

## **Delaware State Volunteer Firemen's Pension Plan**

**Actuarial Valuation  
as of June 30, 2018**

**Produced by Cheiron**

**January 2019**

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January 15, 2019

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, 2018. 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 certain 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) 2019 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

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**FOREWORD**

Cheiron has performed the annual actuarial valuation of the Delaware State Volunteer Firemen's Pension Plan (Plan) as of June 30, 2018. 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 amount** to be paid by the participating employers for Fiscal Year (FY) 2019, and
- 4) **Provide** certain 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 2019 actuarially determined contribution for participating employers.

**Section V** includes certain 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 will vary from our results.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**SECTION I – BOARD SUMMARY**

**General Comments**

The actuarially determined contribution (ADC) amount was calculated to decrease from \$2,016,900 for FY 2018 to \$1,941,500 for FY 2019.

During the year ended June 30, 2018, the Plan's assets earned 6.5% 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 6.4%. This return was less than the assumed investment rate of return of 7.0% for the prior year, resulting in an actuarial loss on investments of \$129,000.

The Plan experienced an actuarial gain on plan liabilities resulting from members retiring, terminating, and dying at rates different from the actuarial assumptions. This liability gain decreased the actuarial liability by \$363,500. This type of gain or loss is normal in the course of plan experience, as we cannot predict exactly how people will behave.

This valuation report also contains certain information to be reported in the June 30, 2018 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 update procedures to roll forward the 2017 actuarial valuation liability results. The calculation of net pension liability in Section V is shown as disclosed for the plan year ending June 30, 2018, based on the 2017 funding actuarial valuation liability results, updated by the rollforward described above. We also present a projection of the June 30, 2019 disclosure in Section V, assuming all actuarial assumptions are exactly met over the coming year, which is based on the 2018 actuarial valuation liability results.

As of the June 30, 2018 funding actuarial valuation, the Plan's unfunded actuarial liability (UAL) was \$13.8 million. This is a decrease from the \$14.4 million UAL in the funding valuation for the prior year.

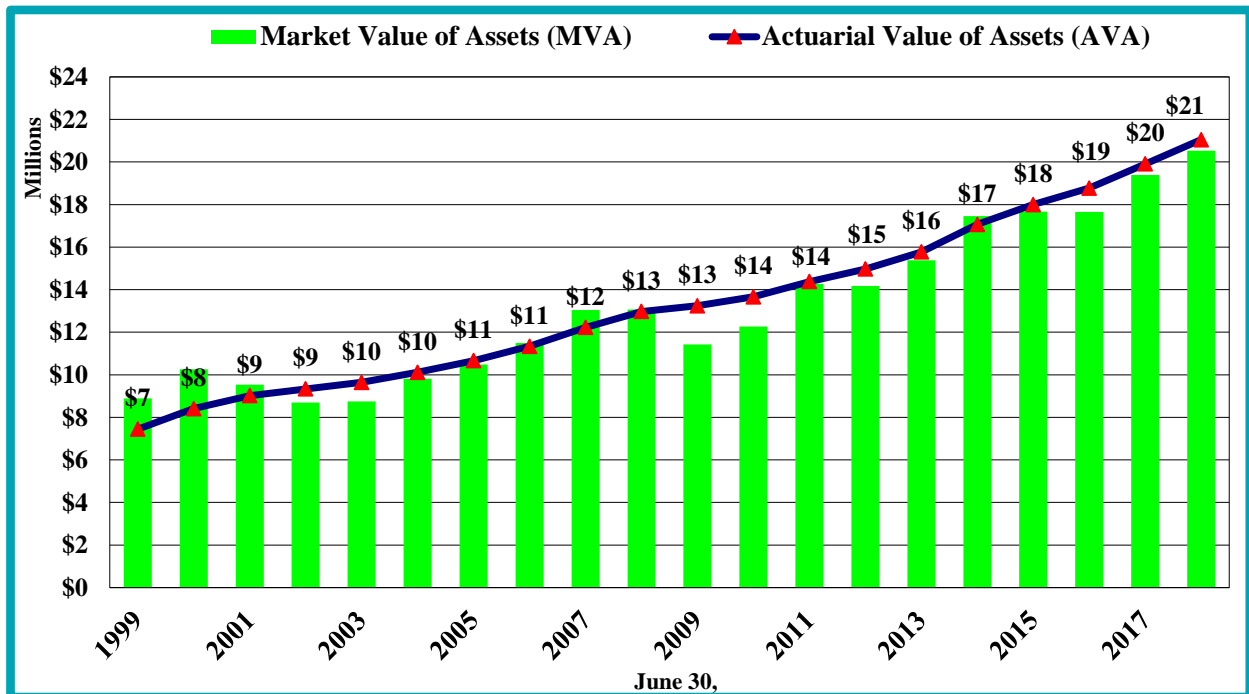
DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018

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 smoothed actuarial value measurements. The black labels above the blue line 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 6.5% over the last year. The determination of the Plan's actuarial value of assets (AVA) for the current year reflects a portion of this return below the 7.0% assumed, and continued recognition of prior years' gains and losses, and thus returned 6.4% over FY 2018.

Over the period July 1, 1999 to June 30, 2018, the Plan's assets measured using the actuarial value of asset measurements returned a compound 7.6%, compared to the current valuation assumption of 7.0%. On a market value of assets basis, the Plan returned 6.5% over the same period.

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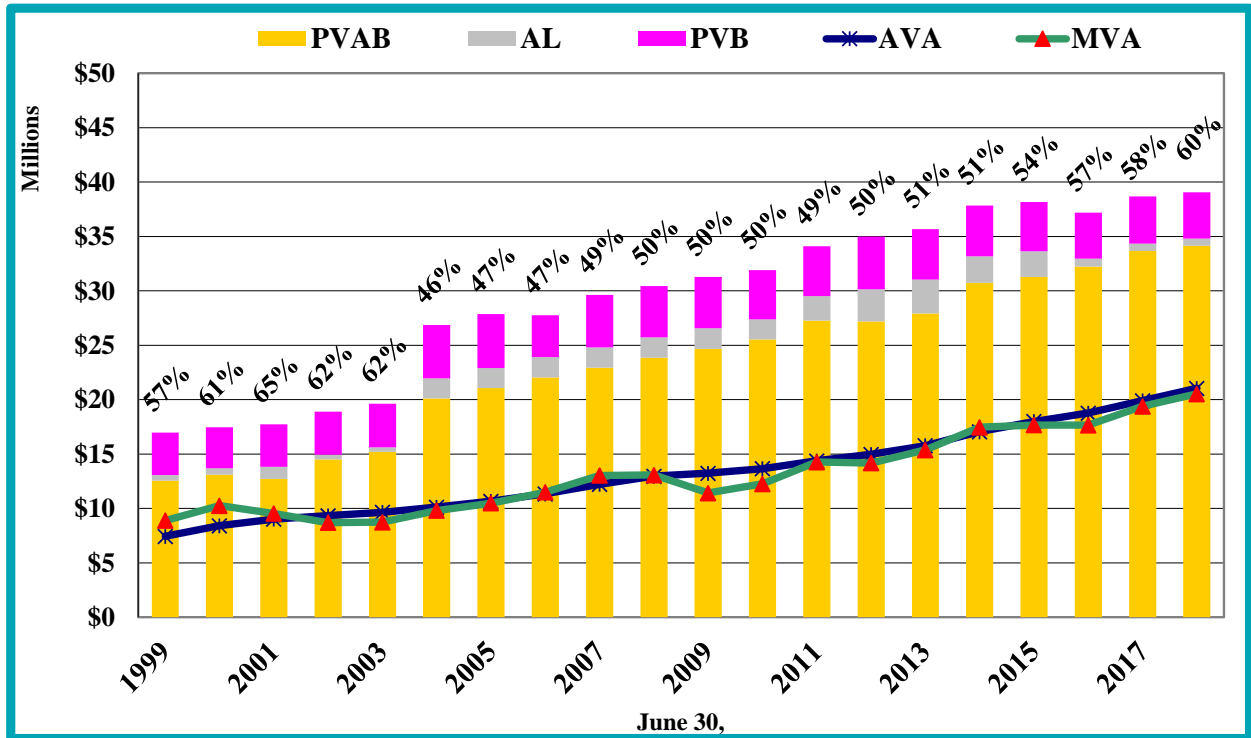
**SECTION I – BOARD SUMMARY**

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 dates.

The second liability measure shown 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.

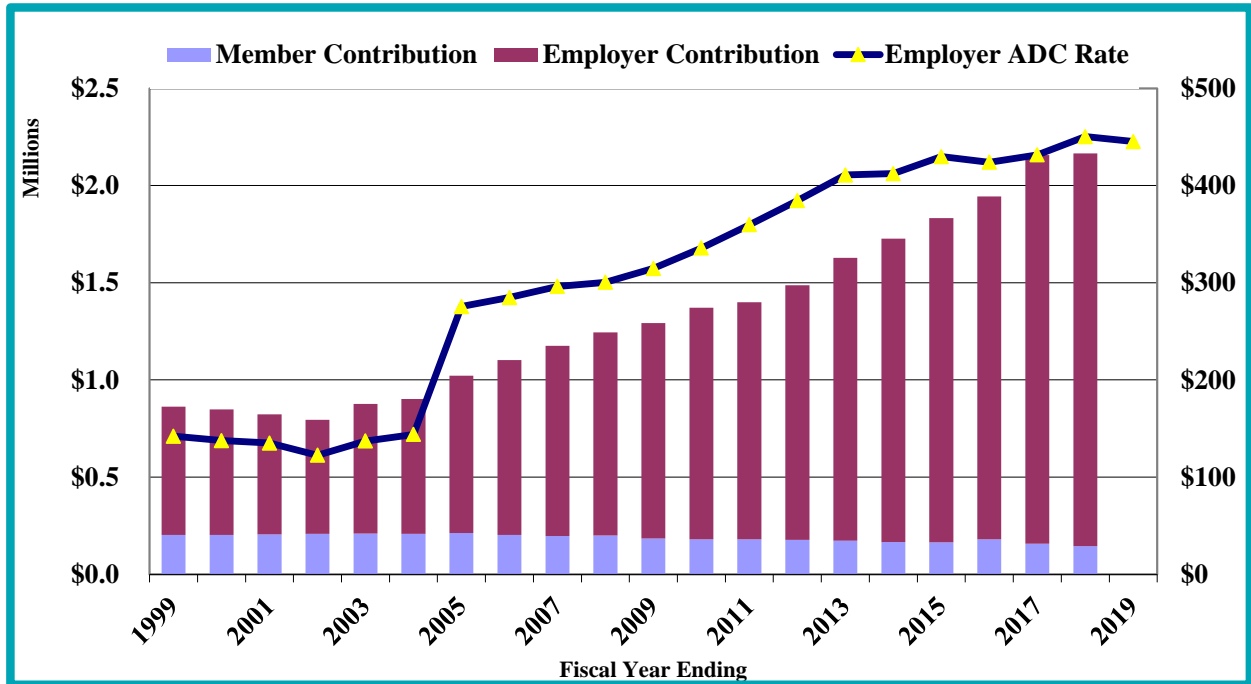
The amount represented by the top of the pink bars, the present value of future benefits (PVB), is the amount needed as of each valuation date to provide all benefits for the current members and their beneficiaries, including reflection of assumed future service. If the Plan had assets equal to the PVB 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  
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SECTION I – BOARD SUMMARY

Contribution Rates



The stacked bars in the graph above show the actual 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 blue line shows the employers' per-head actuarially determined contribution (ADC) amount for each fiscal year and is read using the 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. Please note that there is a lag between the State contribution rates shown are calculated and when they are payable. For example, the value shown for the FY 2018 is the rate prepared by the June 30, 2017 valuation and implemented for the period July 1, 2017 to June 30, 2018. As such, there is one more year's rate shown beyond the years of actual contributions.

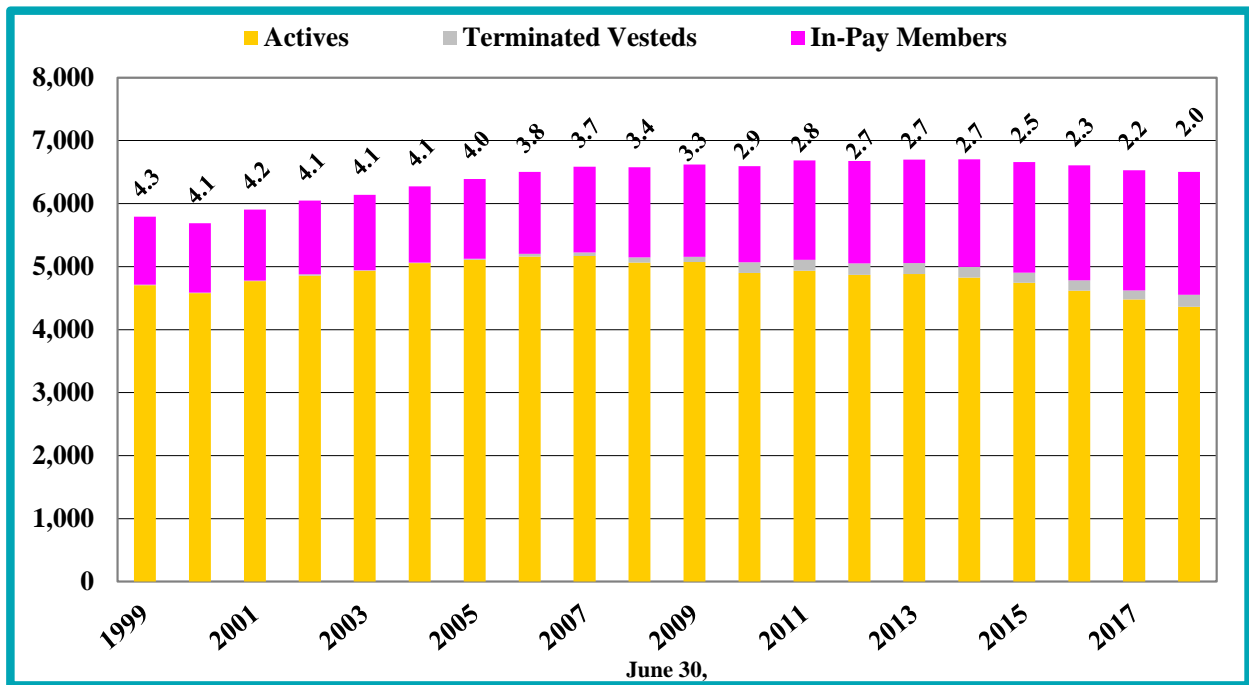


**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

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 4.3 actives for each inactive in 1999 to 2.0 actives for each inactive in 2018.

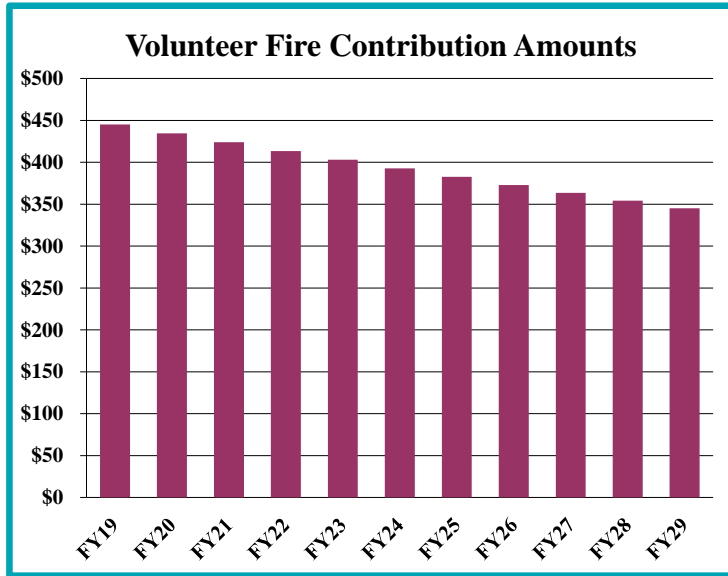


**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

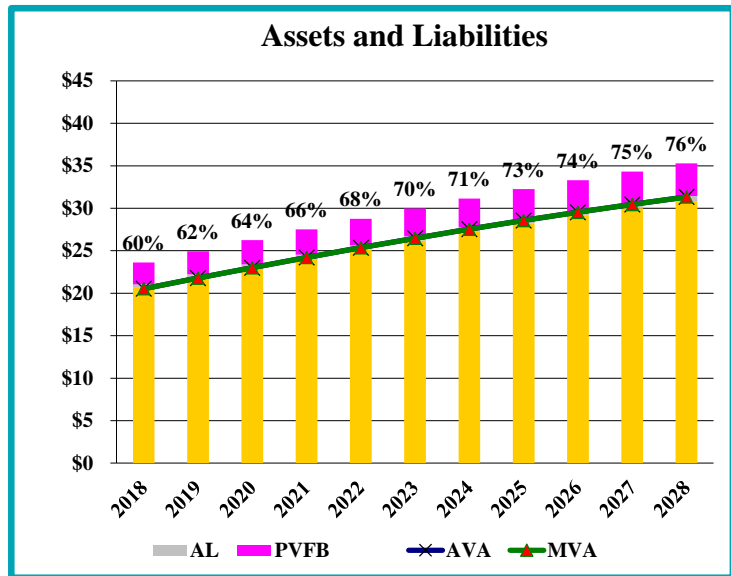
**Future Outlook**

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 Amounts" shows that the projected employer ADC amount per head is expected to decrease over this 10-year period, absent further gains or losses.

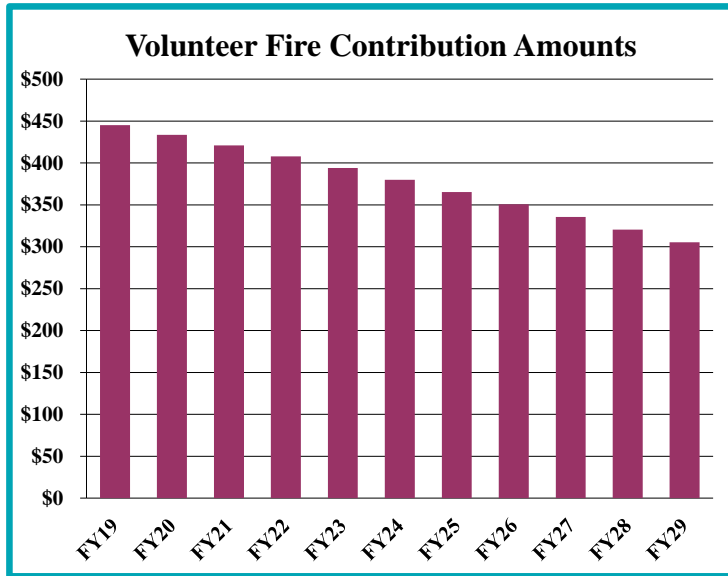
The "Assets and Liabilities" graph shows the projected funded ratios on an actuarial value of assets basis for the Plan over the 10-year projection period. The Plan's funded status is projected to increase from 60% to 76% over the 10-year projection period, assuming all assumptions are exactly met.



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

Projections with Asset Returns of 8.0%

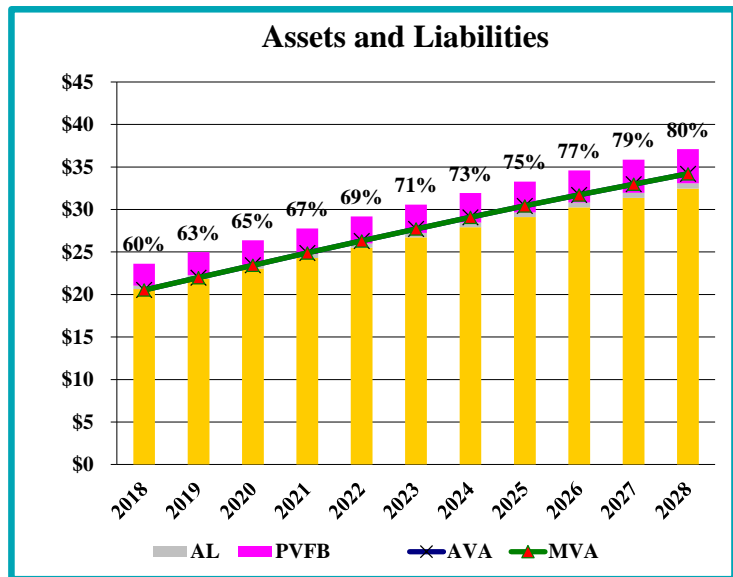


The Plan's investment earnings will affect the future funding status of the Plan. The two graphs on this page show what the next 10 years are expected to look like if the Plan's investment performance is 8.0% each year, 1.0% higher than the valuation investment rate of return assumption.

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 Amounts" graph shows that under this scenario, the employer ADC amount per head decreases even faster than in the baseline case.

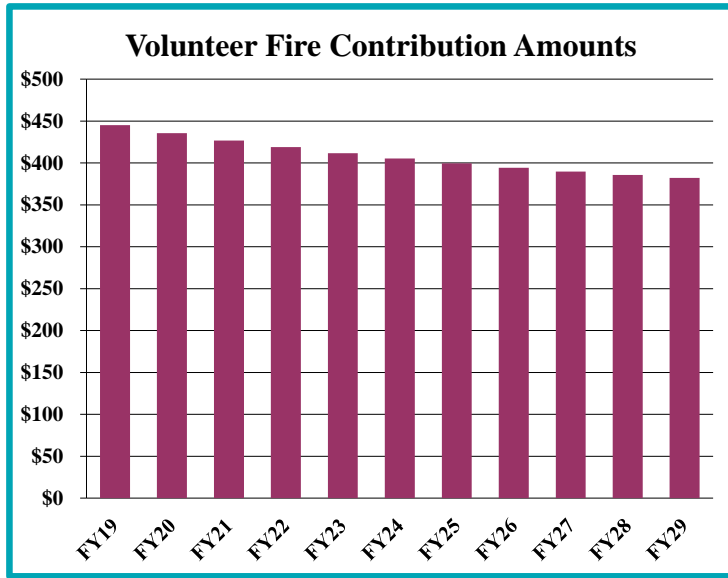
The "Assets and Liabilities" graph shows that under this scenario the Plan would reach an 80% funded ratio by 2028, an improvement over the baseline scenario's ultimate level of 76%.



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**SECTION I – BOARD SUMMARY**

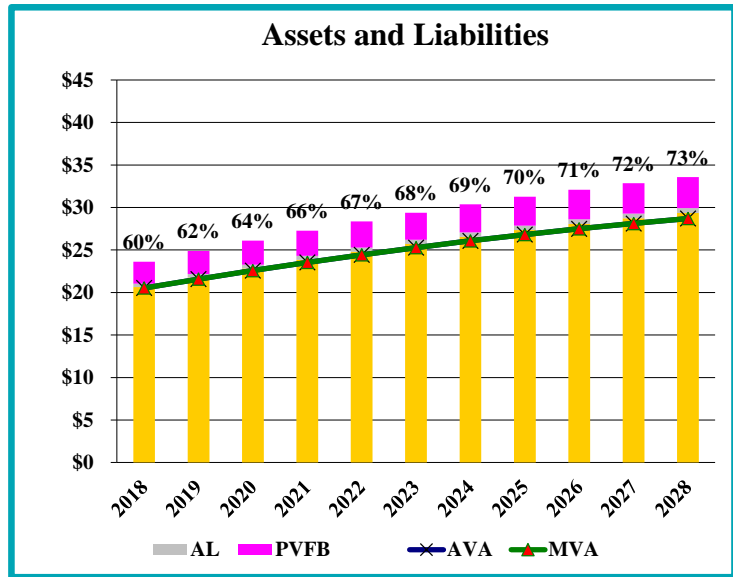
Projections with Asset Returns of 6.0%



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.

Under this scenario, the employer ADC amount still decreases, but to a level of approximately \$382 per head by the end of the 10-year projection period, significantly greater than the \$345 per head ultimate amount in the baseline projection under this scenario. Additionally, the funded ratio is projected to drop in this scenario, reaching 73% at the end of the 10-year projection period, lower than the 76% ultimate ratio in the baseline scenario.



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2017**

**SECTION I – BOARD SUMMARY**

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

<b>Valuation as of:</b>	<b>June 30, 2017</b>	<b>June 30, 2018</b>	<b>% Change</b>
<b><u>Member Counts</u></b>			
Active Members	4,479	4,361	(2.63)%
Retirees and Beneficiaries	1,901	1,947	2.42%
Terminated Vested Members	142	190	33.80%
Terminated Non-Vested Members	<u>8</u>	<u>4</u>	(50.00)%
<b>Total Member Counts</b>	<b>6,530</b>	<b>6,502</b>	(0.43)%
Annual Benefit Payments for Retirees and Beneficiaries	\$ 2,062,000	\$ 2,131,400	3.37%
<b><u>Assets and Liabilities</u></b>			
Actuarial Liability (AL)	\$ 34,340,800	\$ 34,821,400	1.40%
Actuarial Value of Assets (AVA)	<u>19,911,300</u>	<u>21,047,400</u>	5.71%
Unfunded AL (UAL)	\$ 14,429,500	\$ 13,774,000	(4.54)%
Funded Ratio on AVA Basis (AVA/AL)	58.0%	60.4%	
Funded Ratio on MVA Basis (MVA/AL)	56.5%	59.0%	
Present Value of Accrued Benefits (PVAB)	\$ 33,666,400	\$ 34,160,700	1.47%
Market Value of Assets (MVA)	<u>19,392,600</u>	<u>20,531,500</u>	5.87%
Unfunded PVAB	\$ 14,273,800	\$ 13,629,200	(4.52)%
Accrued Benefit Funded Ratio (MVA/PVAB)	57.6%	60.1%	
<b><u>Employer Contribution Amount</u></b>			
	<b>Fiscal Year 2018</b>	<b>Fiscal Year 2019</b>	
Entry Age Normal Cost	\$ 452,800	\$ 444,700	
UAL Amortization Payment	1,531,600	1,462,000	
Administrative Expense	<u>32,500</u>	<u>34,800</u>	
Actuarially Determined Contribution (ADC)	\$ 2,016,900	\$ 1,941,500	

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**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, 2017 and June 30, 2018,
- Statement of the **changes** in market values during FY 2018,
- 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, 2017 and June 30, 2018, along with the changes between the two.

<b>Table II-1 Changes in Market Values of Assets</b>		
<b>Market Value of Assets – June 30, 2017</b>		<b>\$ 19,392,600</b>
<b><u>Additions</u></b>		
Member Contributions	\$ 145,300	
Employer Contributions	2,019,400	
Investment Returns	<u>1,263,200</u>	
<b>Total Additions</b>	<b>\$ 3,427,900</b>	
<b><u>Deductions</u></b>		
Benefit Payments	\$ 2,254,200	
Administrative Expenses	<u>34,800</u>	
<b>Total Deductions</b>	<b>\$ 2,289,000</b>	
<b>Market Value of Assets – June 30, 2018</b>		<b>\$ 20,531,500</b>

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**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, 2018.

<b>Table II-2 Development of Actuarial Value of Assets</b>		
1.	Actuarial Value of Assets at June 30, 2017	\$ 19,911,300
2.	Amount in (1) with interest to June 30, 2018 at 7.0% per year	21,305,100
3.	Employer and member contributions for FY 2018	2,164,700
4.	Interest on contributions assuming payments made uniformly throughout the year to June 30, 2018 at 7.0% per year	75,700
5.	Disbursements from Trust except investment expenses, July 1, 2017 through June 30, 2018	2,289,000
6.	Interest on disbursements to June 30, 2018 at 7.0% per year	<u>80,100</u>
7.	Expected Actuarial Value of Assets at June 30, 2018 = (2) + (3) + (4) – (5) – (6)	\$ 21,176,500
8.	Actual Market Value of Assets at June 30, 2018	<u>\$ 20,531,500</u>
9.	Excess of (8) over (7)	\$ (644,900)
10.	Actuarial Value of Assets at June 30, 2018 = (7) + 20% of (9)	\$ 21,047,400

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**SECTION II – ASSETS**

**Investment Performance**

The market value of assets (MVA) returned 6.5% during 2018, which is less than the prior year's assumed 7.0% investment rate of return. The actuarial value of assets (AVA) returned 6.4% over this same year, reflecting the asset smoothing methodology 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 adopted 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**

<b>Table II-3 Cash Flow Projections</b>		
<b>Year Beginning July 1,</b>	<b>Expected Benefit Payments</b>	<b>Expected Contributions*</b>
2018	\$ 2,250,000	\$ 2,191,000
2019	2,312,000	2,116,000
2020	2,381,000	2,116,000
2021	2,454,000	2,116,000
2022	2,526,000	2,116,000
2023	2,594,000	2,116,000
2024	2,673,000	2,116,000
2025	2,754,000	2,116,000
2026	2,822,000	2,116,000
2027	2,887,000	2,116,000

\* Expected contributions include employer contributions and member contributions. For illustration purposes, we have assumed the employer contribution rate will remain level from FYE 2019.

Expected benefit payments are projected for the closed group valued at June 30, 2018. 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, 2018

**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, 2017 and June 30, 2018, 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 fully 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). This Plan is not subject to this requirement, but this information is provided for informational purposes, as it is sometimes used as part of assessing whether a plan can meet its current benefit commitments. However, it is not intended as a settlement liability value. 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.

DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018

**SECTION III – LIABILITIES**

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

	<b>June 30, 2017</b>	<b>June 30, 2018</b>
<b><u>Present Value of Benefits</u></b>		
Active Member Benefits	\$ 18,908,800	\$ 18,382,400
Retiree, Beneficiary, and Terminated Member Benefits	<u>19,782,200</u>	<u>20,687,600</u>
<b>Present Value of Benefits (PVB)</b>	<b>\$ 38,691,000</b>	<b>\$ 39,070,000</b>
Market Value of Assets (MVA)	\$ 19,392,600	\$ 20,531,500
Future Member Contributions	1,352,000	1,312,000
Future Employer Contributions	<u>17,946,400</u>	<u>17,226,500</u>
<b>Total Resources</b>	<b>\$ 38,691,000</b>	<b>\$ 39,070,000</b>
<b><u>Actuarial Liability</u></b>		
Present Value of Benefits (PVB)	\$ 38,691,000	\$ 39,070,000
Present Value of Future Employer Normal Costs (PVFNC)	2,998,200	2,936,600
Present Value of Future Member Contributions (PVFEEC)	<u>1,352,000</u>	<u>1,312,000</u>
<b>Actuarial Liability (AL=PVB-PVFNC-PVFEEC)</b>	<b>\$ 34,340,800</b>	<b>\$ 34,821,400</b>
Actuarial Value of Assets (AVA)	<u>19,911,300</u>	<u>21,047,400</u>
<b>Net (Surplus)/Unfunded AL (AL – AVA)</b>	<b>\$ 14,429,500</b>	<b>\$ 13,774,000</b>
<b><u>Present Value of Accrued Benefits</u></b>		
Present Value of Benefits (PVB)	\$ 38,691,000	\$ 39,070,000
Present Value of Future Benefit Accruals (PVFBA)	<u>5,024,600</u>	<u>4,909,300</u>
<b>Present Value of Accrued Benefits (PVAB=PVB-PVFBA)</b>	<b>\$ 33,666,400</b>	<b>\$ 34,160,700</b>
Market Value of Assets (MVA)	\$ 19,392,600	\$ 20,531,500
<b>Net (Surplus)/Unfunded PVAB (PVAB – MVA)</b>	<b>\$ 14,273,800</b>	<b>\$ 13,629,200</b>

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**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 methodology 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 the liabilities since the last valuation, in thousands.

<b>Table III-2 Liability Changes</b>			
<b>(In Thousands)</b>	<b>Present Value of Benefits</b>	<b>Actuarial Liability</b>	<b>Present Value of Accrued Benefits</b>
Liabilities June 30, 2017	\$ 38,691	\$ 34,341	\$ 33,666
Liabilities June 30, 2018	39,070	34,821	34,161
Liability Increase/(Decrease)	379	480	495
Change Due to:			
Benefit Changes	0	0	0
Assumption Changes	0	0	0
Actuarial (Gain)/Loss	NC *	(364)	NC *
Benefits Accumulated and Other (Gain)/Loss	379	844	495

\* NC = not calculated.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**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.

<b>Table III-3 Actuarial Liabilities for Funding</b>		
	<b>June 30, 2017</b>	<b>June 30, 2018</b>
1. Actuarial Liabilities		
Retiree, Beneficiary, and Terminated Members	\$ 19,782,200	\$ 20,687,600
Active Members	<u>14,558,600</u>	<u>14,133,800</u>
<b>Total Actuarial Liability (AL)</b>	<b>\$ 34,340,800</b>	<b>\$ 34,821,400</b>
2. Actuarial Value of Assets (AVA)	\$ 19,911,300	\$ 21,047,400
3. Unfunded Actuarial Liability (UAL) [AL – AVA]	\$ 14,429,500	\$ 13,774,000

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
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**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.

<b>Table IV-1 Employer Contribution Amounts</b>		
<b>Valuation Date</b>	<b>June 30, 2017</b>	<b>June 30, 2018</b>
<b>FY Contribution Amount Payable</b>	<b>FY 2018</b>	<b>FY 2019</b>
Entry Age Normal Cost Amount	\$ 452,800	\$ 444,700
UAL Amortization Payment Amount	1,531,600	1,462,000
Administrative Expense Amount	<u>32,500</u>	<u>34,800</u>
Actuarially Determined Contribution	\$ 2,016,900	\$ 1,941,500

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**SECTION IV – CONTRIBUTIONS**

Table IV-2 below provides additional detail about the development of the expected employer contribution amount for FY 2019.

<b>Table IV-2 Expected FY 2019 Employer Contributions</b>		<b>In Dollars</b>
1. Present Value of Projected Benefits Attributable to:		
a. Total Normal Cost	\$	619,100
b. Expected Member Contributions		<u>174,400</u>
c. Employer-Paid Normal Cost (a) – (b)	\$	444,700
2. Amortization of Unfunded Liability		1,462,000
3. Allowance for Administrative Expense		<u>34,800</u>
4. Total Employer Actuarially Determined Contribution Amount (1) + (2) + (3)	\$	1,941,500

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**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, 2017 and June 30, 2018 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, 2017, to the liabilities as of June 30, 2018. These values are based on the funding liability results.

This valuation contains information reported in the June 30, 2018 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 2017 funding valuation results. The calculation of Net Pension Liability in Table V-2 shows the amounts to be disclosed for FY 2018, based on the liabilities of the roll forward of the 2017 funding valuation, as well as a projection of the anticipated FY 2019 disclosures, based on liabilities from the 2018 funding valuation, assuming all actuarial assumptions are met over the coming year. The actual disclosures for FY 2019 will be developed once the asset measure for GASB as of June 30, 2019 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 Schedule of Funded Liabilities by Type, 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 Schedule of Funded Liabilities by Type. None of the liabilities or assets shown is appropriate for settlement purposes. Furthermore, the Schedule of Funded Liabilities by Type 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 contributions 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 employer’s CAFR.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**SECTION V – ACCOUNTING STATEMENT INFORMATION**

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

	<b>June 30, 2017</b>	<b>June 30, 2018</b>
<b>FASB ASC Topic No. 960 Basis</b>		
1. Present Value of Accrued Benefits (PVAB)		
a. Members Currently Receiving Payments	\$ 18,326,100	\$ 18,834,600
b. Former Vested Members	1,456,100	1,853,000
c. Active Members	<u>13,884,200</u>	<u>13,473,100</u>
2. Total PVAB [1(a) + 1(b) + 1(c)]	\$ 33,666,400	\$ 34,160,700
3. Market Value of Assets (MVA)	<u>19,392,600</u>	<u>20,531,500</u>
4. Unfunded PVAB [2 – 3]	\$ 14,273,800	\$ 13,629,200
5. Ratio of Market Value of Assets to Present Value of Benefits [3 / 2]	57.6%	60.1%
<b>Reconciliation of PVAB</b>		
PVAB at June 30, 2017		\$ 33,666,400
Increase/(Decrease) During Year Attributable to:		
Passage of Time		2,277,800
Benefits Paid – FY 2018		(2,254,200)
Benefit Changes		0
Assumption Changes		0
Benefits Accrued, Other Gains/Losses		<u>470,700</u>
Net Increase/(Decrease)		494,300
PVAB at June 30, 2018		\$ 34,160,700



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**SECTION V – ACCOUNTING STATEMENT INFORMATION**

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

	<b>June 30, 2018</b>	<b>Estimated June 30, 2019</b>
<b><u>Total Pension Liability (TPL)</u></b>		
Service cost	\$ 731,000	\$ 720,000
Interest	2,306,000	2,341,000
Changes in benefit terms	0	0
Differences between expected and actual experience	(127,000)	(270,000)
Changes in assumptions	0	0
Benefit payments, including refunds of member contributions	(2,254,000)	(2,250,000)
<b>Net change in TPL</b>	<b>\$ 655,000</b>	<b>\$ 541,000</b>
<b>TPL - beginning</b>	<b>\$ 33,444,000</b>	<b>\$ 34,099,000</b>
<b>TPL - ending (a)</b>	<b>\$ 34,099,000</b>	<b>\$ 34,640,000</b>
<b><u>Fiduciary Net Position (FNP)</u></b>		
Contributions - Employer	\$ 2,019,000	\$ 2,017,000
Contributions - Non-employer	0	0
Contributions - Member	145,000	174,000
Net investment income	1,262,000	1,434,000
Benefit payments, including refunds of member contributions	(2,254,000)	(2,250,000)
Administrative expenses	(35,000)	(32,000)
<b>Net change in FNP</b>	<b>\$ 1,138,000</b>	<b>\$ 1,344,000</b>
<b>FNP - beginning</b>	<b>\$ 19,393,000</b>	<b>\$ 20,531,000</b>
<b>FNP - ending (b)</b>	<b>\$ 20,531,000</b>	<b>\$ 21,875,000</b>
<b>Net Pension Liability/(Asset) - ending [(a)-(b)]</b>	<b>\$ 13,567,000</b>	<b>\$ 12,764,000</b>

Items printed in red will be replaced with actual amounts once known at the end of FY 2019.

Note that GASB Statement No. 67 requires that the level percentage of payroll version of Entry Age Normal calculations be used, even when benefits are not related to salary. As such, the liability calculations shown in these accounting exhibits are based on a level percentage of payroll methodology with the percentage being the assumed inflation rate, 2.5% for this valuation. 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, 2018**

**SECTION V – ACCOUNTING STATEMENT INFORMATION**

**Table V-3**

**Note to Required Supplementary Information**

The June 30, 2018 total pension liability presented in Table V-4 was determined as part of the measurement at the date indicated. Additional information as of the latest measurement date follows:

Measurement date:	July 1, 2018
Valuation date:	July 1, 2017
Actuarial cost method:	Entry age normal
Actuarial cost method:	Entry age normal with level % of pay using inflation as the rate of pay increase
Actuarial assumptions:	
Investment rate of return*	7.0%
Projected salary increases*	N/A
Cost-of-living adjustments	ad hoc
* Includes inflation at	2.50%

The actuarially determined contribution for fiscal year 2019 will use the contribution rate developed in section IV of this valuation. It was determined using the measurement date and key assumptions that follow:

Measurement date:	July 1, 2018
Valuation date:	July 1, 2018
Actuarial cost method:	Entry age normal level dollar
Amortization method:	Level dollar open
Amortization period:	15 years
Asset valuation method:	Smoothed market, 20% annual market weight
Actuarial assumptions:	
Investment rate of return*	7.0%
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 economic assumptions were updated first effective with the 2017 valuation based on the Board's

The total amount of employer contributions to the Plan is composed of the employer normal cost, the unfunded actuarial liability amortization payment, and the administrative expenses. The employer normal cost is a level dollar amount that, 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, 2018**

**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**

<b>Type of Activity</b>	<i>Gain (or Loss) for Year Ending June 30, (expressed in thousands)</i>					
	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Investment Income on Actuarial Assets	\$ (97)	\$ 141	\$ (83)	\$ (278)	\$ (130)	\$ (129)
Combined Liability Experience	<u>161</u>	<u>230</u>	<u>505</u>	<u>142</u>	<u>6</u>	<u>364</u>
(Loss)/Gain during Year from Financial Experience	\$ 64	\$ 371	\$ 422	\$ (136)	\$ (124)	\$ 235
Non-Recurring Items	<u>(28)</u>	<u>(1,287)</u>	<u>0</u>	<u>1,271</u>	<u>634</u>	<u>0</u>
Composite Gain (or Loss) during Year	\$ 36	\$ 916	\$ 422	\$ 1,135	\$ (758)	\$ 235

**Table V-5  
Schedule of Funded Liabilities by Type  
Aggregate Accrued Liabilities for  
(expressed in thousands)**

<b>Valuation Date June 30,</b>	<b>Active Member Contributions (1)</b>	<b>Retirees &amp; Beneficiaries (2)</b>	<b>Active Member State-Financed Contributions (3)</b>	<b>Actuarial Value of Reported Assets</b>	<b>Portion of Accrued Liabilities Covered by Reported Assets</b>		
					<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
2018	\$ 5,207	\$ 18,835	\$ 10,779	\$ 21,047	100%	84%	0%
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

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**APPENDIX A – MEMBERSHIP INFORMATION**

<b>Delaware State Volunteer Firemen's Pension Plan Data Reconciliation</b>								
	<b>A</b>	<b>P-TDV</b>	<b>P-SUPP</b>	<b>P-RET</b>	<b>P-DIS</b>	<b>P-SR</b>	<b>P-SURV</b>	<b>Total</b>
1. June 30, 2017 valuation	4,479	135	7	1,898	0	0	3	6,522
2. Additions								
(a) New entrants	163	2		2				167
(b) <u>New Beneficiary/QDRO</u>								
(c) Total	163	2		2				167
3. Reductions								
(a) Terminated - not vested	(123)							(123)
(b) <u>Paid Out/Expired/Death</u>		(3)		(62)			(3)	(68)
(c) Total	(123)	(3)		(62)			(3)	(191)
4. Changes in status								
(a) P-TDV	(68)	68						
(b) P-SUPP								
(c) Returned to work								
(d) P-RET	(90)	(19)		109				
(e) PRET25								
(f) P-DIS								
(g) P-LTD								
(h) P-SURV								
(i) PSUR25								
(j) P-SR								
(k) <u>Data corrections</u>								
(l) Total	(158)	49		109				
5. June 30, 2018 valuation	4,361	183	7	1,947	0	0	0	6,498

A=Active, P-TDV=Terminated Deferred Vested, P-SUPP=Terminated Deferred Vested, P-RET=Retired, PRET25=Retired, P-DIS=Disabled, P-LTD=Long-Term Disabled, P-SURV=Surviving Beneficiary, PSUR25=Surviving Beneficiary, P-SR=Disabled

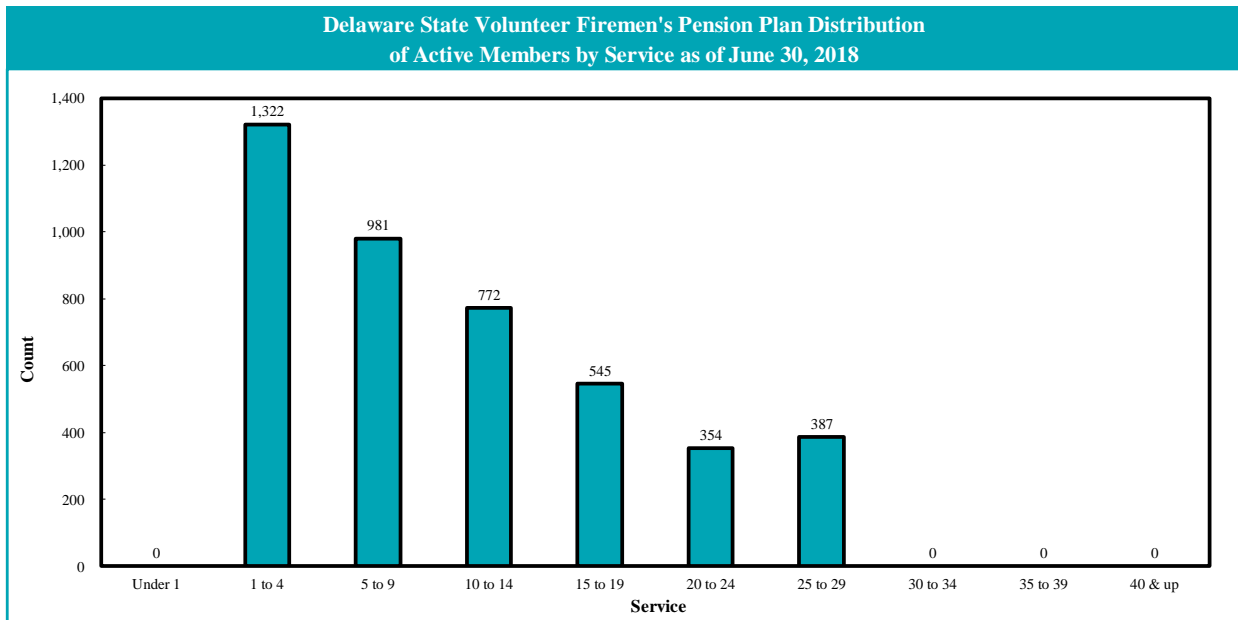
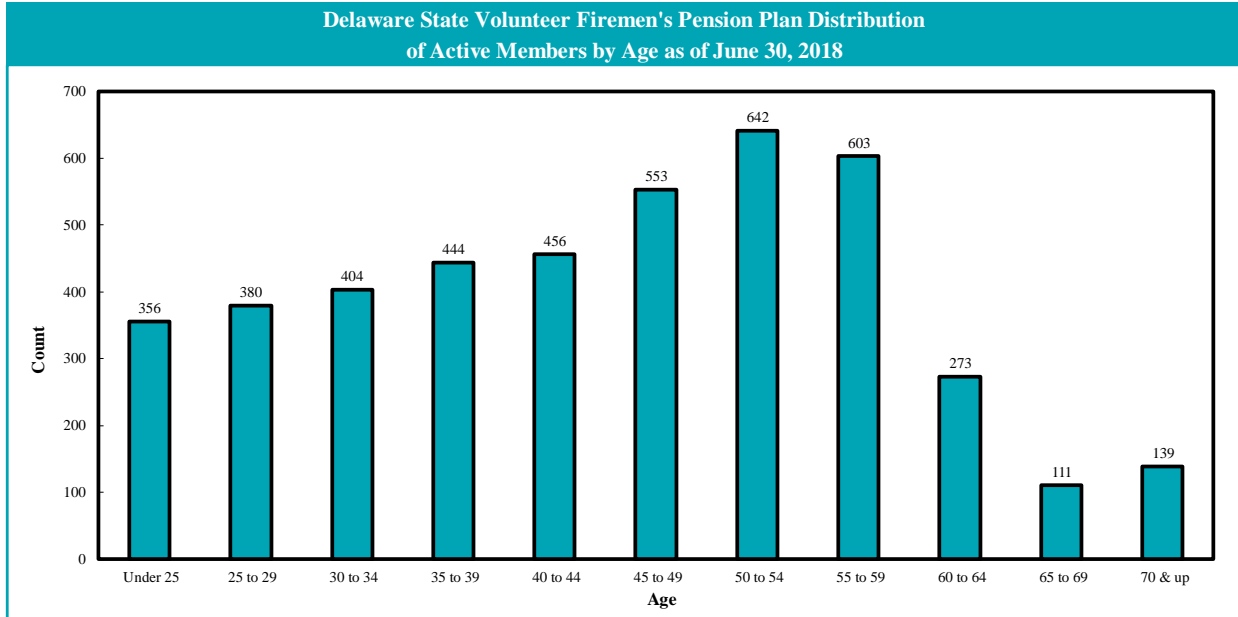
**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**APPENDIX A – MEMBERSHIP INFORMATION**

Delaware State Volunteer Firemen's Pension Plan Distribution of Active Members by Age and Service as of June 30, 2018												
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	293	63	0	0	0	0	0	0	0	0	356
25 to 29	0	192	149	37	2	0	0	0	0	0	0	380
30 to 34	0	136	121	113	34	0	0	0	0	0	0	404
35 to 39	0	121	96	112	83	32	0	0	0	0	0	444
40 to 44	0	112	81	89	83	62	29	0	0	0	0	456
45 to 49	0	115	78	122	97	75	66	0	0	0	0	553
50 to 54	0	116	105	113	110	82	116	0	0	0	0	642
55 to 59	0	82	94	103	97	76	151	0	0	0	0	603
60 to 64	0	65	79	55	30	21	23	0	0	0	0	273
65 to 69	0	38	49	15	4	3	2	0	0	0	0	111
70 & up	0	52	66	13	5	3	0	0	0	0	0	139
Total	0	1,322	981	772	545	354	387	0	0	0	0	4,361

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**APPENDIX A – MEMBERSHIP INFORMATION**



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

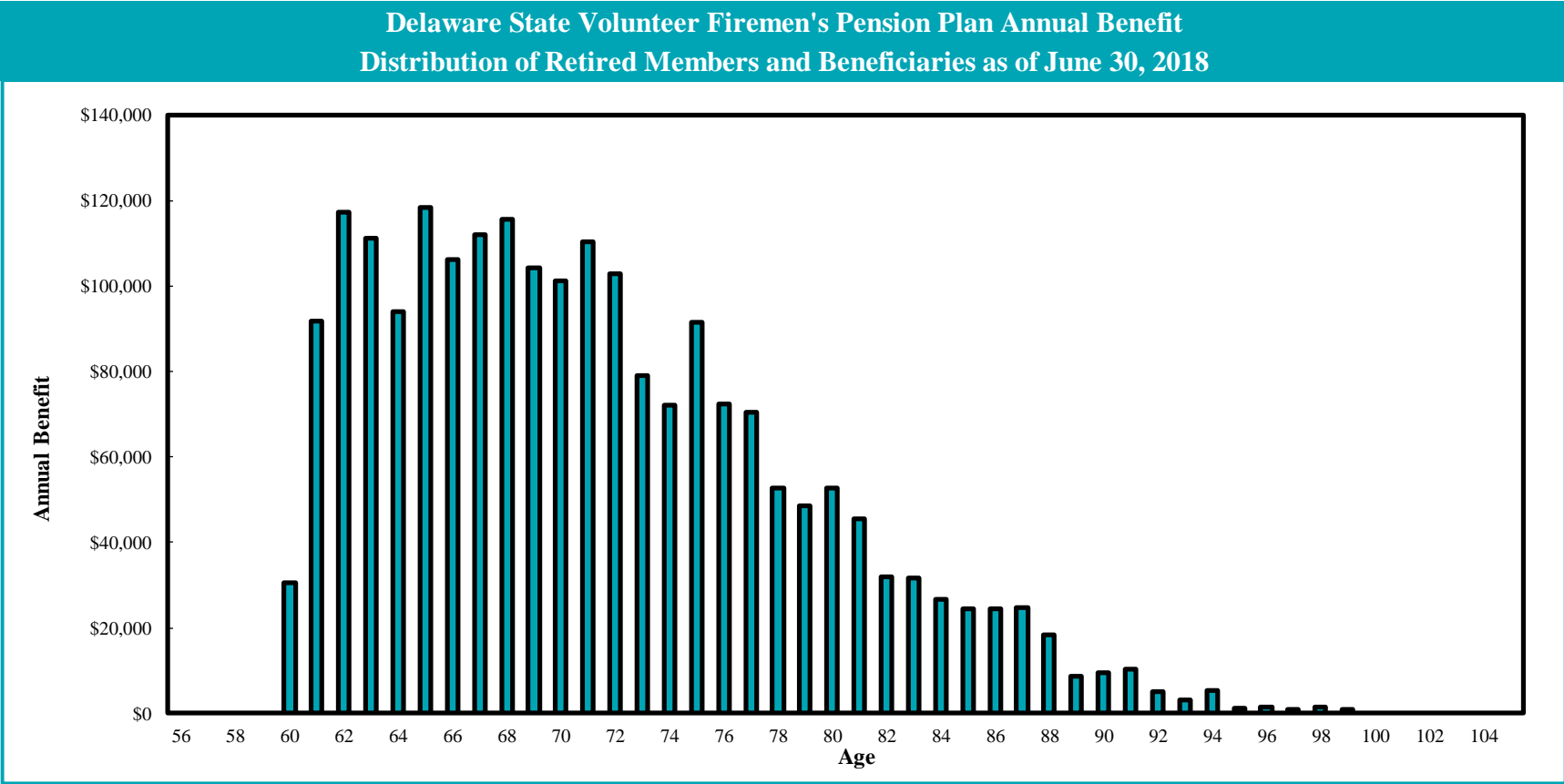
**APPENDIX A – MEMBERSHIP INFORMATION**

**Delaware State Volunteer Firemen's Pension Plan Annual Benefit  
Distribution of Retired Members and Beneficiaries as of June 30, 2018**

Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	\$0	73	70	\$79,080
25	0	\$0	74	66	\$72,060
26	0	\$0	75	80	\$91,380
27	0	\$0	76	66	\$72,420
28	0	\$0	77	68	\$70,500
29	0	\$0	78	52	\$52,680
30	0	\$0	79	52	\$48,540
31	0	\$0	80	58	\$52,620
32	0	\$0	81	47	\$45,600
33	0	\$0	82	34	\$31,860
34	0	\$0	83	37	\$31,680
35	0	\$0	84	31	\$26,700
36	0	\$0	85	31	\$24,540
37	0	\$0	86	30	\$24,600
38	0	\$0	87	32	\$24,720
39	0	\$0	88	25	\$18,540
40	0	\$0	89	12	\$8,820
41	0	\$0	90	14	\$9,660
42	0	\$0	91	14	\$10,320
43	0	\$0	92	7	\$5,100
44	0	\$0	93	5	\$3,240
45	0	\$0	94	8	\$5,340
46	0	\$0	95	2	\$1,200
47	0	\$0	96	2	\$1,380
48	0	\$0	97	1	\$840
49	0	\$0	98	2	\$1,500
50	0	\$0	99	1	\$840
51	0	\$0	100	0	\$0
52	0	\$0	101	0	\$0
53	0	\$0	102	0	\$0
54	0	\$0	103	0	\$0
55	0	\$0	104	0	\$0
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	22	\$30,660	109	0	\$0
61	71	\$91,740	110	0	\$0
62	89	\$117,300	111	0	\$0
63	92	\$111,180	112	0	\$0
64	78	\$94,080	113	0	\$0
65	96	\$118,380	114	0	\$0
66	91	\$106,140	115	0	\$0
67	96	\$112,020	116	0	\$0
68	95	\$115,500	117	0	\$0
69	89	\$104,340	118	0	\$0
70	92	\$101,160	119	0	\$0
71	97	\$110,400	120	0	\$0
72	92	\$102,780			
			Totals	1,947	\$2,131,440

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**APPENDIX A – MEMBERSHIP INFORMATION**





**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2018**

**APPENDIX A – MEMBERSHIP INFORMATION**

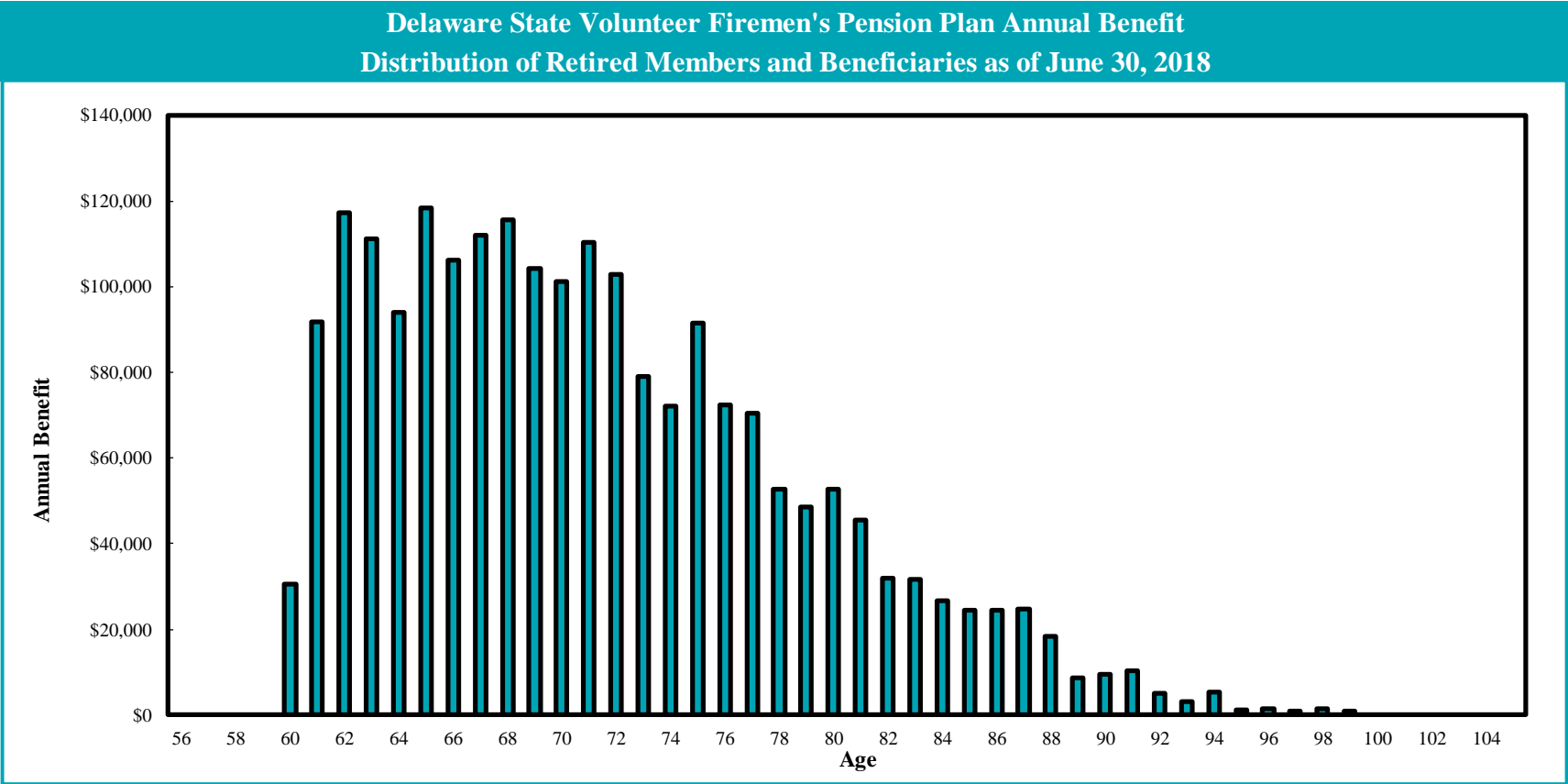
**Delaware State Volunteer Firemen's Pension Plan Annual Benefit  
Distribution of Vested Members as of June 30, 2018**

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	1	\$660	82	0	\$0
34	0	\$0	83	0	\$0
35	0	\$0	84	0	\$0
36	0	\$0	85	0	\$0
37	0	\$0	86	0	\$0
38	2	\$1,740	87	0	\$0
39	2	\$1,920	88	0	\$0
40	0	\$0	89	0	\$0
41	1	\$840	90	0	\$0
42	1	\$600	91	0	\$0
43	1	\$960	92	0	\$0
44	2	\$2,460	93	1	\$720
45	3	\$2,820	94	0	\$0
46	3	\$2,940	95	0	\$0
47	5	\$5,940	96	0	\$0
48	8	\$9,660	97	0	\$0
49	5	\$5,640	98	0	\$0
50	2	\$2,280	99	0	\$0
51	8	\$10,860	100	0	\$0
52	5	\$5,100	101	1	\$720
53	11	\$13,920	102	0	\$0
54	16	\$22,740	103	0	\$0
55	14	\$18,060	104	0	\$0
56	17	\$24,960	105	0	\$0
57	16	\$21,960	106	0	\$0
58	18	\$22,320	107	0	\$0
59	13	\$18,300	108	0	\$0
60	10	\$12,360	109	0	\$0
61	8	\$9,420	110	0	\$0
62	0	\$0	111	0	\$0
63	3	\$3,600	112	0	\$0
64	5	\$5,460	113	0	\$0
65	0	\$0	114	0	\$0
66	1	\$1,500	115	0	\$0
67	3	\$3,060	116	0	\$0
68	2	\$3,000	117	0	\$0
69	1	\$600	118	0	\$0
70	0	\$0	119	0	\$0
71	0	\$0	120	0	\$0
72	1	\$960			
			Totals	190	\$238,080

Amounts shown are those payable once the participant reaches retirement eligibility.

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



Amounts shown are those payable once the participant reaches retirement eligibility.

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

(2018 Values Shown)		
Age	Male	Female
25	5	2
30	5	2
35	5	3
40	6	4
45	10	6
50	18	10
55	30	16
60	50	24
65	88	36
70	150	63
75	256	108
80	432	187

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.

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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):**

(2018 Values Shown)		
Age	Male	Female
50	43	26
55	61	36
60	83	52
65	117	79
70	182	128
75	296	209
80	498	354
85	869	628
90	1,537	1,126
95	2,434	1,859
100	3,486	2,785

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.

**b. Termination of Employment Rates (Prior to 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

\*Termination rates zero once member has reached retirement eligibility regardless of service.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**c. Rates of 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.

**d. Salary Increase Rates**

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

**e. Service Accrual Assumption**

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
- 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**

None.

## 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.

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,

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

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.

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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*