 30, 2016	1,943,300
4.	Interest on contributions assuming payments made uniformly throughout the year to June 30, 2016 at 7.50% per year	70,000
5.	Disbursements from Trust except investment expenses, July 1, 2015 through June 30, 2016	2,181,700
6.	Interest on disbursements to June 30, 2016 at 7.50% per year	<u>78,600</u>
7.	Expected Actuarial Value of Assets at June 30, 2016 = (2) + (3) + (4) – (5) – (6)	\$ 19,050,900
8.	Actual Market Value of Assets at June 30, 2016	<u>\$ 17,660,000</u>
9.	Excess of (8) over (7)	\$ (1,390,900)
10.	Actuarial Value of Assets at June 30, 2016 = (7) + 20% of (9)	\$ 18,772,700

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION II - ASSETS

Investment Performance

The market value of assets (MVA) returned 1.3% during 2016, which is less than the assumed 7.2% investment rate of return. The actuarial value of assets (AVA) returned 5.6% over this same year, reflecting the asset smoothing method being utilized by the Plan for the measurement of the AVA. Since only 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*
2016	\$ 2,076,000	\$ 2,142,000
2017	2,141,000	2,177,000
2018	2,215,000	2,177,000
2019	2,296,000	2,177,000
2020	2,369,000	2,177,000
2021	2,440,000	2,177,000
2022	2,527,000	2,177,000
2023	2,604,000	2,177,000
2024	2,684,000	2,177,000
2025	2,765,000	2,177,000

* Expected contributions include employer contributions and member contributions. For illustration purposes, we have assumed the employer contribution rate will remain level from FYE 2017 and does not reflect the continued phase-in to paying the full actuarially calculated amount.

Expected benefit payments are projected for the closed group valued at June 30, 2016. 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.

DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016

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, 2015 and June 30, 2016, 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 7.2% per year.

Note that 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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION III - LIABILITIES

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

	June 30, 2015	June 30, 2016
<u>Present Value of Benefits</u>		
Active Member Benefits	\$ 20,716,700	\$ 18,392,600
Retiree, Beneficiary, Disabled, and Terminated Members Benefits	17,448,600	18,812,500
Present Value of Benefits (PVB)	\$ 38,165,300	\$ 37,205,100
Market Value of Assets (MVA)	\$ 17,671,200	\$ 17,660,000
Future Member Contributions	2,208,000	1,380,000
Future Employer Contributions	18,286,100	18,165,100
Total Resources	\$ 38,165,300	\$ 37,205,100
<u>Actuarial Liability</u>		
Present Value of Benefits (PVB)	\$ 38,165,300	\$ 37,205,100
Present Value of Future Employer Normal Costs (PVFNC)	2,318,400	2,868,100
Present Value of Future Member Contributions (PVFEEC)	2,208,000	1,380,000
Actuarial Liability (AL=PVB-PVFNC-PVFEEC)	\$ 33,638,900	\$ 32,957,000
Actuarial Value of Assets (AVA)	18,001,800	18,772,700
Net (Surplus)/Unfunded AL (AL - AVA)	\$ 15,637,100	\$ 14,184,300
<u>Present Value of Accrued Benefits</u>		
Present Value of Benefits (PVB)	\$ 38,165,300	\$ 37,205,100
Present Value of Future Benefit Accruals (PVFBA)	6,885,700	4,970,500
Present Value of Accrued Benefits (PVAB=PVB-PVFBA)	\$ 31,279,600	\$ 32,234,600
Market Value of Assets (MVA)	\$ 17,671,200	\$ 17,660,000
Net (Surplus)/Unfunded PVAB (PVAB - MVA)	\$ 13,608,400	\$ 14,574,600

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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, 2015	\$ 38,165	\$ 33,639	\$ 31,280
Liabilities June 30, 2016	37,205	32,957	32,235
Liability Increase/(Decrease)	(960)	(682)	955
Change Due to:			
Benefit Changes	0	0	0
Assumption Changes	(1,439)	(1,271)	333
Actuarial (Gain)/Loss	NC *	(142)	NC*
Benefits Accumulated and Other Sources	479	731	622

* NC = not calculated

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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, 2015	June 30, 2016
1. Actuarial Liabilities		
Retiree, Beneficiary, Disabled, and Terminated Members	\$ 17,448,600	\$ 18,812,500
Active Members	<u>16,190,300</u>	<u>14,144,500</u>
Total Actuarial Liability	\$ 33,638,900	\$ 32,957,000
2. Actuarial Value of Assets	\$ 18,001,800	\$ 18,772,700
3. Unfunded Actuarial Liability (UAL)	\$ 15,637,100	\$ 14,184,300

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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, 2015	June 30, 2016
FY Contribution Amount Payable	FY 2016	FY 2017
Entry Age Normal Cost Amount	\$ 298,700	\$ 436,000
UAL Amortization Payment Amount	1,679,200	1,523,200
Administrative Expense Amount	<u>32,400</u>	<u>33,200</u>
Actuarially Determined Contribution	\$ 2,010,300	\$ 1,992,400

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
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SECTION IV - CONTRIBUTIONS

Table IV-2 below provides additional detail about the development of the expected employer contribution amount for FY 2017.

Table IV-2 Expected FY 2017 Employer Contributions	
	In Dollars
1. Present Value of Projected Benefits Attributable to:	
a. Total Normal Cost	\$ 620,700
b. Expected Member Contributions	<u>184,700</u>
c. Employer-Paid Normal Cost (a) – (b)	\$ 436,000
2. Amortization of Unfunded Liability	1,523,200
3. Allowance for Administrative Expense	<u>33,200</u>
4. Total Employer Actuarially Determined Contribution Amount (1) + (2) + (3)	\$ 1,992,400

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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, 2015 and June 30, 2016 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, 2015, to the liabilities as of June 30, 2016. These values are based on the June 30, 2016 funding liability results.

This valuation contains information reported in the June 30, 2016 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 2015 funding valuation results. The calculation of Net Pension Liability in Table V-2 shows the amounts to be disclosed for FY 2016, based on the liabilities of the roll forward of the 2015 funding valuation, as well as a projection of the anticipated FY 2017 disclosures, based on the liabilities from the 2016 funding valuation, assuming all actuarial assumptions are met over the coming year. The actual disclosures for FY 2017 will be developed once the asset measure for GASB as of June 30, 2017 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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION V - ACCOUNTING STATEMENT INFORMATION

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

	June 30, 2015	June 30, 2016
FASB ASC Topic No. 960 Basis		
1. Present Value of Accrued Benefits		
a. Members Currently Receiving Payments	\$ 15,849,600	\$ 17,169,300
b. Former Vested Members	1,599,000	1,643,200
c. Active Members	<u>13,831,000</u>	<u>13,422,100</u>
2. Total Present Value of Accrued Benefits (1 (a) + 1(b) + 1(c))	\$ 31,279,600	\$ 32,234,600
3. Market Value of Assets	<u>17,671,200</u>	<u>17,660,000</u>
4. Unfunded Present Value of Accrued Benefits (2 – 3)	\$ 13,608,400	\$ 14,574,600
5. Ratio of Market Value of Assets to Present Value of Benefits (3 / 2)	56.5%	54.8%
Reconciliation of Present Value of Accrued Benefits		
Actuarial Present Value of Accrued Benefits at June 30, 2015		\$ 31,279,600
Increase/(Decrease) During Year Attributable to:		
Passage of Time		2,174,800
Benefits Paid – FY 2016		(2,148,500)
Benefit Changes		0
Assumption Changes		333,000
Benefits Accrued, Other Gains/Losses		<u>595,700</u>
Net Increase/(Decrease)		955,000
Actuarial Present Value of Accrued Benefits at June 30, 2016		\$ 32,234,600

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
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SECTION V - ACCOUNTING STATEMENT INFORMATION

**Table V-2
GASB Number 67 Disclosures**

	June 30, 2016	Estimated June 30, 2017
<u>Total Pension Liability</u>		
Service cost	\$ 667,000	\$ 714,000
Interest	2,302,000	2,274,000
Changes in benefit terms	0	0
Differences between expected and actual experience	(2,222,000)	3,000
Changes in assumptions	772,000	(1,221,000)
Benefit payments, including refunds of member contributions	(2,148,000)	(2,256,000)
Net change in Total Pension Liability	\$ (629,000)	\$ (486,000)
Total Pension Liability - beginning	\$ 33,818,000	\$ 33,189,000
Total Pension Liability - ending (a)	\$ 33,189,000	\$ 32,703,000
<u>Plan Fiduciary Net Position</u>		
Contributions - Employer	\$ 1,764,000	\$ 1,958,000
Contributions - Non-employer	0	0
Contributions - Member	179,000	185,000
Net investment income	227,000	1,266,000
Benefit payments, including refunds of member contributions	(2,148,000)	(2,256,000)
Administrative expenses	(33,000)	(34,000)
Net change in Plan Fiduciary Net Position	\$ (11,000)	\$ 1,119,000
Plan Fiduciary Net Position - beginning	\$ 17,671,000	\$ 17,660,000
Plan Fiduciary Net Position - ending (b)	\$ 17,660,000	\$ 18,779,000
Plan Net Pension Liability (Asset) - ending [(a)-(b)]	\$ 15,529,000	\$ 13,924,000

Items printed in red will be replaced with actual amounts once known at the end of FY 2017.

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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION V - ACCOUNTING STATEMENT INFORMATION

**Table V-3
Note to Required Supplementary Information**

The information presented in the required supplementary schedules was determined as part of the measurement at the date indicated. Additional information as of the latest measurement date follows:

Measurement date	July 1, 2016
Actuarial cost method	Entry age normal
Amortization method	Level dollar - open
Remaining amortization period	15 years
Asset valuation method	Smoothed market, 20% annual market weight
Actuarial assumptions:	
Investment rate of return*	7.2%
Projected salary increases	N/A
Cost-of-living adjustments	ad hoc
*Includes inflation at	2.50%

The actuarial assumptions used have been recommended by the actuary and adopted by the Plan's Board of Trustees based on the most recent review of the Plan's experience completed in 2016.

The total amount of employer contributions to the Plan is composed of the employer normal cost amount, unfunded actuarial liability amortization payment amount, and the administrative expense amount. The employer normal cost is a level dollar amount which, along with member contributions, will pay for projected benefits at retirement 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 costs or future member contributions. The difference between this liability and the funds accumulated as of the same date is the unfunded actuarial liability. The allowance for administrative expenses is based upon the Plan's actual administrative expenses.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

SECTION V - ACCOUNTING STATEMENT INFORMATION

**Table V-4
Analysis of Financial Experience
Gain and Loss in Accrued Liability During Years Ended June 30
Resulting from Differences Between Assumed Experience and Actual Experience**

Type of Activity	<i>Gain (or Loss) for Year ending June 30, (expressed in thousands)</i>					
	2011	2012	2013	2014	2015	2016
Investment Income on Actuarial Assets	\$ (27)	\$ (200)	\$ (97)	\$ 141	\$ (83)	\$ (278)
Combined Liability Experience	<u>29</u>	<u>388</u>	<u>161</u>	<u>230</u>	<u>505</u>	<u>142</u>
(Loss)/Gain During Year from Financial Experience	\$ 2	\$ 188	\$ 64	\$ 371	\$ 422	\$ (136)
Non-Recurring Items	<u>(1,132)</u>	<u>0</u>	<u>(28)</u>	<u>(1,287)</u>	<u>0</u>	<u>1,271</u>
Composite Gain (or Loss) During Year	\$ (1,130)	\$ 188	\$ 36	\$ 916	\$ 422	\$ 1,135

**Table V-5
Solvency Test
Aggregate Accrued Liabilities for**

Valuation Date June 30,	(expressed in thousands)				Portion of Accrued Liabilities Covered by Reported Assets		
	Active Member Contributions	Retirees & Beneficiaries	Active Member State-Financed Contributions	Actuarial Value of Reported Assets			
	(1)	(2)	(3)		(1)	(2)	(3)
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
2011	4,797	13,457	11,261	14,379	100	71	0

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
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APPENDIX A - MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Data Reconciliation							
	A	P-TDV	P-RET	P-DIS	P-SR	P-SURV	Total
1. June 30, 2015 valuation	4,742	160	1,749	0	0	0	6,651
2. Additions							
(a) New entrants	214		3				217
(b) <u>New Beneficiary/QDRO</u>							
(c) Total	214		3				217
3. Reductions							
(a) Terminated - not vested	(188)						(188)
(b) <u>Paid Out/Expired/Death</u>		(2)	(72)				(74)
(c) Total	(188)	(2)	(72)				(262)
4. Changes in status							
(a) P-TDV	(22)	22					
(b) Returned to work	1	(1)					
(c) P-RET	(130)	(13)	143				
(d) P-DIS							
(e) P-LTD							
(f) P-SURV							
(g) <u>Data corrections</u>							
(h) Total	(151)	8	143				
5. June 30, 2016 valuation	4,617	166	1,823	0	0	0	6,606

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

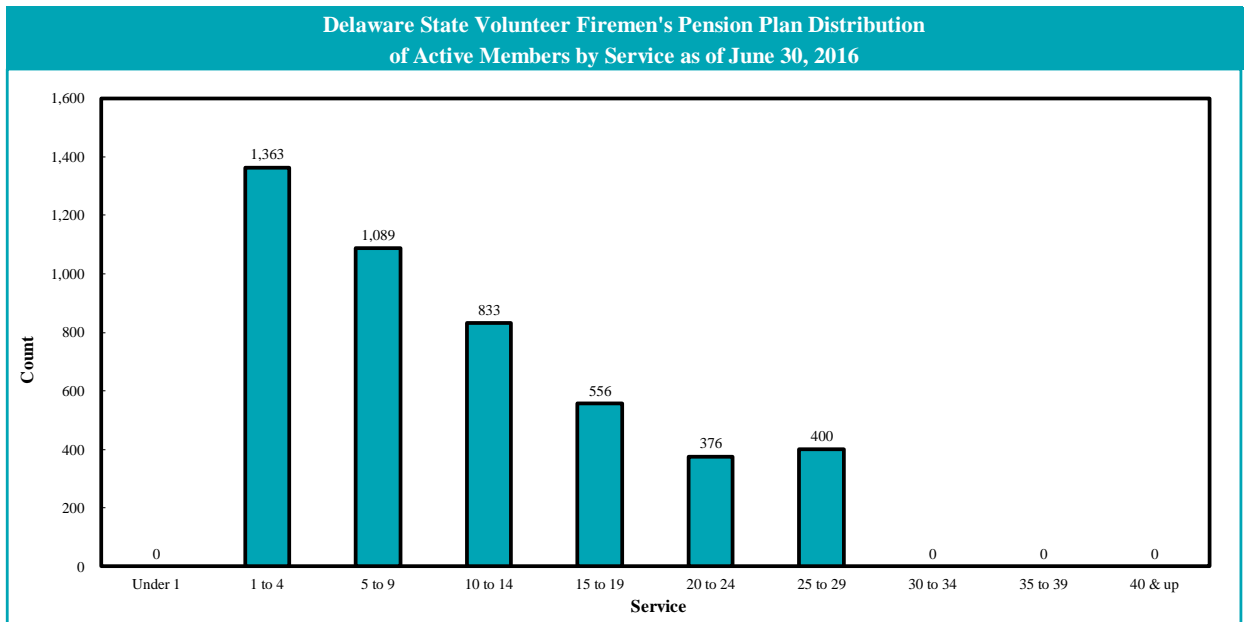
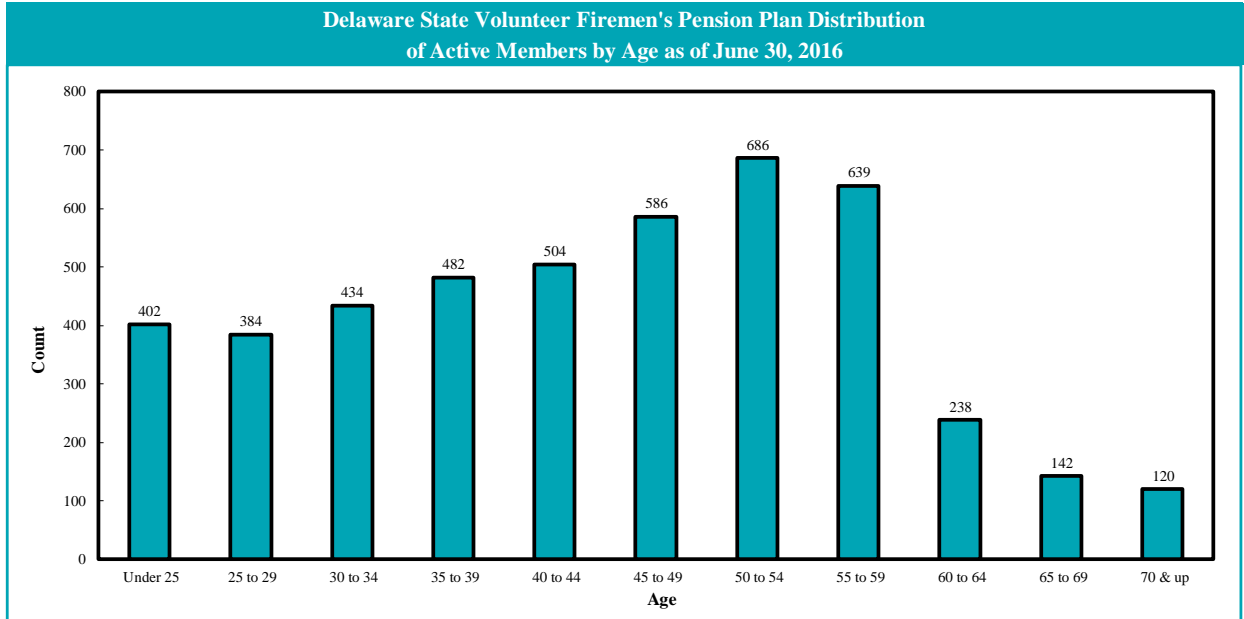
**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

APPENDIX A - MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Distribution of Active Members by Age and Service as of June 30, 2016												
Counts By Age/Service												
Age	Service										Total	
	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		
Under 25	0	325	74	3	0	0	0	0	0	0	0	402
25 to 29	0	183	153	46	2	0	0	0	0	0	0	384
30 to 34	0	145	138	115	32	4	0	0	0	0	0	434
35 to 39	0	125	116	113	96	32	0	0	0	0	0	482
40 to 44	0	114	89	110	92	74	25	0	0	0	0	504
45 to 49	0	115	123	107	100	82	59	0	0	0	0	586
50 to 54	0	123	116	127	100	86	134	0	0	0	0	686
55 to 59	0	92	100	121	96	74	156	0	0	0	0	639
60 to 64	0	57	69	46	24	18	24	0	0	0	0	238
65 to 69	0	47	55	23	9	6	2	0	0	0	0	142
70 & up	0	37	56	22	5	0	0	0	0	0	0	120
Total	0	1,363	1,089	833	556	376	400	0	0	0	0	4,617

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

APPENDIX A - MEMBERSHIP INFORMATION



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

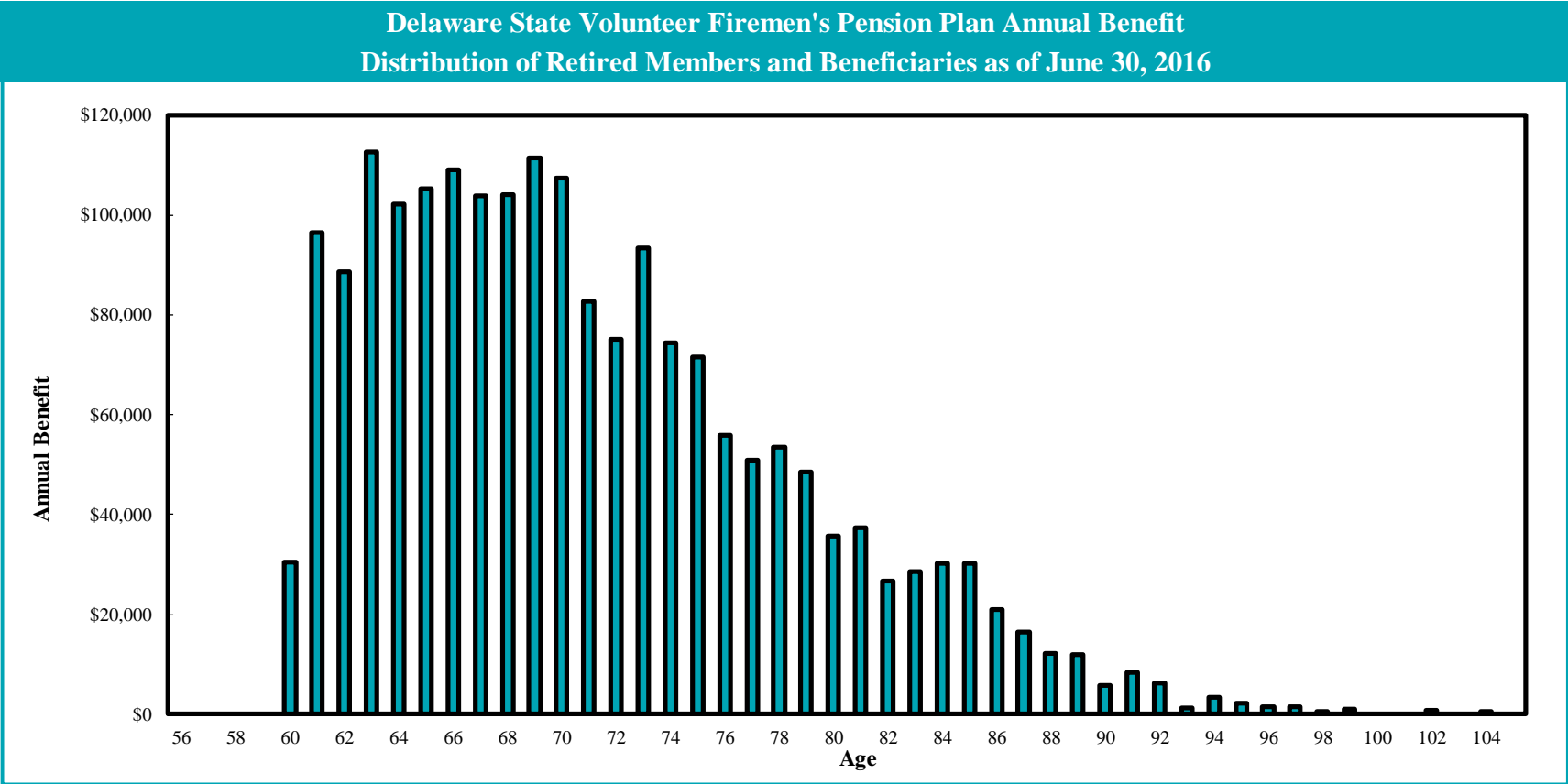
APPENDIX A - MEMBERSHIP INFORMATION

**Delaware State Volunteer Firemen's Pension Plan Annual Benefit
Distribution of Retired Members and Beneficiaries as of June 30, 2016**

Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	\$0	73	81	\$93,420
25	0	\$0	74	67	\$74,280
26	0	\$0	75	67	\$71,640
27	0	\$0	76	55	\$55,860
28	0	\$0	77	54	\$50,940
29	0	\$0	78	59	\$53,520
30	0	\$0	79	50	\$48,420
31	0	\$0	80	39	\$35,820
32	0	\$0	81	42	\$37,320
33	0	\$0	82	31	\$26,760
34	0	\$0	83	35	\$28,500
35	0	\$0	84	38	\$30,180
36	0	\$0	85	40	\$30,360
37	0	\$0	86	29	\$21,000
38	0	\$0	87	22	\$16,560
39	0	\$0	88	17	\$12,120
40	0	\$0	89	16	\$12,060
41	0	\$0	90	8	\$5,880
42	0	\$0	91	13	\$8,520
43	0	\$0	92	9	\$6,300
44	0	\$0	93	2	\$1,200
45	0	\$0	94	5	\$3,360
46	0	\$0	95	3	\$2,340
47	0	\$0	96	2	\$1,500
48	0	\$0	97	2	\$1,620
49	0	\$0	98	1	\$600
50	0	\$0	99	1	\$960
51	0	\$0	100	0	\$0
52	0	\$0	101	0	\$0
53	0	\$0	102	1	\$780
54	0	\$0	103	0	\$0
55	0	\$0	104	1	\$600
56	0	\$0	105	0	\$0
57	0	\$0	106	0	\$0
58	0	\$0	107	0	\$0
59	0	\$0	108	0	\$0
60	23	\$30,480	109	0	\$0
61	77	\$96,360	110	0	\$0
62	72	\$88,680	111	0	\$0
63	89	\$112,620	112	0	\$0
64	86	\$102,180	113	0	\$0
65	88	\$105,300	114	0	\$0
66	87	\$108,960	115	0	\$0
67	88	\$103,740	116	0	\$0
68	93	\$103,980	117	0	\$0
69	96	\$111,420	118	0	\$0
70	94	\$107,460	119	0	\$0
71	72	\$82,740	120	0	\$0
72	68	\$75,060			
			Totals	1,823	\$1,961,400

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
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APPENDIX A - MEMBERSHIP INFORMATION



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

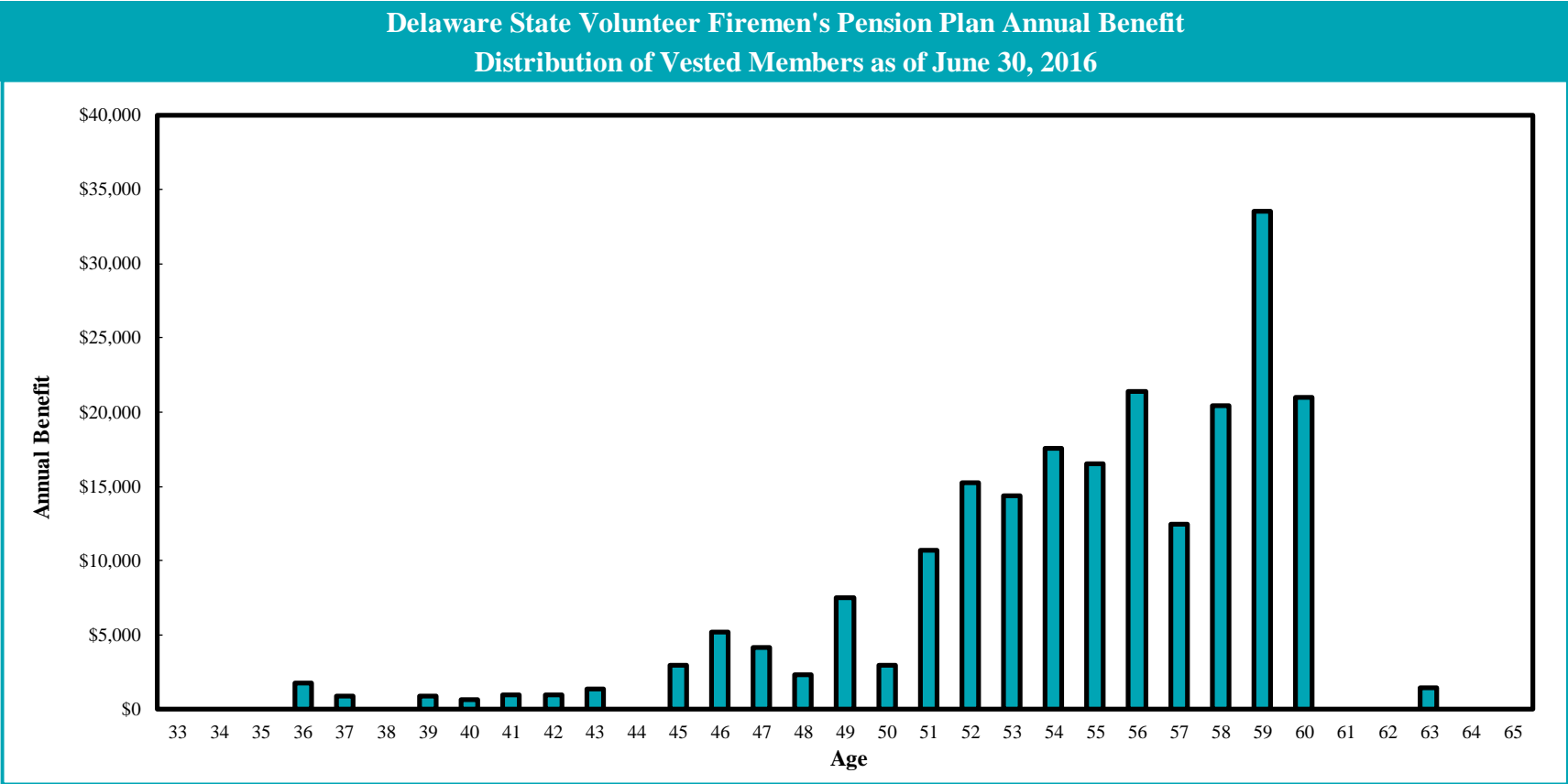
APPENDIX A - MEMBERSHIP INFORMATION

**Delaware State Volunteer Firemen's Pension Plan Annual Benefit
Distribution of Vested Members as of June 30, 2016**

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	2	\$1,740	85	0	\$0
37	1	\$840	86	0	\$0
38	0	\$0	87	0	\$0
39	1	\$840	88	0	\$0
40	1	\$600	89	0	\$0
41	1	\$960	90	0	\$0
42	1	\$960	91	0	\$0
43	2	\$1,320	92	0	\$0
44	0	\$0	93	0	\$0
45	3	\$2,940	94	0	\$0
46	5	\$5,160	95	0	\$0
47	4	\$4,140	96	0	\$0
48	2	\$2,280	97	0	\$0
49	5	\$7,500	98	0	\$0
50	3	\$2,940	99	0	\$0
51	8	\$10,680	100	0	\$0
52	11	\$15,240	101	0	\$0
53	11	\$14,340	102	0	\$0
54	12	\$17,520	103	0	\$0
55	12	\$16,500	104	0	\$0
56	17	\$21,420	105	0	\$0
57	9	\$12,480	106	0	\$0
58	15	\$20,460	107	0	\$0
59	25	\$33,540	108	0	\$0
60	14	\$21,000	109	0	\$0
61	0	\$0	110	0	\$0
62	0	\$0	111	0	\$0
63	1	\$1,440	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	166	\$216,840

DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016

APPENDIX A - MEMBERSHIP INFORMATION



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):

(2016 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	51	25
65	90	37
70	153	64
75	261	110
80	441	190

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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
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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):**

(2016 Values Shown)		
Age	Male	Female
50	44	27
55	62	36
60	84	53
65	119	81
70	185	130
75	302	213
80	508	360
85	885	638
90	1,553	1,138
95	2,447	1,868
100	3,500	2,796

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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN
ACTUARIAL VALUATION AS OF JUNE 30, 2016**

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):**

(2016 Values Shown)		
Age	Male	Female
25	93	28
30	89	35
35	105	49
40	126	67
45	196	105
50	240	138
55	276	174
60	313	207
65	375	252
70	486	342
75	666	502
80	949	757
85	1,411	1,145
90	2,157	1,690
95	3,019	2,453
100	3,973	3,446

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

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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: 7.20%
- 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

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- 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.

4. Changes Since Last Valuation

As a result of an experience study completed in spring 2016, the following assumptions were changed:

Healthy Inactive, Active, and Disabled Mortality
Termination Employment (Prior to Retirement Eligibility)
Retirement
Service Accrual
Administrative Expense

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.

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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

Member contributions assumed to be made by 2/3 of actives.

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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.

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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