



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

**Actuarial Valuation  
as of June 30, 2022**

**Produced by Cheiron**

**January 2023**

## TABLE OF CONTENTS

<i>Section</i>	<i>Page</i>
Letter of Transmittal .....	i
Foreword.....	ii
Section I Board Summary .....	1
Section II Risk Disclosure .....	10
Section III Assets .....	15
Section IV Liabilities .....	18
Section V Contributions.....	22
Section VI Accounting Statement Information.....	24
 <i>Appendices</i>	
Appendix A Membership Information .....	29
Appendix B Actuarial Assumptions and Methods .....	36
Appendix C Summary of Plan Provisions.....	42

January 31, 2023

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, 2022. 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 the 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) 2023 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: Plan experience differing from that anticipated by the assumptions, changes in assumptions, and changes in Plan provisions or applicable law.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations, 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 opinions 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, 2022**

**FOREWORD**

Cheiron has performed the annual actuarial valuation of the Delaware State Volunteer Firemen's Pension Plan (Plan) as of June 30, 2022. 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) 2023, 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 discloses important trends experienced by the Plan in recent years.

**Section II** reviews the primary risks facing the Plan and quantifies these using various risk and maturity measures.

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

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

**Section V** presents the FY 2023 actuarially determined contribution for participating employers.

**Section VI** 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, 2022**

**SECTION I – BOARD SUMMARY**

**General Comments**

The actuarially determined contribution (ADC) amount was calculated to increase from \$1,907,000 for FY 2022 to \$2,365,900 for FY 2023.

During the year ended June 30, 2022, the Plan's assets lost 13.9% 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 4.3%. Although more than the return on a market value basis, 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 \$646,000.

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 \$571,000. This type of gain or loss is normal in the course of Plan experience, as we cannot predict exactly how people will behave.

Effective January 1, 2023, the benefit multiplier doubles from \$5 to \$10 per year of service, including current retirees. This plan improvement approximately doubled the actuarial liability, increasing the liability by \$38.1 million. The State Legislature has appropriated \$38.1 million in funding to pay for this increase in past service, leaving only the increase in future service accrual to increase the actuarially determined contribution (ADC).

This valuation report also contains certain information to be reported in the June 30, 2022 Annual Comprehensive Financial Report (ACFR) 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 2021 actuarial valuation liability results. The calculation of net pension liability in Section VI is shown as disclosed for the plan year ending June 30, 2022, based on the 2021 funding actuarial valuation liability results, updated by the roll forward described above. We also present a projection of the June 30, 2023 disclosure in Section VI, assuming all actuarial assumptions are exactly met over the coming year, which is based on the 2022 actuarial valuation liability results.

As of the June 30, 2022 funding actuarial valuation, the Plan's unfunded actuarial liability (UAL) was \$51.6 million. Taking into account the past service funding, the net UAL for ADC purposes is \$12.9 million. This is a decrease from the \$13.4 million UAL in the funding valuation for the prior year.

Effective with the June 30, 2020 valuation, the UAL is amortized over a closed 15-year period. First effective with the June 30, 2021 valuation, any new sources of UAL are amortized annually over individual closed 15-year periods as a level dollar amount.

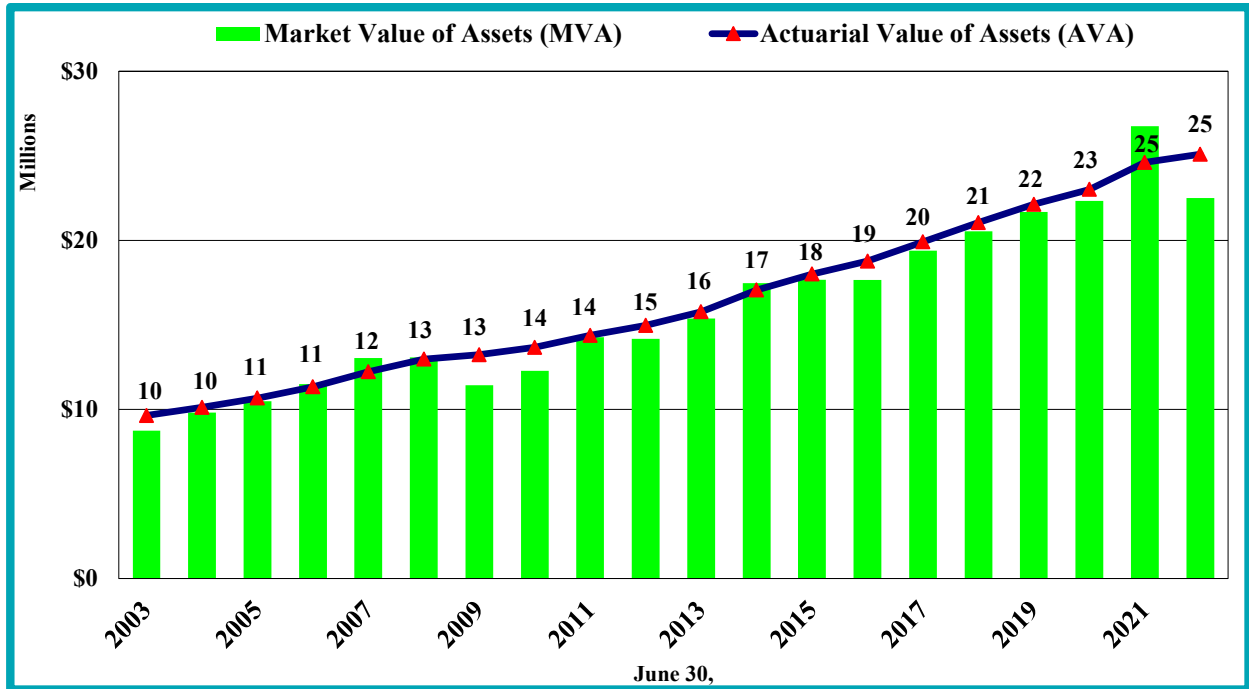
DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022

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 -13.9% 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, with the combined effect of returning 4.3% over FY 2022.

Over the period July 1, 2003 to June 30, 2022, both the Plan's assets measured using the actuarial value of asset measurements and on a market value of assets basis returned a compound 7.0%, equal to the current valuation assumption of 7.0%.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION I – BOARD SUMMARY**

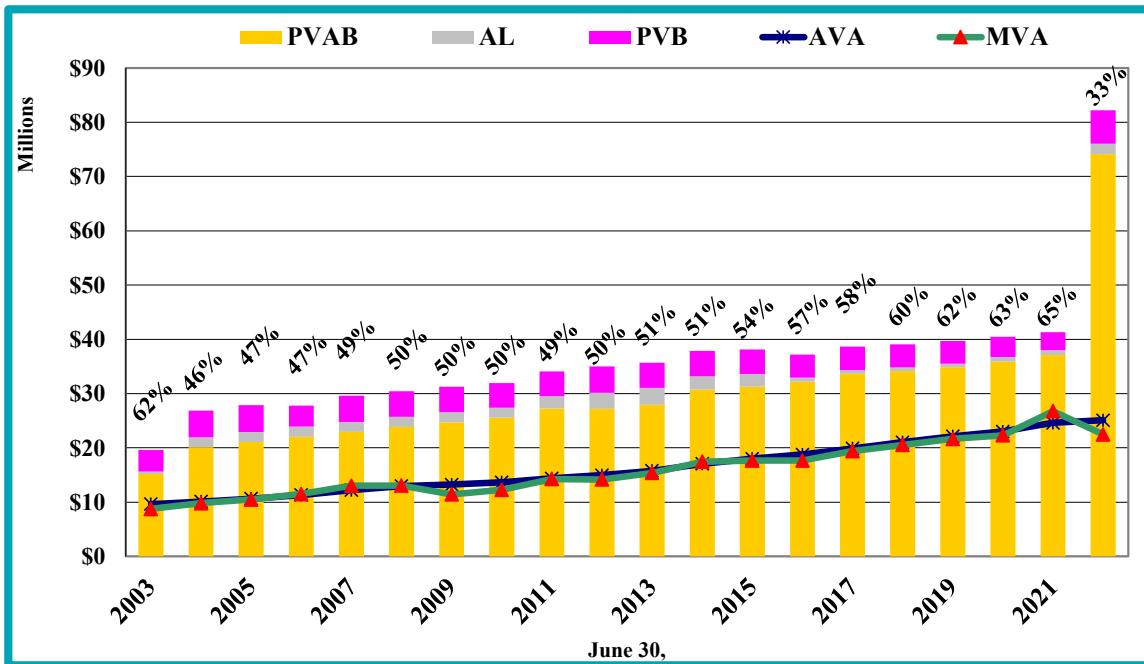
Assets and Liabilities

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 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. 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.

The significant increase in liabilities in 2022 is a result of the Plan change effective January 1, 2023 that doubles the monthly benefit and benefit maximum for all members. Note that if we include the \$38 million of receivable State funds in the assets for 2022, the funded ratio increases to 83%.

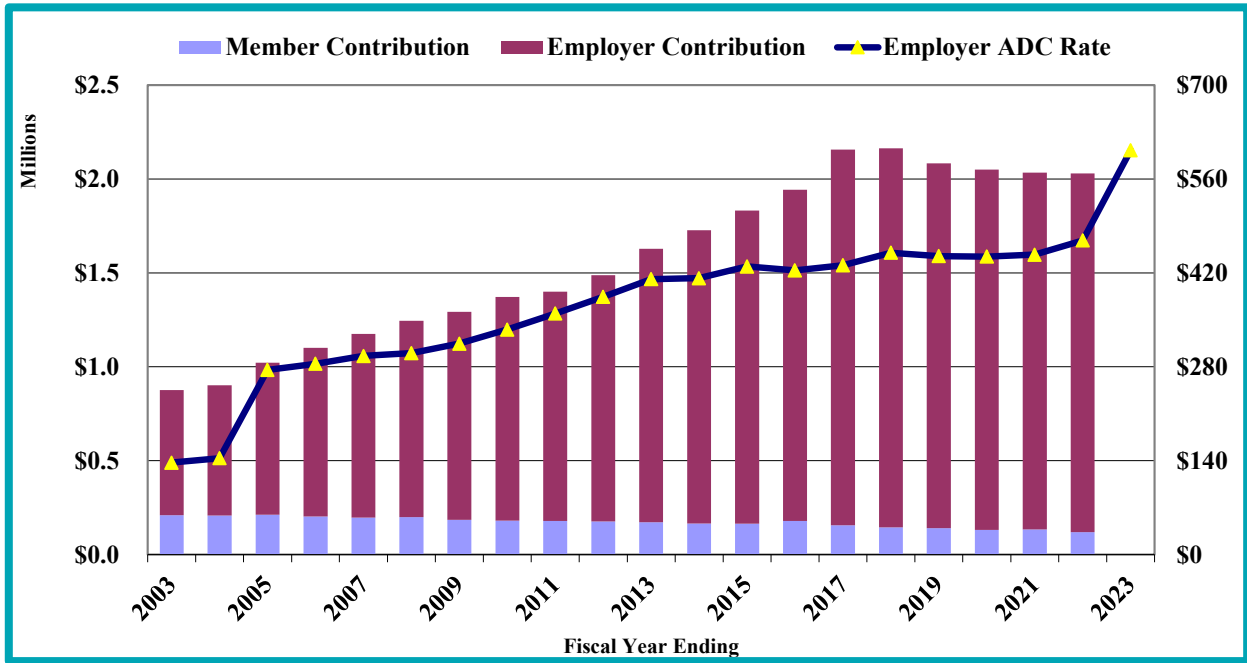


Funded ratios are as a percentage of AVA, and values would be different if presented as percentage of MVA.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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 the timing between when the Employer contribution rates shown are calculated and when they are payable. For example, the value shown for the FY 2022 is the rate prepared by the June 30, 2021 valuation and implemented for the period July 1, 2021 to June 30, 2022. As such, there is one more year’s rate shown beyond the years of actual contributions.

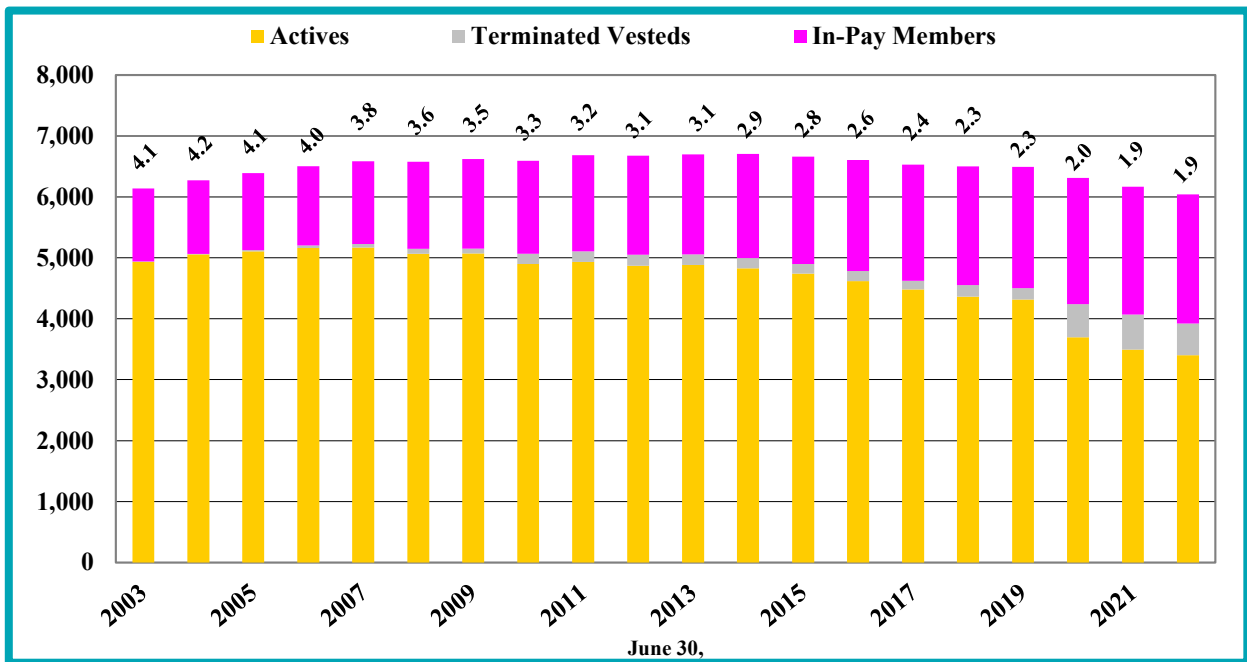


**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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 an increase in the number of inactives over recent years. The numbers that appear above each bar represent the ratio of active members plus terminated vested members to members in pay at each valuation date. This ratio is different than that used in most pension plans by including the terminated vested members with the actives rather than the retirees. This is due to the funding policy of this plan where employer contributions are made on the basis of terminated vested members as well as actives. This ratio has decreased from 4.1 members on whom employers make contributions for each inactive in 2003 to 1.9 actives and terminated vested members for each inactive in 2022. The decrease in active members from 2019 to 2020 was primarily the result of an administrative effort to process pension applications for members with the maximum of 25 years of service.

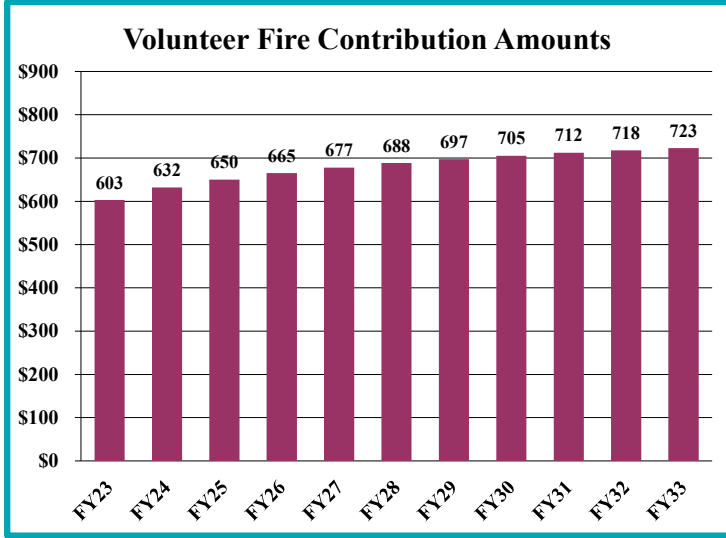


**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION I – BOARD SUMMARY**

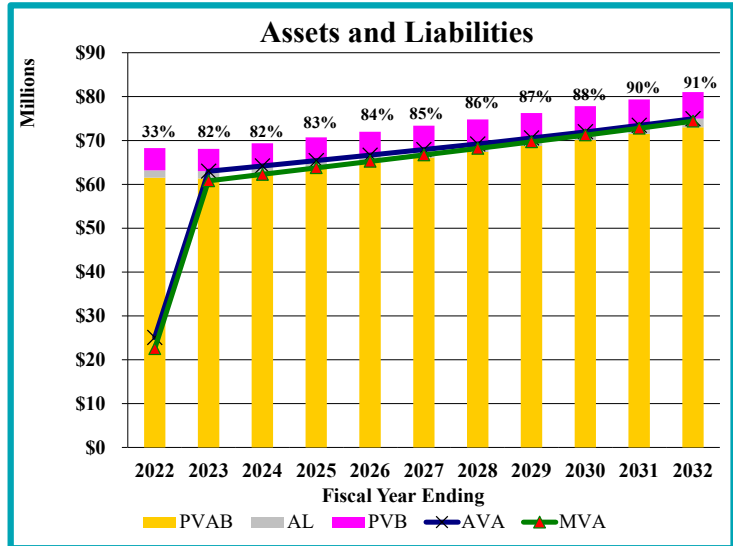
**Future Outlook**

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 increase over this 10-year period as the FY 2022 asset loss is recognized.

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 33% to 91% over the 10-year projection period, assuming all assumptions are exactly met. The increase from 33% to 82% reflects the expected State contribution of \$38 million to pay for the past service portion of the increase in benefits effective January 1, 2023.

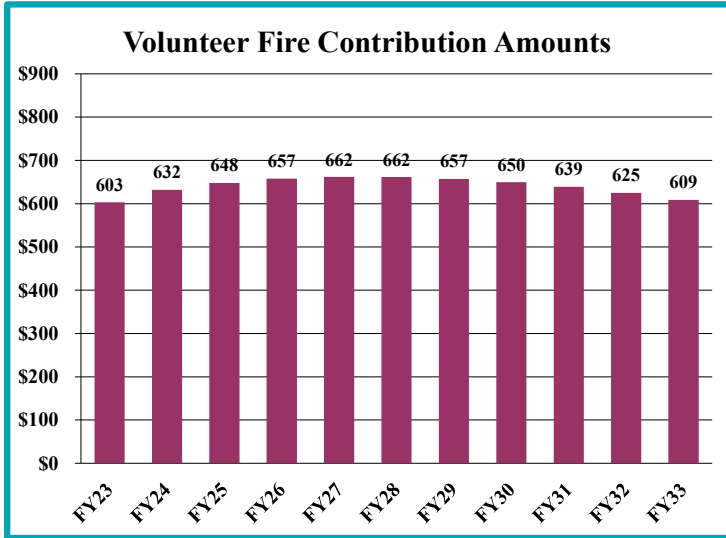


Funded ratios are as a percentage of AVA, and values would be different if presented as percentage of MVA.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION I – BOARD SUMMARY**

Projections with Asset Returns of 8.0%

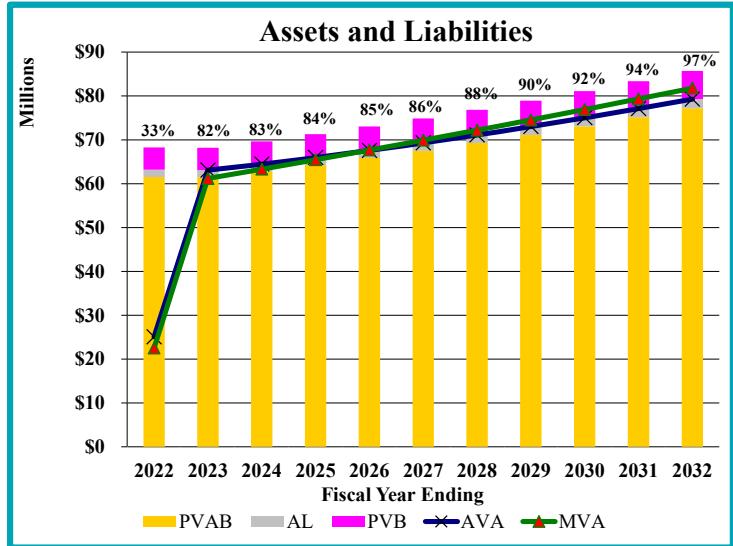


The Plan's investment earnings will affect the future funding status of the Plan. The two graphs on this page show what the next 10 years are expected to look like if the Plan's investment performance is 8.0% each year, 1.0% higher than the valuation investment rate of return assumption.

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 generally decreases during the 10-year period to \$609 per head instead of the \$723 of the baseline scenario.

The "Assets and Liabilities" graph shows that under this scenario the Plan would reach a 97% funded ratio by 2032, an improvement over the baseline scenario's ultimate level of 91%. With on-going investment gains, the Market Value is expected to be higher than the Actuarial Value of Assets starting in FY 2026.

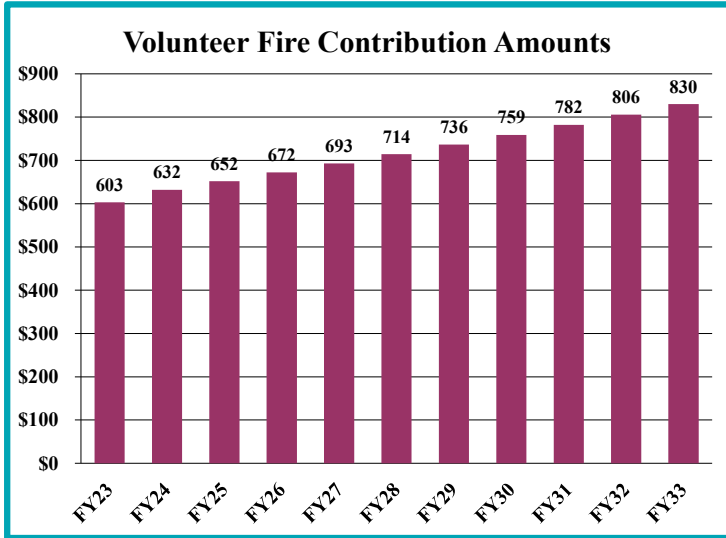


Funded ratios are as a percentage of AVA, and values would be different if presented as percentage of MVA.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION I – BOARD SUMMARY**

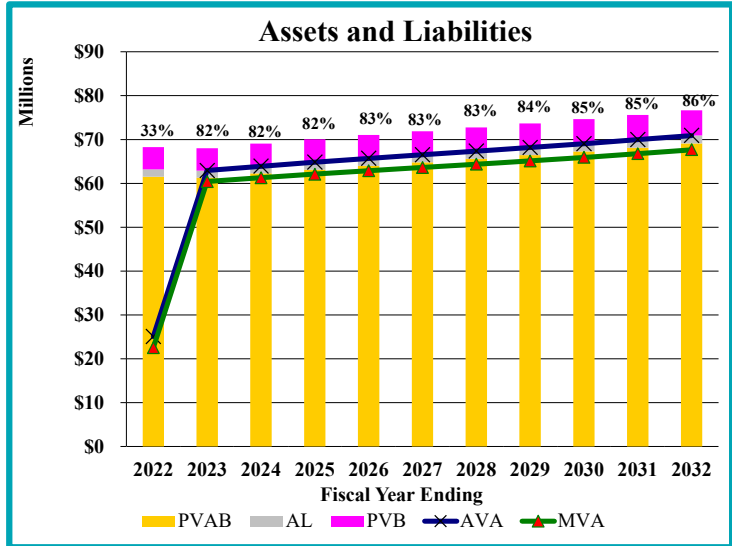
Projections with Asset Returns of 6.0%



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 amounts grow over time, reaching approximately \$830 per head by the end of the 10-year projection period. Additionally, the funded ratio is projected to also increase in this scenario, but at a slower pace with the emerging losses, reaching 86% at the end of the 10-year projection period, lower than the 91% ultimate ratio in the baseline scenario. By introducing investment losses, MVA lags behind AVA for the whole projection period.



Funded ratios are as a percentage of AVA, and values would be different if presented as percentage of MVA.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION I – BOARD SUMMARY**

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

<b>Valuation as of:</b>	<b>June 30, 2021</b>	<b>June 30, 2022</b>	<b>% Change</b>
<b><u>Member Counts</u></b>			
Active Members	3,492	3,402	(2.58)%
Retirees and Beneficiaries	2,099	2,120	1.00%
Terminated Vested Members (TV)	578	521	(9.86)%
Terminated Non-Vested Members	16	10	(37.50)%
<b>Total Member Counts</b>	<b>6,185</b>	<b>6,053</b>	<b>(2.13)%</b>
Annual Benefit Payments for Retirees and Beneficiaries	\$ 2,366,900	\$ 2,411,300	1.88%
<b><u>Assets and Liabilities</u></b>			
Actuarial Liability (AL)	\$ 37,986,200	\$ 76,066,000	100.25%
Actuarial Value of Assets (AVA)	24,608,900	25,086,200	1.94%
Unfunded AL (UAL)	\$ 13,377,300	\$ 50,979,800	281.09%
Funded Ratio on AVA Basis (AVA/AL)	64.8%	33.0%	
Funded Ratio on MVA Basis (MVA/AL)	70.4%	29.6%	
Present Value of Accrued Benefits (PVAB)	\$ 37,100,800	\$ 74,090,200	99.70%
Market Value of Assets (MVA)	26,750,200	22,501,400	(15.88)%
Unfunded PVAB	\$ 10,350,600	\$ 51,588,800	398.41%
Accrued Benefit Funded Ratio (MVA/PVAB)	72.1%	30.4%	
<b><u>Employer Contribution Amount</u></b>			
	<b>Fiscal Year 2022</b>	<b>Fiscal Year 2023</b>	
Entry Age Normal Cost	\$ 378,500	\$ 819,700	
UAL Amortization Payment	1,478,000	1,489,300	
Administrative Expense	50,500	56,900	
Actuarially Determined Contribution (ADC)	\$ 1,907,000	\$ 2,365,900	
ADC per Active + TV Member*	\$ 468.55	\$ 603.08	

\* The divisor uses both actives and terminated vested members for developing the per-head rate in order to be comparable to how this contribution is administered.

DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022

SECTION II – RISK DISCLOSURE

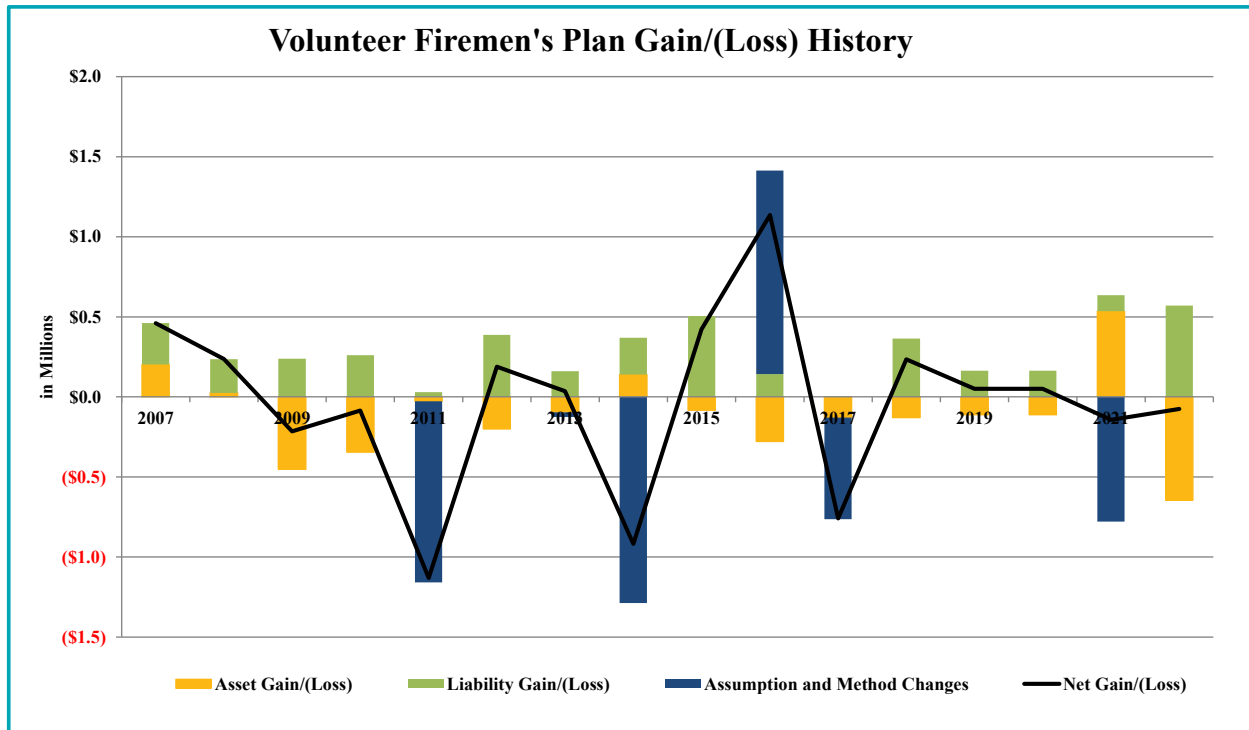
Introduction

The Plan's actuarial valuation results are dependent on assumptions about future economic and demographic experience. Based on actuarial standards of practice, the assumptions represent a reasonable estimate for future experience. However, actual future experience will never conform exactly to the assumptions and may differ significantly from the assumptions. This deviation is the risk that pension plan sponsors undertake in relying on a pension plan's actuarial valuation results.

This section of this report is intended to identify the primary drivers of these risks, provide background information and assessments about these identified risks, and communicate the significance of these risks to this plan.

Historical Experience

For this plan, the two primary measurements where there is risk that the actual measurements will significantly differ from the expected future measurements are in the measurements of the liabilities of the Plan and the resulting calculation of the actuarially determined contributions. Therefore, while future experience will not be the same as past experience, it is useful to look at what factors have contributed to the actual liability measurements at each valuation date deviating from that which was predicted by the prior year's valuation. The following graph shows the gains/(losses) for each valuation date between the actual liability measurement and the expected liability broken down by cause.



## SECTION II – RISK DISCLOSURE

This shows that the assumption and method changes gain/(loss) has been the most significant risk for the Plan over this period in regard to the actual liability measurements deviating from the expected. After that, the next two most significant causes are the liability gain/(loss) and the asset gain/(loss). Additionally, this graph shows that over the whole period shown the values for all three of these causes have somewhat offset each other. Over the whole period, gains from liability have had the greatest cumulative impact on the liability.

### Risk Identification

Considering the specific characteristics of the Plan, the assumptions and methods used in the actuarial valuations for the Plan, and the recent history, we have identified the risks that we think are the most significant in terms of possibly leading to actual values of the measurements deviating from those expected by the valuation process, as follows:

- Investment risk,
- Longevity and other demographic risk, and
- Assumption change risk.

While we have identified these risks as potentially significant in regard to actual measurements deviating from expected, it is possible that there are other risks that we have not identified that will turn out to be significant. For example, while it is possible that the contributing employers could start paying contributions other than the actuarially determined contributions, and the measurements thus differ as a result of contribution risk, we have not included contribution risk above as this Plan has consistently received contributions equal to what is assumed in the valuation process.

*Investment Risk* is the potential for investment returns to be different than anticipated. In the case of this plan, that is the risk that the returns on assets will be materially different from the 7.0% that is currently assumed. If actual investment returns are lower than anticipated by the assumptions used in the actuarial valuation, this will increase the unfunded liability measurements and require higher contributions in the future than if the actual returns equaled the assumed returns. On the other hand, if the actual returns are higher than the assumptions, the resulting unfunded liability measurements and actuarially determined contributions will be lower than anticipated. As seen in the historical section, this has been a significant driver of deviations in the actual measurements from those expected by prior valuations.

*Longevity and Other Demographic Risk* is the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time as the actual experience deviates from expected and is typically periodically reduced through the Plan's regular actuarial experience process. As such, these risks are often dwarfed by other risks, particularly those due to the investment returns. However, for small plans like this, there are relatively few members and so the behavior of individual members can have significant impact on the liabilities. In addition, this plan is relatively young and so there has been limited information to develop the demographic assumptions on, which has

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION II – RISK DISCLOSURE**

contributed to this risk. The historical section shows that this has been true for this plan historically, with the magnitude of the gains from liability experience being of even greater magnitude than those from investment experience, both cumulatively and in most years.

*Assumption Change Risk* is the potential for the environment to change such that future valuation assumptions are adjusted to be different than the current assumptions. For example, declines in interest rates resulting in changes in the assumed rates of return, changes in employee behavior and/or plan provisions requiring changes in the demographic assumptions, and similar changes. Assumption change risk is an extension of the risks previously identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment resulting in the current assumption no longer being reasonable. The historical review earlier in this section showed that assumption change risk has been a relatively significant risk for this plan over the recent historical period.

The revisions to the assumed rate of return from 8.0% to 7.5% in 2011, from 7.5% to 7.2% in 2014, and from 7.2% to 7.0% in 2017 constitute the majority of the increases to the unfunded measurements from the expected values as a result of assumption changes. Changes to the demographic assumptions to reflect mortality improvements have also had a relatively significant impact as have changes in the methodology of the funding policy throughout the years. Other changes to demographic assumptions have also resulted in deviations from the expected values, particularly the changes from the experience study reflected in the 2016 valuation.

It is important to note that these changes simply reflect recognizing changes in the expected values of assumptions. If these revisions had not been made, we would anticipate that these amounts would be gradually recognized in the other risks. If future expectations of assumptions, such as interest rates or mortality, change further, we anticipate similar amounts will have to be recognized.

### **Plan Maturity Measures**

The future financial condition of a mature pension plan is more sensitive to each of the risks identified in the previous section than in a less mature plan. Before assessing the risks to the Plan from a forward-looking perspective, it is of value to understand the maturity of the Plan compared to other plans as well as how the Plan's maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic, the larger the plan is compared to the contribution or revenue base that supports it, the more sensitive the plan will be to risk. There are extensive measures available to assess plan maturity. For this plan, we have examined a number of these, and all indicate that the Plan is maturing, but is less mature than most of its peers. We have included the most simplistic of these measures as a demonstration of this.



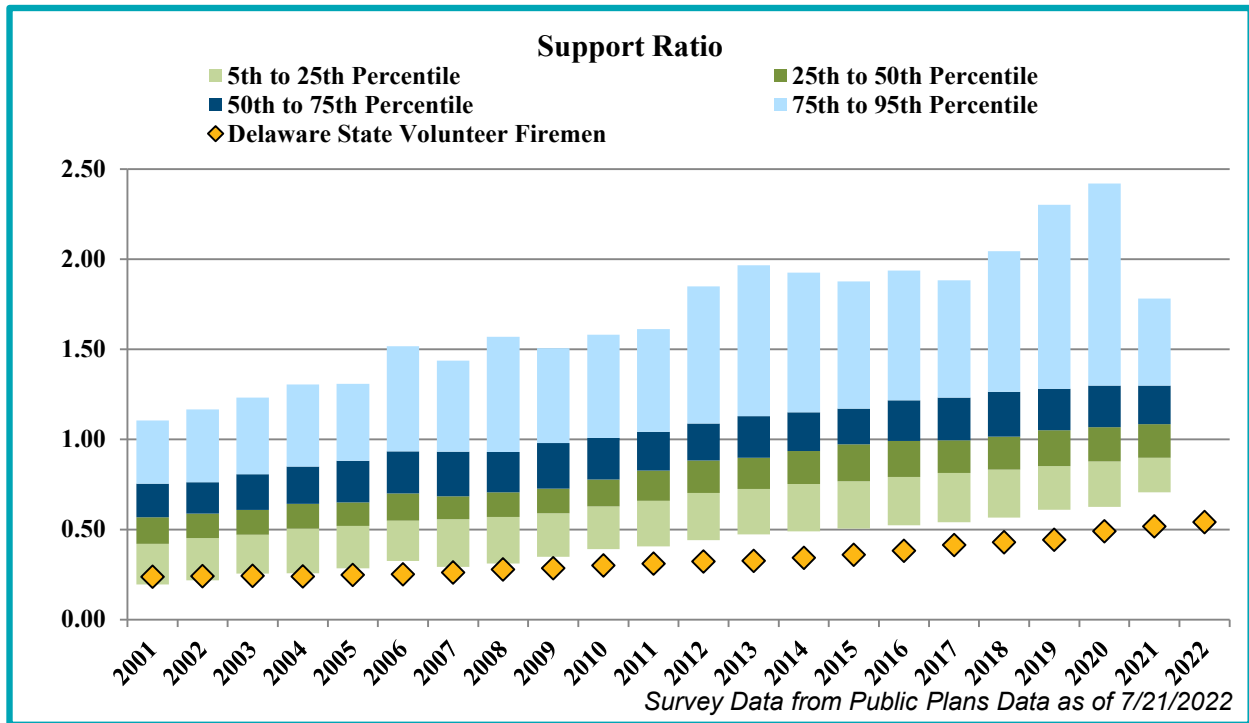
DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022

SECTION II – RISK DISCLOSURE

The most simplistic of the plan maturity measures is the support ratio, which is typically the ratio of the number of inactive members (those receiving benefits currently or entitled to a deferred benefit) to the number of active members. In a typical plan, the contributions paid by the employers are only made on the basis of the actives, so they are the population that is supporting the remaining membership. However, for this plan, the employer contributions are made on the basis of the terminated vested members as well as the actives. As such, the support ratio we develop for this plan includes the terminated vested members with the actives instead of with the members whose benefits are in pay. The following graph shows the support ratio over time for the Plan versus a universe of other public plans.

The Boston College's Center for Retirement Research, NASRA, and the Center for State and Local Government Excellence maintain the Public Plans Database that contains the majority of state plans as well as many large municipal plans, covering over 95% of the membership in public plans as well as over 95% of the assets held by public pension plans.

The chart that follows shows the support ratio for all plans in this database since 2001. The colored bars represent the central 90% of the support ratios for the plans in the database. Note that for these purposes, the support ratio calculated for the plans in the database is the traditional version where the terminated vested members are included with the in pay members in the ratio. The Delaware State Volunteer Firemen's Pension Plan is represented by the gold diamonds. For these gold diamonds, we have included the terminated vested members with the actives, consistent with how the Plan is funded. Note that this chart shows one more year for the System than the universe as the 2022 numbers are not yet available for the database.



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION II – RISK DISCLOSURE**

This graph shows that the support ratio for the Plan has generally increased over time. This graph shows that Delaware Volunteer Fire's support ratio is much lower than a typical plan, indicating that the Plan is less mature based on this metric, and that over the recent history, the Plan's ratio has grown at a slower rate than typical plans in this universe through 2021. As of the most recent dates for which the full database is available, the Delaware Volunteer Fire's support ratio remains below the 5<sup>th</sup> percentile among all plans in the database.

**More Detailed Assessment**

A more detailed assessment is always valuable to enhance the understanding of the risks identified above, however the value of this must be compared alongside the costs of such an exercise. The costs in this case are both measurable costs as expressed by the actuarial fees for the additional assessment and the cost of staff time required to support the effort and more intangible costs such as the additional information potentially drowning out the principal findings from the valuation and overwhelming decision makers.

Whether or not to have a more detailed risk assessment performed at this time is the Board's decision, but we do not believe that this additional risk assessment is required at this time based on our understanding of the Board's priorities.

**Conclusion**

The results of this valuation are based on the assumptions and methodology used within the valuation, and to the extent that actual experience deviates from these, the actual future measurements will deviate from those projected by this valuation. The most significant risks related to this are anticipated to be investment risk, mortality and other demographic risk, and assumption change risk.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION III – 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, 2021 and June 30, 2022,
- Statement of the **changes** in market values during FY 2022,
- 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 III-1 below shows the market values as of June 30, 2021 and June 30, 2022, along with the changes between the two.

Table III-1 Changes in Market Values of Assets		
<b>Market Value of Assets – June 30, 2021</b>		<b>\$ 26,750,200</b>
<b><u>Additions</u></b>		
Member Contributions	\$ 120,000	
Employer Contributions	1,910,800	
Investment Returns	<u>(3,669,600)</u>	
<b>Total Additions</b>	<b>\$ (1,638,800)</b>	
<b><u>Deductions</u></b>		
Benefit Payments	\$ 2,553,100	
Administrative Expenses	<u>56,900</u>	
<b>Total Deductions</b>	<b>\$ 2,610,000</b>	
<b>Market Value of Assets – June 30, 2022</b>		<b>\$ 22,501,400</b>

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION III – 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, 2022.

<b>Table III-2 Development of Actuarial Value of Assets</b>		
1.	Actuarial Value of Assets at June 30, 2021	\$ 24,608,900
2.	Amount in (1) with interest to June 30, 2022 at 7.0% per year	26,331,500
3.	Employer and member contributions for FY 2022	2,030,800
4.	Interest on contributions assuming payments made uniformly throughout the year to June 30, 2022 at 7.0% per year	69,900
5.	Disbursements from Trust except investment expenses, July 1, 2021 through June 30, 2022	2,610,000
6.	Interest on disbursements to June 30, 2022 at 7.0% per year	<u>89,800</u>
7.	Expected Actuarial Value of Assets at June 30, 2022 = (2) + (3) + (4) – (5) – (6)	\$ 25,732,400
8.	Actual Market Value of Assets at June 30, 2022	<u>\$ 22,501,400</u>
9.	Excess of (8) over (7)	\$ (3,231,000)
10.	Actuarial Value of Assets at June 30, 2022 = (7) + 20% of (9)	\$ 25,086,200

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION III – ASSETS**

**Investment Performance**

The market value of assets (MVA) returned -13.9% during 2022, less than the prior year's assumed 7.0% investment rate of return. The actuarial value of assets (AVA) returned 4.3% 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 III-3 Cash Flow Projections</b>		
<b>Year Beginning July 1,</b>	<b>Expected Benefit Payments and Administrative Expenses</b>	<b>Expected Contributions*</b>
2022	\$ 3,854,000	\$ 40,581,000 **
2023	5,282,000	2,502,000
2024	5,468,000	2,502,000
2025	5,655,000	2,502,000
2026	5,802,000	2,502,000
2027	5,930,000	2,502,000
2028	6,035,000	2,502,000
2029	6,131,000	2,502,000
2030	6,235,000	2,502,000
2031	6,333,000	2,502,000

\* Expected contributions include employer contributions and member contributions. For illustration purposes, we have assumed the employer contribution rate will remain level at \$603.08 from FYE 2023.

\*\* Expected contributions for 2022 include the anticipated State contribution of \$38.1 million to cover past service cost of benefit improvement.

Expected benefit payments are projected for the closed group valued at June 30, 2022. 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, 2022**

**SECTION IV – 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, 2021 and June 30, 2022, 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, 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, 2022**

**SECTION IV – LIABILITIES**

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

	<b>June 30, 2021</b>	<b>June 30, 2022</b>
<b><u>Present Value of Benefits</u></b>		
Active Member Benefits	\$ 13,825,500	\$ 27,735,400
Retiree, Beneficiary, and Terminated Member Benefits	<u>27,506,900</u>	<u>54,472,400</u>
<b>Present Value of Benefits (PVB)</b>	<b>\$ 41,332,400</b>	<b>\$ 82,207,800</b>
Market Value of Assets (MVA)	\$ 26,750,200	\$ 22,501,400
Future Member Contributions	984,000	948,000
Future Employer Contributions	<u>13,598,200</u>	<u>58,758,400</u>
<b>Total Resources</b>	<b>\$ 41,332,400</b>	<b>\$ 82,207,800</b>
<b><u>Actuarial Liability</u></b>		
Present Value of Benefits (PVB)	\$ 41,332,400	\$ 82,207,800
Present Value of Future Employer Normal Costs (PVFNC)	2,362,200	5,193,800
Present Value of Future Member Contributions (PVFEEC)	<u>1,284,000</u>	<u>948,000</u>
<b>Actuarial Liability (AL=PVB–PVFNC–PVFEEC)</b>	<b>\$ 37,986,200</b>	<b>\$ 76,066,000</b>
Actuarial Value of Assets (AVA)	<u>24,608,900</u>	<u>25,086,200</u>
<b>Net (Surplus)/Unfunded AL (AL – AVA)</b>	<b>\$ 13,377,300</b>	<b>\$ 50,979,800</b>
<b><u>Present Value of Accrued Benefits</u></b>		
Present Value of Benefits (PVB)	\$ 41,332,400	\$ 82,207,800
Present Value of Future Benefit Accruals (PVFBA)	<u>4,231,600</u>	<u>8,117,600</u>
<b>Present Value of Accrued Benefits (PVAB=PVB–PVFBA)</b>	<b>\$ 37,100,800</b>	<b>\$ 74,090,200</b>
Market Value of Assets (MVA)	\$ 26,750,200	\$ 22,501,400
<b>Net (Surplus)/Unfunded PVAB (PVAB – MVA)</b>	<b>\$ 10,350,600</b>	<b>\$ 51,588,800</b>

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION IV – 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 IV-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, 2021	\$ 41,332	\$ 37,986	\$ 37,101
Liabilities June 30, 2022	82,208	76,066	74,090
Liability Increase/(Decrease)	40,876	38,080	36,989
Change Due to:			
Benefit Changes	40,945	38,089	36,916
Assumption Changes	0	0	0
Actuarial (Gain)/Loss	NC *	(571)	NC *
Benefits Accumulated and Other (Gain)/Loss	(69)	(849)	73

\* NC = not calculated.



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION IV – LIABILITIES**

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

<b>Table IV-3 Actuarial Liabilities for Funding</b>		
	<b>June 30, 2021</b>	<b>June 30, 2022</b>
1. Actuarial Liabilities		
Retiree, Beneficiary, and Terminated Members	\$ 27,506,900	\$ 54,472,400
Active Members	<u>10,479,300</u>	<u>21,593,600</u>
<b>Total Actuarial Liability (AL)</b>	<b>\$ 37,986,200</b>	<b>\$ 76,066,000</b>
2. Actuarial Value of Assets (AVA)	\$ 24,608,900	\$ 25,086,200
3. Unfunded Actuarial Liability (UAL) [AL – AVA]	\$ 13,377,300	\$ 50,979,800
4. Anticipated State contribution to cover past service cost of benefit improvement	N/A	\$ 38,088,600
5. Outstanding Base for 15-Year 2020 Amortization (13 Years Remaining as of June 30, 2022)	\$ 13,211,900	\$ 12,626,000
6. Outstanding Base for 15-Year 2021 UAL Amortization (14 Years Remaining as of June 30, 2022)	\$ 165,400	\$ 158,800
7. <b>Net Base for 15-Year 2022 UAL Amortization     (3-4-5-6)</b>	N/A	<b>\$ 106,400</b>

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION V – 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 is 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 amount for all active members equals the sum of the employer normal cost amount 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 closed period. The period was closed beginning with the 2020 valuation. Future gains and losses, beginning with the June 30, 2021 actuarial valuation, are amortized over individual 15-year layers.

The current assumed administrative expense is equal to the actual administrative expenses charged in the prior year. 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 V-1</b>		
<b>Employer Contribution Amounts</b>		
<b>Valuation Date</b>	<b>June 30, 2021</b>	<b>June 30, 2022</b>
<b>FY Contribution Amount Payable</b>	<b>FY 2022</b>	<b>FY 2023</b>
Entry Age Normal Cost Amount	\$ 378,500	\$ 819,700
UAL Amortization Payment Amount	1,478,000	1,489,300
Administrative Expense Amount	<u>50,500</u>	<u>56,900</u>
Actuarially Determined Contribution	\$ 1,907,000	\$ 2,365,900

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION V – CONTRIBUTIONS**

Table V-2 below provides additional detail about the development of the expected employer contribution amount for FY 2023.

<b>Table V-2 Expected FY 2023 Employer Contributions</b>		<b>In Dollars</b>
1. Present Value of Projected Benefits		
Attributable to:		
a. Total Normal Cost	\$	946,400
b. Expected Member Contributions		<u>126,700</u>
c. Employer-Paid Normal Cost (a) – (b)	\$	819,700
2. Amortization of Unfunded Liability		
a. 13-Year Amortization of 2020 UAL	\$	1,460,500
b. 14-Year Amortization of 2021 Layer		17,500
c. 15-Year Amortization of 2022 Layer		<u>11,300</u>
d. Total UAL Amortization		1,489,300
3. Allowance for Administrative Expense		<u>56,900</u>
4. Total Employer Actuarially Determined Contribution Amount (1c) + (2c) + (3)	\$	2,365,900

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION VI – 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, 2021 and June 30, 2022 are provided for informational purposes and are exhibited in Table VI-1 which also includes a reconciliation of liabilities determined as of the prior valuation, July 1, 2021, to the liabilities as of June 30, 2022. These values are based on the funding liability results with level percentage of payroll used as discussed later in this section.

This valuation contains information reported in the June 30, 2022 Annual Comprehensive Financial Report (ACFR) of Delaware PERS under GASB Statement No. 67. Disclosures are based on the use of updated procedures to roll forward the 2021 funding valuation results. The calculation of Net Pension Liability in Table VI-2 shows the amounts to be disclosed for FY 2022, based on the liabilities of the roll forward of the 2021 entry age normal level percent of pay results, as well as a projection of the anticipated FY 2023 disclosures, based on liabilities from the 2022 funding valuation, assuming all actuarial assumptions are met over the coming year. The actual disclosures for FY 2023 will be developed once the asset measure for GASB as of June 30, 2023 is known.

Tables VI-3 through VI-5 are exhibits to be used for the System’s ACFR. Table VI-3 is the Note to Required Supplementary Information. Table VI-4 is a history of gains and losses in accrued liability, and Table VI-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 ACFR.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION VI – ACCOUNTING STATEMENT INFORMATION**

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

	<b>June 30, 2021</b>	<b>June 30, 2022</b>
<b>FASB ASC Topic No. 960 Basis</b>		
1. Present Value of Accrued Benefits (PVAB)		
a. Members Currently Receiving Payments	\$ 21,132,100	\$ 42,897,400
b. Former Vested Members	6,374,800	11,575,000
c. Active Members	<u>9,593,900</u>	<u>19,617,800</u>
2. Total PVAB [1(a) + 1(b) + 1(c)]	\$ 37,100,800	\$ 74,090,200
3. Market Value of Assets (MVA)	<u>26,750,200</u>	<u>22,501,400</u>
4. Unfunded PVAB [2 – 3]	\$ 10,350,600	\$ 51,588,800
5. Ratio of Market Value of Assets to Present Value of Benefits [3 / 2]	72.1%	30.4%
<b>Reconciliation of PVAB</b>		
PVAB at June 30, 2021		\$ 37,100,800
Increase/(Decrease) During Year Attributable to:		
Passage of Time		2,509,200
Benefits Paid – FY 2022		(2,553,100)
Benefit Changes		36,915,600
Assumption Changes		0
Benefits Accrued, Other Gains/Losses		<u>117,700</u>
Net Increase/(Decrease)		36,989,400
PVAB at June 30, 2022		\$ 74,090,200

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**SECTION VI – ACCOUNTING STATEMENT INFORMATION**

<b>Table VI-2 GASB Number 67 Disclosures</b>		
	<b>June 30, 2022</b>	<b>Estimated June 30, 2023</b>
<b><u>Total Pension Liability (TPL)</u></b>		
Service cost	\$ 593,000	\$ 1,115,000
Interest	2,563,000	5,179,000
Changes in benefit terms	38,088,000	0
Differences between expected and actual experience	(106,000)	(1,237,000)
Changes in assumptions	0	0
Benefit payments, including refunds of member contributions	(2,553,000)	(3,797,000)
<b>Net change in TPL</b>	<b>\$ 38,585,000</b>	<b>\$ 1,260,000</b>
<b>TPL – beginning</b>	<b>\$ 37,385,000</b>	<b>\$ 75,970,000</b>
<b>TPL – ending (a)</b>	<b>\$ 75,970,000</b>	<b>\$ 77,230,000</b>
<b><u>Fiduciary Net Position (FNP)</u></b>		
Contributions – Employer	\$ 1,911,000	\$ 2,366,000
Contributions – Non-employer	0	38,088,000
Contributions – Member	120,000	127,000
Net investment income	(3,670,000)	2,772,000
Benefit payments, including refunds of member contributions	(2,553,000)	(3,797,000)
Administrative expenses	(57,000)	(57,000)
<b>Net change in FNP</b>	<b>\$ (4,249,000)</b>	<b>\$ 39,499,000</b>
<b>FNP – beginning</b>	<b>\$ 26,750,000</b>	<b>\$ 22,501,000</b>
<b>FNP – ending (b)</b>	<b>\$ 22,501,000</b>	<b>\$ 62,000,000</b>
<b>Net Pension Liability/(Asset) – ending [(a)-(b)]</b>	<b>\$ 53,469,000</b>	<b>\$ 15,230,000</b>

Items printed in red will be replaced with actual amounts once known at the end of FY 2023.

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, 2022**

**SECTION VI – ACCOUNTING STATEMENT INFORMATION**

**Table VI-3**

**Note to Required Supplementary Information**

The June 30, 2022 total pension liability presented in Table VI-2 was determined as part of the measurement at the date indicated. Additional information as of the latest measurement date follows.

Measurement date:	July 1, 2022
Valuation date:	July 1, 2021
Actuarial cost method for funding:	Entry age normal – level dollar method
Actuarial cost method for GASB 67:	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 2023 will use the contribution rate developed in Section V of this valuation. It was determined using the measurement date and key assumptions that follow.

Measurement date:	July 1, 2022
Valuation date:	July 1, 2022
Actuarial cost method:	Entry age normal level dollar
Amortization method:	Level dollar – closed
Amortization period:	Initial 15-year period for UAL as of June 30, 2020 (13 years remaining as of 6/30/2022) and 15-year layers for unexpected changes in UAL after 6/30/2020 Equivalent single amortization period 13.0 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 2021. The economic assumptions were updated first effective with the 2017 valuation based on the Board's annual review of these assumptions.

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, 2022**

**SECTION VI – ACCOUNTING STATEMENT INFORMATION**

**Table VI-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>					
	2017	2018	2019	2020	2021	2022
Investment Income on Actuarial Assets	\$ (130)	\$ (129)	\$ (112)	\$ (170)	\$ 535	\$ (646)
Combined Liability Experience	<u>6</u>	<u>364</u>	<u>163</u>	<u>(720)</u>	<u>99</u>	<u>571</u>
(Loss)/Gain during Year from Financial Experience	\$ (124)	\$ 235	\$ 51	\$ (890)	\$ 634	\$ (75)
Non-Recurring Items	<u>(634)</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(778)</u>	<u>(38,089)</u>
Composite Gain (or Loss) during Year	\$ (758)	\$ 235	\$ 51	\$ (890)	\$ (144)	\$ (38,164)

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

Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member State-Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liabilities Covered by Reported Assets		
					(1)	(2)	(3)
2022	\$ 3,788	\$ 42,897	\$ 29,381	\$ 25,086	100%	50%	0%
2021	3,676	21,132	13,178	24,609	100	99	0
2020	3,756	20,456	12,557	23,010	100	94	0
2019	5,283	19,391	10,798	22,126	100	87	0
2018	5,207	18,835	10,779	21,047	100	84	0
2017	5,302	18,326	10,713	19,911	100	80	0



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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, 2021 valuation	3,492	572	6	2,099	0	0	0	6,169
2. Additions								
(a) New entrants	117			3				120
(b) <u>New Beneficiary/QDRO</u>								
(c) Total	117			3				120
3. Reductions								
(a) Terminated - not vested	(148)							(148)
(b) <u>Paid Out/Expired/Death</u>		(3)		(95)				(98)
(c) Total	(148)	(3)		(95)				(246)
4. Changes in status								
(a) P-TDV	(7)	7						
(b) P-SUPP								
(c) Returned to work	2	(2)						
(d) P-RET	(54)	(59)		113				
(e) PRET25								
(f) P-DIS								
(g) P-LTD								
(h) P-SURV								
(i) PSUR25								
(j) P-SR								
(k) <u>Data corrections</u>								
(l) Total	(59)	(54)		113				
5. June 30, 2022 valuation	3,402	515	6	2,120	0	0	0	6,043

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

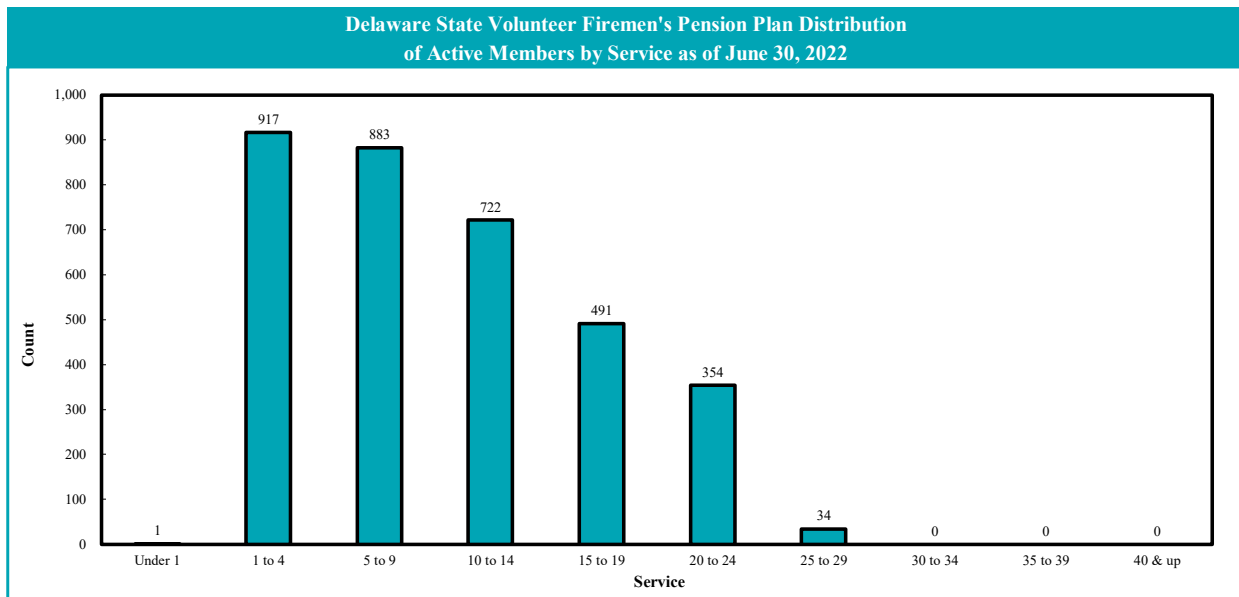
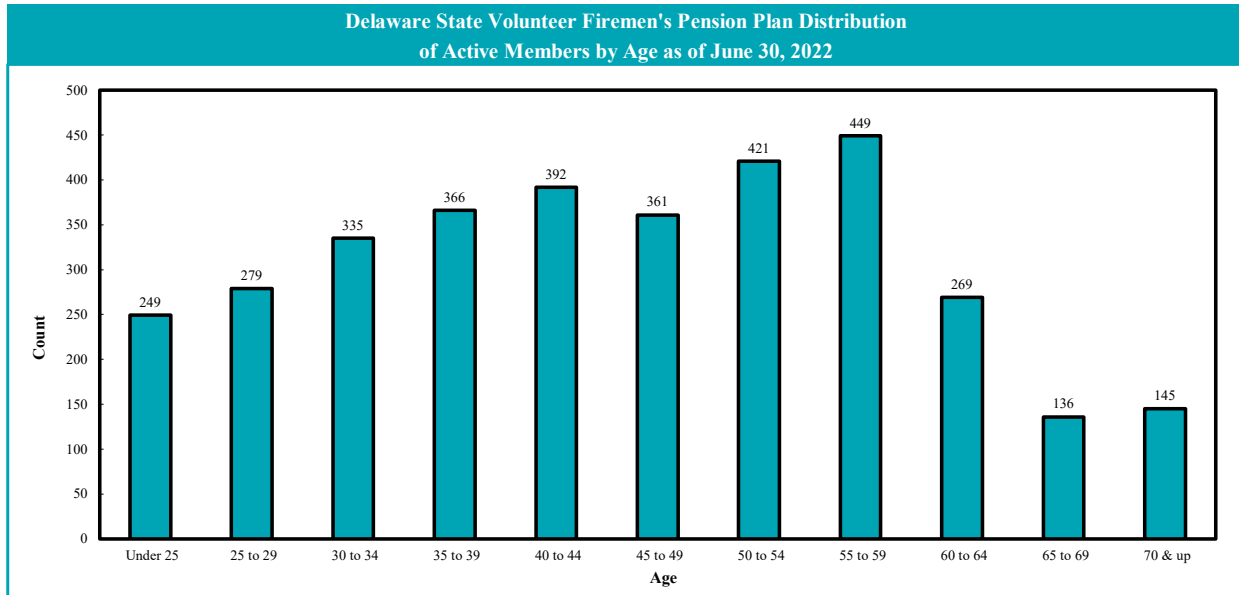
**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX A – MEMBERSHIP INFORMATION**

Delaware State Volunteer Firemen's Pension Plan Distribution of Active Members by Age and Service as of June 30, 2022												
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	187	61	1	0	0	0	0	0	0	0	249
25 to 29	0	126	115	37	1	0	0	0	0	0	0	279
30 to 34	0	112	105	92	24	2	0	0	0	0	0	335
35 to 39	0	79	94	83	88	22	0	0	0	0	0	366
40 to 44	1	64	86	95	72	67	7	0	0	0	0	392
45 to 49	0	64	77	78	67	67	8	0	0	0	0	361
50 to 54	0	78	75	112	75	75	6	0	0	0	0	421
55 to 59	0	75	73	109	107	76	9	0	0	0	0	449
60 to 64	0	49	71	70	42	34	3	0	0	0	0	269
65 to 69	0	41	56	25	7	6	1	0	0	0	0	136
70 & up	0	42	70	20	8	5	0	0	0	0	0	145
Total	1	917	883	722	491	354	34	0	0	0	0	3,402

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX A – MEMBERSHIP INFORMATION**



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX A – MEMBERSHIP INFORMATION**

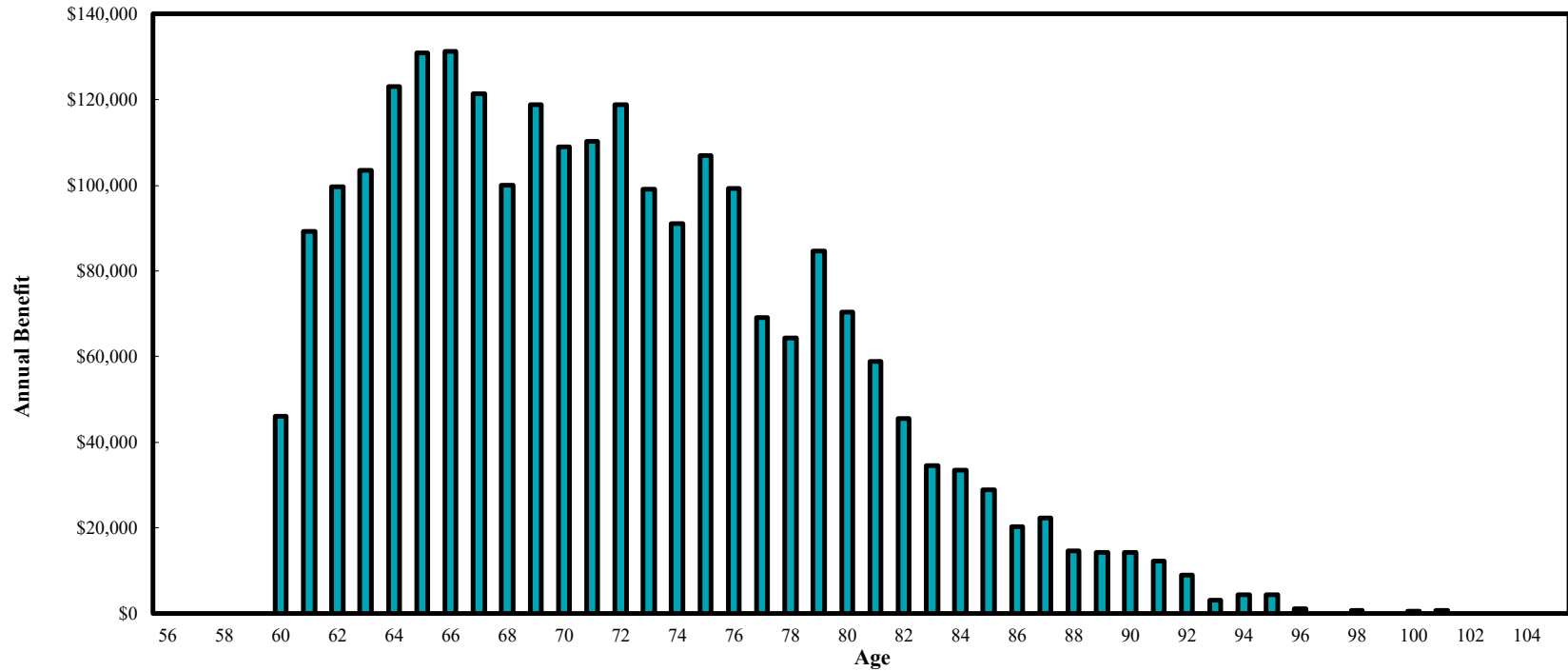
**Delaware State Volunteer Firemen's Pension Plan Annual Benefit  
Distribution of Retired Members and Beneficiaries as of June 30, 2022**

Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	\$0	73	85	\$99,180
25	0	\$0	74	85	\$91,080
26	0	\$0	75	95	\$106,920
27	0	\$0	76	88	\$99,240
28	0	\$0	77	61	\$69,060
29	0	\$0	78	61	\$64,440
30	0	\$0	79	76	\$84,660
31	0	\$0	80	65	\$70,440
32	0	\$0	81	57	\$58,860
33	0	\$0	82	44	\$45,600
34	0	\$0	83	38	\$34,680
35	0	\$0	84	38	\$33,540
36	0	\$0	85	31	\$28,980
37	0	\$0	86	22	\$20,400
38	0	\$0	87	25	\$22,380
39	0	\$0	88	18	\$14,700
40	0	\$0	89	18	\$14,280
41	0	\$0	90	17	\$14,220
42	0	\$0	91	16	\$12,300
43	0	\$0	92	12	\$9,060
44	0	\$0	93	4	\$3,120
45	0	\$0	94	6	\$4,440
46	0	\$0	95	6	\$4,500
47	0	\$0	96	2	\$1,200
48	0	\$0	97	0	\$0
49	0	\$0	98	1	\$840
50	0	\$0	99	0	\$0
51	0	\$0	100	1	\$600
52	0	\$0	101	1	\$840
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	33	\$46,020	109	0	\$0
61	68	\$89,220	110	0	\$0
62	78	\$99,600	111	0	\$0
63	79	\$103,560	112	0	\$0
64	98	\$123,000	113	0	\$0
65	106	\$130,920	114	0	\$0
66	102	\$131,280	115	0	\$0
67	105	\$121,320	116	0	\$0
68	85	\$99,960	117	0	\$0
69	98	\$118,800	118	0	\$0
70	96	\$108,960	119	0	\$0
71	100	\$110,280	120	0	\$0
72	99	\$118,860			
			<b>Totals</b>	<b>2,120</b>	<b>\$2,411,340</b>

DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022

APPENDIX A – MEMBERSHIP INFORMATION

Delaware State Volunteer Firemen's Pension Plan Annual Benefit  
Distribution of Retired Members and Beneficiaries as of June 30, 2022



**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX A – MEMBERSHIP INFORMATION**

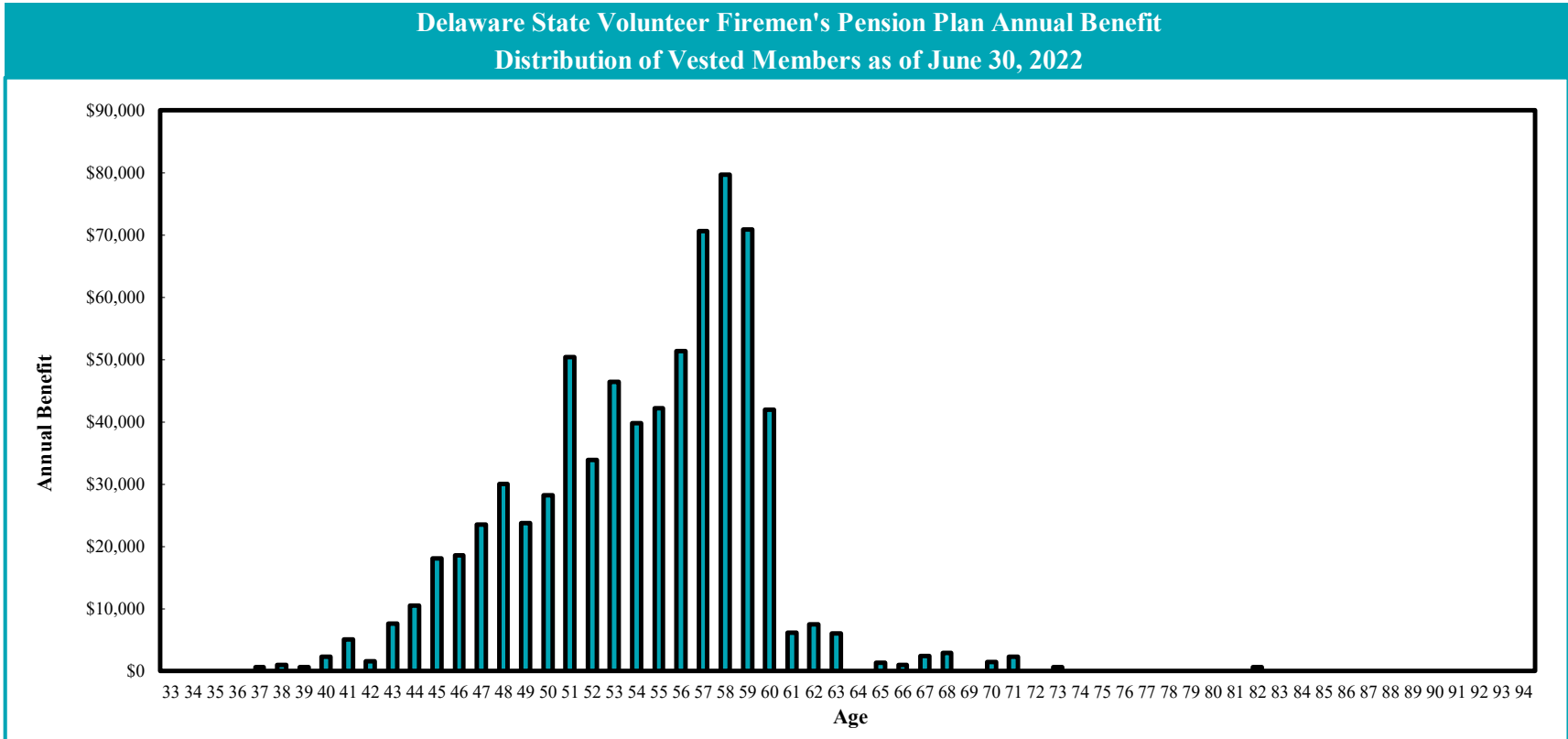
**Delaware State Volunteer Firemen's Pension Plan Annual Benefit  
Distribution of Vested Members as of June 30, 2022**

Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	\$0	73	1	\$600
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	1	\$660
34	0	\$0	83	0	\$0
35	0	\$0	84	0	\$0
36	0	\$0	85	0	\$0
37	1	\$600	86	0	\$0
38	1	\$1,020	87	0	\$0
39	1	\$660	88	0	\$0
40	2	\$2,340	89	0	\$0
41	4	\$5,100	90	0	\$0
42	2	\$1,560	91	0	\$0
43	7	\$7,560	92	0	\$0
44	8	\$10,500	93	0	\$0
45	13	\$18,120	94	0	\$0
46	13	\$18,600	95	0	\$0
47	16	\$23,460	96	0	\$0
48	21	\$30,060	97	0	\$0
49	17	\$23,760	98	0	\$0
50	21	\$28,200	99	0	\$0
51	36	\$50,400	100	0	\$0
52	25	\$33,840	101	0	\$0
53	33	\$46,440	102	0	\$0
54	27	\$39,780	103	0	\$0
55	29	\$42,240	104	0	\$0
56	36	\$51,360	105	0	\$0
57	49	\$70,620	106	0	\$0
58	54	\$79,620	107	0	\$0
59	50	\$70,920	108	0	\$0
60	29	\$41,940	109	0	\$0
61	5	\$6,180	110	0	\$0
62	5	\$7,500	111	0	\$0
63	4	\$6,000	112	0	\$0
64	0	\$0	113	0	\$0
65	2	\$1,380	114	0	\$0
66	1	\$1,020	115	0	\$0
67	2	\$2,400	116	0	\$0
68	2	\$2,940	117	0	\$0
69	0	\$0	118	0	\$0
70	1	\$1,500	119	0	\$0
71	2	\$2,340	120	0	\$0
72	0	\$0			
			Totals	521	\$731,220

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

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX A – MEMBERSHIP INFORMATION**



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

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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):**

(2022 Values Shown)		
Age	Male	Female
25	3	1
30	5	2
35	7	3
40	9	4
45	10	5
50	14	8
55	21	13
60	33	20
65	47	28
70	65	43
75	99	72
80	157	124

Rates are based on 100% of the Pub-2010 General Employee Mortality Table, for males and females, using the Pub-2010 General Benefits Weighted Healthy Annuitant Mortality Table rates after the end of the Employee Mortality Table, both projected from the 2010 base rates using the RPEC-2020 model, with an ultimate rate of 0.85% for ages 20-80, grading down to an ultimate rate of 0% for ages 114-120, and convergence to the ultimate rate in the year 2027. The valuation uses a 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, 2022**

**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):**

(2022 Values Shown)		
Age	Male	Female
50	30	21
55	45	29
60	68	41
65	99	59
70	152	94
75	257	169
80	464	313
85	855	593
90	1,486	1,109
95	2,317	1,810
100	3,335	2,726

Rates are based on 107% and 100% of the Pub-2010 General Benefits Weighted Healthy Annuitant Mortality Table, respectively, for males and females, using the Pub-2010 General Employee Mortality Table for ages prior to start of the Healthy Annuitant Mortality Table, both projected from the 2010 base rates using the RPEC-2020 model, with an ultimate rate of 0.85% for ages 20-80, grading down to an ultimate rate of 0% for ages 114-120, and convergence to the ultimate rate in the year 2027. The valuation uses a 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
0-5	7.00%
6-7	6.00
8	5.00
9	4.50
10	1.50
11-14	1.25
15	1.00
16-23	0.50
24-25	20.00
26+	0.00

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

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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*	
Age	Rates
<60	0.0%
60	50.0
61-62	30.0
63-64	35.0
65	25.0
66-67	35.0
68	25.0
69-70	30.0
71-79	25.0
80+	100.0

\* Rates are 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. Projections assume 3% increases.

**3. Technical and Miscellaneous Assumptions**

- a. Decrement timing: Middle of year

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**4. Disclosures Regarding Models Used**

In accordance with Actuarial Standard of Practice (ASOP) No. 56 *Modeling*, the following disclosures are made:

a. Valuation Software

Cheiron utilizes ProVal, an actuarial valuation software program leased from Winklevoss Technologies (WinTech), to calculate liabilities and projected benefit payments. We have reviewed the underlying workings of this model to the degree feasible and consistent with ASOP No. 56 and believe them to be appropriate for the purposes of the valuation.

b. Projections

This valuation report includes projections of future contributions and funded status for the purpose of assisting the Board of Trustees and the sponsors of the Plan with the management of the Plan.

The projections are based on the same census data and financial information as of June 30, 2022 as disclosed in this actuarial valuation. The projections assume continuation of the Plan provisions and actuarial assumptions in effect as of June 30, 2022 and do not reflect the impact of any changes in benefits or actuarial assumptions that may be adopted after June 30, 2022.

The projections assume that all future assumptions are met except where specifically indicated. The future outcomes become increasingly uncertain over time, and therefore, the general trends and not the absolute values should be considered in the review of these projections. Further, for the purpose of these projections, we have only reflected the impact of new entrants entering the Plan in aggregate and have not developed individual liabilities or detailed profiles related to these potential new entrants. We feel this is appropriate for the purpose of these projections, but if they were to be used for other purposes, this may not be appropriate and alternative projections may need to be developed.

**5. 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 2021 and covering the period July 1, 2015 through June 30, 2020. 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.

**6. Changes and Rationale 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 individual 15-year periods. 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. This rolling 15-year period continued until July 1, 2020, when the method was changed to individual closed 15-year layers for periods beginning July 1, 2020. This method was chosen to provide more level contributions over time while ensuring that the UAL being paid off in a reasonable period of 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

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

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 and Rationale Since Last Valuation**

None

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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: Prior to January 1, 2023: \$5.00 per year of credited service, to a maximum of \$125.00 per month

On and after January 1, 2023: \$10.00 per year of credited service, to a maximum of \$250.00 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.

**DELAWARE STATE VOLUNTEER FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JUNE 30, 2022**

**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**

Effective January 1, 2023, the benefit is increased from \$5.00 to \$10.00 monthly per year of credited service. The maximum monthly benefit has also increased from \$125.00 to \$250.00.