



Section VII: Risk Considerations

The other significant risk factor for the System is investment return because of the volatility of returns and the size of plan assets compared to payroll. This is to be expected, given the underlying capital market assumptions and the System's asset allocation. To the extent that the investment return on the market value of assets cannot achieve the assumed investment rate of return, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results. Please see the summary of results of this report which demonstrates the sensitivity of valuation results to differing assumed rates of return on the market value of assets.

A key demographic risk for the Retirement System is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect a margin for improvement in mortality experience these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, which would also be significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

The exhibits on the following pages summarize some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.



Section VII: Risk Considerations

Historical Asset Volatility Ratios (in 1,000's)

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets	Plan Year Payroll	Asset Volatility Ratio
6/30/2015	\$ 340,636	\$ 41,041	8.30
6/30/2016	351,629	43,119	8.15
6/30/2017	395,506	45,208	8.75
6/30/2018	433,935	47,935	9.05
6/30/2019	461,189	50,756	9.09
6/30/2020	477,937	53,859	8.87
6/30/2021	611,282	56,282	10.86
6/30/2022	589,209	59,394	9.92

The assets at June 30, 2022 are 992.0% of payroll, so underperforming the investment return assumption by 1.00% (i.e., earn 6.30% for one year) is equivalent to 9.92% of payroll. While the actual impact in the first year is mitigated by the asset smoothing method and amortization of the UAAL, this illustrates the risk associated with volatile investment returns.



Section VII: Risk Considerations

Historical Cash Flows (in 1,000's)

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments and administrative expenses. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. Since June 30, 2015, the System has experience positive cash flows which ranged from 0.59% to 1.30% for the prior eight years. Currently, there is no concern for the foreseeable future.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/2015	\$ 340,636	\$ 24,383	\$ 19,944	\$ 4,439	1.30%
6/30/2016	351,629	24,885	21,202	3,683	1.05%
6/30/2017	395,506	25,864	22,824	3,040	0.77%
6/30/2018	433,935	28,495	24,366	4,129	0.95%
6/30/2019	461,189	29,418	25,887	3,531	0.77%
6/30/2020	477,937	31,633	27,124	4,509	0.94%
6/30/2021	611,282	32,417	28,804	3,613	0.59%
6/30/2022	589,209	34,468	30,551	3,917	0.66%



Section VII: Risk Considerations

Liability Maturity Measurement

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations, and in some cases declining active populations, resulting in an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the remaining baby boomers over the next decade is expected to further exacerbate the aging of the retirement system population. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs. Below are two tables which demonstrate the ratio of the System's retiree liability compared to the total accrued liability and the ratio of the number of retirees and beneficiaries to the number of active members.

Year End	Retiree Liability (a)	Total Actuarial Accrued Liability (b)	Retiree Percentage (a) / (b)
6/30/2015	\$276,879,242	\$441,834,268	62.7%
6/30/2016	295,838,021	466,671,399	63.4%
6/30/2017	338,350,700	522,287,639	64.8%
6/30/2018	359,654,851	548,240,945	65.6%
6/30/2019	378,008,258	579,103,280	65.3%
6/30/2020	402,508,346	612,294,224	65.7%
6/30/2021	422,394,922	646,173,296	65.4%
6/30/2022	469,688,657	748,060,423	62.8%

Historical Member Statistics

Valuation Date June 30,	Number of		Active/ Retired
	Active	Retired	
2015	627	609	1.03
2016	644	621	1.04
2017	678	630	1.08
2018	691	652	1.06
2019	722	661	1.09
2020	735	678	1.08
2021	734	692	1.06
2022	749	704	1.06



Appendix A: Actuarial Procedures and Methods

The assumptions and methods utilized in the valuation were developed in the five-year experience study for the period ending June 30, 2021.

Tables B-3 through B-5 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment.

Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is defined to equal the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

Records and Data

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data has been supplied by the System and was accepted for valuation purposes without audit.

Replacement of Terminated Members

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

Administrative and Investment Expenses

The administrative and investment expenses of the System are assumed to be funded by investment earnings in excess of 7.30% per year.

Valuation of Assets

The actuarial asset valuation method spreads asset gains and losses over four years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years.



Appendix A: Actuarial Procedures and Methods

Investment Earnings

The annual rate of investment earnings of the assets of the System is assumed to be 7.30% per year net of administrative and investment expenses, compounded annually.

Interest on Member Contributions

Interest on member contributions is assumed to accrue at the most recent actual rate granted, or a rate of 0.22% per annum, compounded annually.

Future Salaries

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table B-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 3.50% annual rate of increase in the general wage level of the membership.

Service Retirement

Table B-3 shows the annual assumed rates of retirement among members eligible for service retirement. Separate rates are used when a member is eligible for reduced benefits, for the first year a member is eligible for full benefits, and for the years following the first year a member is eligible for full benefits.

Disablement

The rates of disablement used in this valuation are illustrated in Table B-4.

Mortality

The mortality rates used in this valuation are described in Table B-1.

Other Terminations of Employment

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table B-5.

Probability of Marriage & Dependent Children

If death occurs in active status, all members are assumed to have an eligible surviving spouse with no dependent children. Female spouses are assumed to be three years younger than their male spouse.

Records with no Birth Date

New records with no birth date are assumed to be 37 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.

Active Records with a Salary Less than \$1,000

These members are included in the active headcounts, however the pay of these members is not included in the Valuation Projected Salaries summarized in Appendix D. The liability for these members is their accumulated member contributions payable on the valuation date.



Table B-1

Summary of Valuation Assumptions

I. Economic assumptions	
A. General wage increases	3.50%
B. Investment return	7.30%
C. Price Inflation assumption	2.75%
D. Payroll growth	3.25%
E. Growth in membership	0.00%
F. Interest on member accounts	0.22%
II. Demographic assumptions	
A. Individual salary increase due to promotion and longevity	Table B-2
B. Retirement	Table B-3
C. Disablement	Table B-4
D. Mortality among Active Participants PUB-2010 Safety Amount Weighted Employee Mortality projected to 2021 for males and females. Projected generationally using MP-2021.	
E. Mortality among Disabled pensioners PUB-2010 Safety Amount Weighted Disabled Retiree mortality table projected to 2021 set forward 1 year for males.	
F. Mortality among Contingent Survivor pensioners PUB-2010 Safety Amount Weighted Contingent Survivor Mortality projected to 2021 with ages set forward 1 year for males. Projected generationally using MP-2021.	
G. Mortality among Healthy pensioners For Males and Females: PUB 2010 Safety Amount Weighted Healthy Retiree Mortality Table projected to 2021, set forward one year for males and adjusted 105% for males and 100% for females. Projected generationally using MP-2021.	
H. Other terminations of employment	Table B-5



Table B-2
Future Salaries

	(a)	(b)	(1+(a))*(1+(b))
Years of Service	Individual Merit & Longevity	General Wage Increase	Total Salary Increase
0-1	6.40%	3.50%	10.12%
1-2	4.70	3.50	8.36
2-3	3.60	3.50	7.23
3-4	2.70	3.50	6.29
4-5	2.00	3.50	5.57
5-6	1.40	3.50	4.95
6 & Up	1.00	3.50	4.54



Table B-3
Retirement
Annual Rates

<u>Age</u>	<u>20 or More Years of Service</u>
Less than 50	16.0%
50	16.0%
51	16.0
52	16.0
53	16.0
54	16.0
55	25.0
56	25.0
57	25.0
58	25.0
59	25.0
60	25.0
61	40.0
62	40.0
63 & Over	100.0



Table B-4
Disablement
Annual Rates

<u>Age</u>	<u>All Members</u>
22	0.00%
27	0.11
32	0.11
37	0.11
42	0.37
47	0.37
52	0.37
57	0.36
62	0.00

All disabilities are assumed to be permanent and without recovery.



Table B-5

**Other Terminations of Employment
Among Members Not Eligible to Retire
Annual Rates**

<u>Years of Service</u>	<u>All Members</u>
0	9.0%
1	7.0
2	5.0
3	4.0
4	3.0
5	2.0
6	2.0
7	2.0
8	2.0
9	2.0
10	2.0
11	2.0
12 & Over	1.0

Family Composition

Female spouses are assumed to be three years younger than males. 100% of non-retired employees are assumed married for both male and female employees. Actual marital characteristics are used for pensioners.

Vested Benefits for Termination Members

Vested benefits for members who terminated during years ending June 30, 2009 and later were estimated based upon compensation and service information in the census data. For members who terminated prior to June 30, 2008, vested benefits valued were the same as had been calculated by the prior actuary for the June 30, 2008 actuarial valuation.



Appendix C: Summary of Benefit Provisions

- Service credit**
- Service credit is used to determine the amount of a member's retirement benefit.
 - One month of service credit is earned for each month where the member is paid for 160 hours. This includes certain transferred and purchased service.
- Membership service**
- Membership service is used to determine eligibility for vesting, retirement or other benefits.
 - One month of membership service is earned for any month member contributions are made, regardless of the number of hours worked.
 - Eligible members in all systems may purchase service that counts toward membership service.
- Additionally, eligible active and inactive Sheriffs' Retirement System (SRS) members may purchase 1 for 5 (additional) service that will count as membership service.
- Contributions**
- Member contributions are made through an "employer pick-up" arrangement which results in deferral of taxes on the contributions.
- Compensation**
- Compensation generally means all remuneration paid, excluding certain allowances, benefits, and lump sum payments. Compensation is specifically defined in law and differs amongst the systems.
 - Bonuses paid **on or after** July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses.
- Withdrawal of employee contributions**
- A member is eligible for a withdrawal of their contributions when they terminate service and are either not eligible for or have not taken a retirement benefit.
 - The member receives the accumulated member contributions, which consists of member contributions and regular interest.
 - Upon receipt of a refund of accumulated contributions a member's vested right to a monthly benefit is forfeited.
- Member contributions interest credited (regular interest)**
- Interest is credited to member accounts at the rates determined by the Board.
 - The current interest rate credited to member accounts was 0.22%.



Appendix C: Summary of Benefit Provisions

Working Retiree Limitations

Applies to retirement system members who return **on or after** July 1, 2017 to covered employment in the system from which they retired. These limits already applied to SRS members before July 1, 2017.

- Members who return for **less than 480 hours** in a **calendar** year:
 - may not become an active member in the system; and
 - are subject to a \$1 reduction in their retirement benefit for each \$3 earned in excess of \$5,000 in the calendar year.
- Members who return for **480 or more hours** in a **calendar** year;
 - must become an active member of the system;
 - will stop receiving a retirement benefit from the system; **and**
 - will be eligible for a second retirement benefit if they earn 5 or more years of service credit through their second employment.
- Employee, employer and state contributions apply as follows:
 - Employer contributions and state contributions (if any) must be paid on all working retirees;
- Employee contributions must be paid on working retirees who return to covered employment for 480 or more hours in a calendar year.
 - NOTE: PERS has its own limits.

Second Retirement Benefit

Applies to retirement system members who return on or after July 1, 2017 to active service covered by the system from which they retired.

- If the member works more than 480 hours in a calendar year and accumulates less than 5 years of service credit before terminating again, the member:
 - is not awarded service credit for the period of reemployment;
 - is refunded the accumulated contributions associated with the period of reemployment;
 - starting the first month following termination of service, receives the same retirement benefit previously paid to the member; anddoes not accrue post-retirement benefit adjustments during the term of reemployment but receives a GABA in January immediately following second retirement.



Appendix C: Summary of Benefit Provisions

- Second Retirement Benefit (continued)**
- If the member works more than 480 hours in a calendar year and accumulates at least 5 years of service credit before terminating again, the member:
 - is awarded service credit for the period of reemployment;
 - starting the first month following termination of service, receives:
 - * the same retirement benefit previously paid to the member; **and**
 - * a second retirement benefit for the period of reemployment calculated based on the laws in effect as of the member's rehire date; **and**
 - does not accrue post-retirement benefit adjustments during the term of reemployment but receives a GABA:
 - * on the initial retirement benefit in January immediately following second retirement; **and**
 - * on the second retirement benefit starting in January after receiving that benefit for at least 12 months.
 - A member who returns to covered service is **not** eligible for a disability benefit.
- Refunds**
- Terminating members eligible to retire may, in lieu of receiving a monthly retirement benefit, refund their accumulated contributions in a lump sum.
 - Terminating members with accumulated contributions between \$200 and \$1,000 who wish to rollover their refund must do so within 90 days of termination of service.
 - Trusts, estates, and charitable organizations listed as beneficiaries are entitled to receive only a lump sum payment.
- Lump-sum payouts**
- Effective July 1, 2017, lump sum payouts in all systems are limited to the member's accumulated contributions rather than the present value of the member's benefit.
- Type of plan**
- Multiple-employer cost sharing
- Membership eligibility**
- Firefighters of first- and second-class cities
 - Firefighters of other cities that adopt the plan
 - Firefighters of rural fire district departments that adopt the plan
 - Firefighters hired by the Montana Air National Guard (MANG) on or after October 1, 2001
- Member contributions**
- Members hired **before** 7/1/1997 and **not electing** GABA: 9.5% of member's compensation
 - Members hired **on or after** 7/1/1997 or **electing** GABA: 10.7% of member's compensation
- Employer contributions**
- 14.36% of each member's compensation
 - 14.36% of each working retiree's compensation



Appendix C: Summary of Benefit Provisions

State contributions	<ul style="list-style-type: none">• 32.61% of each member's compensation• 32.61% of each working retiree's compensation
Compensation period used in benefit calculation	<ul style="list-style-type: none">• HAC = Highest Average Compensation• HAC is average of the highest 36 consecutive months (or shorter period of total service) of compensation paid to member.• Part-time firefighter: 15% of regular compensation of a newly confirmed full-time firefighter.• Hired on or after July 1, 2013: 110% annual cap on compensation considered as part of a member's HAC
Service retirement eligibility and benefit formula	<p>Member hired on or after July 1, 1981, or a member who has elected to be covered by GABA:</p> <ul style="list-style-type: none">○ 20 years of membership service○ 2.5% of HAC x years of service credit <p>Member hired prior to July 1, 1981, and who had not elected to be covered by GABA, the greater of above, or:</p> <p>If membership service is less than 20 years:</p> <ul style="list-style-type: none">○ 2% of highest monthly compensation (HMC) x years of membership service and <p>If membership service is greater or equal to 20 years:</p> <ul style="list-style-type: none">• 50% of HMC + 2% of HMC x years of membership service in excess of 20
Early retirement eligibility and benefit	<ul style="list-style-type: none">• Age 50 with 5 years of membership service○ Normal retirement benefit calculated using HAC and service credit at early retirement.
Disability retirement eligibility and benefit formula	<ul style="list-style-type: none">• Any active member• The greater of:<ul style="list-style-type: none">a. 50% of HAC, or• 2.5% of HAC x years of service credit
Survivor's eligibility and benefit formula	<ul style="list-style-type: none">• Any active or inactive member• For deaths of active members with less than 20 years of membership service, a monthly survivor benefit to the surviving spouse (or equally to dependent children if there is no surviving spouse or after a surviving spouse dies, for as long as they remain dependent children) equal to 50% of HAC.<ul style="list-style-type: none">b. For active or inactive members with more than 20 years of membership service, a benefit equal to the accrued retirement benefit at the date of death.
Vesting eligibility and benefit	<ul style="list-style-type: none">• 5 years of membership service• Accrued normal retirement benefit, payable when eligible for retirement.• In lieu of a pension, a member may receive a refund of



Appendix C: Summary of Benefit Provisions

Retirement benefits - Form of payment

- accumulated contributions.
- Upon receipt of a refund of accumulated contributions, a member's vested right to a monthly benefit is forfeited.
- The retirement benefit is paid for the retired member's life.
- Upon the death of the retired member, the benefit is paid to the surviving spouse.
- If there is no surviving spouse, or after the death of a surviving spouse, benefits are paid to the dependent children, if any, for as long as they remain dependent children.

Post retirement benefit increases

- For retired members who became active members **on or after** July 1, 1997 and those who elected to be **covered under** GABA and who have been retired at least 12 months, a GABA will be paid each year in January equal to 3%.
- For retired members who were hired **prior to** July 1, 1997 and who did **not elect GABA**, the minimum benefit adjustment should not be less than 50% of the current base compensation of a newly confirmed active firefighter of the employer that last employed the member as a firefighter.

Changes since last valuation

- None



Appendix D: Valuation Data

Valuation Data

This chart is presented for informational purposes only. The counts shown in the valuation line were used for preparation of the liabilities disclosed within this report. The counts disclosed for the Annual Financial Report and the Summary of Results (page 1) match the Financial Statements at the request of the Board. The differences between counts, if any, have no material effect upon the liability calculation.

	<u>Active</u>	<u>Disabled</u>	<u>Retirees and Beneficiaries</u>	<u>Terminated Vested Members</u>	<u>Terminated Non-Vested Members</u>	<u>Total</u>
Participant Counts Used for Valuation	749	55	649	51	92	1,596
Disabled Members having attained normal retirement age		(42)	42			
Beneficiaries of Disabled Members						
Beneficiaries with less than one year of certain payments remaining						
Other Adjustments					1	1
Participant Counts shown in the Annual Financial Report	749	13	691	51	93	1,597



Appendix D: Valuation Data

This valuation is based upon the membership of the System as of June 30, 2022. Membership data were supplied by the System and accepted for valuation purposes without audit. However, tests were performed to ensure that the data are sufficiently accurate for valuation purposes.

The salaries used in the tables and charts which follow are different than the salaries used for the Summary on Page 1. The valuation projected salaries to be paid for the following fiscal year, whereas the Summary, salaries are applicable in the year ending on the valuation.

<u>Active Members</u>	<u>Number</u>	<u>Valuation Projected Salaries</u>
Full-Time Members	708	\$ 59,822,299
Part-Time Members	<u>41</u>	<u>\$ 859,306</u>
Total Active Members	749	\$ 60,681,605

Table D-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

Table D-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Terminated vested members.

Table D-3 is a reconciliation of membership data from June 30, 2021 to June 30, 2022.



Appendix D: Valuation Data

The following is a summary of retired members and beneficiaries currently receiving benefits. The chart reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page **Error! Bookmark not defined.** for an explanation of the number of annuitants used for valuation purposes.

Type of Annuitant	Number	Annual Benefits	Average Annual Benefits
Service Retirement	501	\$ 24,044,831	\$ 47,994
Survivors of Deceased Retired Members	131	4,610,320	35,193
Survivors of Deceased Active Members	17	518,710	30,512
Total Retirees and Beneficiaries	649	\$ 29,173,861	\$ 44,952
Disability Retirement	55	1,826,768	33,214
Total Annuitants	704	\$ 31,000,629	\$ 44,035

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	51
Non-Vested Terminated Members	92
Total Terminated Members	143



**Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2022**

Number of Employees

Age	<u>Completed Years of Service</u>											Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+
<25	9	7	2	1									19
25 to 29	17	11	11	25	18								82
30 to 34	9	8	11	23	52	12							115
35 to 39	4	5	5	30	41	51	24	1					161
40 to 44	2	1	3	6	35	35	44	9					135
45 to 49	1	1	1	3	12	23	31	26	5				103
50 to 54	1				2	8	16	26	11	2			66
55 to 59				2	2		1	4	6	3			18
60 to 64			1			1			2	2			6
65 to 69					1	1				1			3
70 and up													
Totals	43	33	34	90	163	131	116	66	24	8	-	-	708



**Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2022**

Annual Salaries in Thousands

Age	<u>Completed Years of Service</u>											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	527	441	136	63										1,166
25 to 29	1,003	630	800	1,659	1,321									5,413
30 to 34	516	526	732	1,475	4,071	939								8,259
35 to 39	227	280	336	2,251	3,288	4,448	2,387	87						13,305
40 to 44	142	61	163	471	2,923	3,082	4,166	958						11,966
45 to 49	76	58	81	236	944	2,164	3,148	2,952	552					10,210
50 to 54	81				227	751	1,620	2,813	1,093	217				6,801
55 to 59				83	117		88	491	708	343				1,829
60 to 64			6			82			173	201				462
65 to 69					108	177				126				411
70 and up														
Totals	2,572	1,996	2,254	6,237	12,999	11,644	11,408	7,300	2,526	887	-	-		59,822

The salary shown in the above chart was used for valuation purposes and assumes pay increases for the year.



Appendix D: Valuation Data

**Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2022**

Average Annual Salary

Age	Completed Years of Service										Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34		35 to 39	40+
<25	58,523	62,981	68,032	62,733									61,388
25 to 29	58,995	57,252	72,724	66,375	73,378								66,010
30 to 34	57,363	65,725	66,518	64,132	78,288	78,291							71,820
35 to 39	56,869	56,078	67,228	75,023	80,189	87,225	99,443	87,410					82,639
40 to 44	71,074	61,319	54,199	78,469	83,509	88,062	94,693	106,395					88,637
45 to 49	75,746	57,887	81,248	78,515	78,678	94,079	101,537	113,522	110,497				99,127
50 to 54	80,910				113,512	93,881	101,228	108,176	99,350	108,462			103,045
55 to 59				41,360	58,535		87,595	122,672	118,032	114,254			101,613
60 to 64			6,209			81,794			86,277	100,662			76,980
65 to 69					108,284	177,207				125,513			137,001
70 and up													
Totals	59,818	60,486	66,292	69,299	79,748	88,886	98,345	110,603	105,253	110,816			84,495

The salary shown in the above chart was used for valuation purposes and assumes pay increases for the year.



**Table D-1:
Active Members Distribution of
Part-Time Employees
as of June 30, 2022**

Number of Employees

Age	<u>Completed Years of Service</u>											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	5	1	1											7
25 to 29	4	2		1	1									8
30 to 34	4			3	1									8
35 to 39	5			1		1								7
40 to 44	4				1		1							6
45 to 49	1					1	1							3
50 to 54						1								1
55 to 59														
60 to 64														
65 to 69					1									1
70 and up														
Totals	23	3	1	5	4	3	2	-	-	-	-	-	-	41



Appendix D: Valuation Data

**Table D-2:
Distribution of Inactive Lives**

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page **Error! Bookmark not defined.** for an explanation of the number of annuitants used for valuation purposes.

Members Receiving Service Retirement Benefits as of June 30, 2022

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	13	\$ 603,969	\$ 46,459
50 to 54	59	2,465,130	41,782
55 to 59	62	2,985,413	48,152
60 to 64	94	4,465,269	47,503
65 to 69	95	4,982,086	52,443
70 to 74	76	4,058,262	53,398
75 to 79	54	2,650,052	49,075
80 to 84	34	1,459,242	42,919
85 to 89	11	291,019	26,456
90 and up	3	84,389	28,130
Totals	501	\$ 24,044,831	\$ 47,994

Members Receiving Disability Retirement Benefits as of June 30, 2022

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	13	\$ 419,576	\$ 32,275
50 to 54	4	169,035	42,259
55 to 59	5	206,865	41,373
60 to 64	4	106,193	26,548
65 to 69	8	239,565	29,946
70 to 74	12	421,294	35,108
75 to 79	5	152,273	30,455
80 to 84	1	24,575	24,575
85 to 89	2	57,929	28,964
90 and up	1	29,463	29,463
Totals	55	\$ 1,826,768	\$ 33,214



Appendix D: Valuation Data

**Table D-2:
Distribution of Inactive Lives**

Please refer to the chart on page **Error! Bookmark not defined.** for an explanation of the number of annuitants used for valuation purposes.

Survivors of Deceased Retired Members as of June 30, 2022

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	1	\$ 37,735	\$ 37,735
50 to 54	-	-	-
55 to 59	6	219,132	36,522
60 to 64	6	270,877	45,146
65 to 69	11	422,271	38,388
70 to 74	19	697,259	36,698
75 to 79	18	863,276	47,960
80 to 84	24	781,656	32,569
85 to 89	29	915,949	31,584
90 and up	17	402,165	23,657
Totals	131	\$ 4,610,320	\$ 35,193

Survivors of Deceased Active Members as of June 30, 2022

Survivors of Active Members

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	3	\$ 95,644	\$ 31,881
50 to 54	1	34,607	34,607
55 to 59	-	-	-
60 to 64	1	24,324	24,324
65 to 69	1	30,406	30,406
70 to 74	2	67,494	33,747
75 to 79	2	79,462	39,731
80 to 84	2	53,853	26,926
85 to 89	3	77,318	25,773
90 and up	2	55,602	27,801
Totals	17	\$ 518,710	\$ 30,512



**Table D-2:
Distribution of Inactive Lives**

Please refer to the chart on page **Error! Bookmark not defined.** for an explanation of the number of annuitants used for valuation purposes.

**Terminated Vested Members as of June 30, 2022
Number of Persons**

Term Vested Members	
<u>Age</u>	<u>Number</u>
<25	
25 to 29	1
30 to 34	1
35 to 39	9
40 to 44	18
45 to 49	16
50 to 54	3
55 to 59	3
60 to 64	
65 to 69	
70 and above	
Total	51



**Table D-3:
Data Reconciliation**

The following table shows a reconciliation of the participants used in the previous valuation to this valuation. This chart reflects the counts used for valuation purposes as a result of data processing.

	Active Contributing Members	Terminated Vested Members	Service Retired Members	Disabled Members	Survivors and Beneficiaries
June 30, 2021 Valuation	734	43	485	59	148
Refunds and Non-Vested Terminations	(18)				(9)
Vested Terminations	(16)	16			
Service Retirements	(25)	(6)	31		
Disability Retirements	(1)			1	
Deaths			(17)	(4)	6
New Entrants	68		2		3
Rehires	7	(2)		(1)	
Other					
June 30, 2022 Valuation	749	51	501	55	148



Appendix E: Comparative Schedules

Comparative Schedules

This section contains tables that summarize the experience of the System shown in present and past valuation reports.

Table E-1 shows a summary of the active members covered as of the various valuation dates.

Table E-2 shows a summary of the retired and inactive members as of the various valuation dates.

Table E-3 summarizes the contribution rates determined by each annual actuarial valuation.



**Table E-1:
Active Membership Data**

<u>Valuation Date June 30,</u>	<u>Actives</u>	<u>Annual Salaries in Thousands</u>	<u>Average Annual Salary</u>	<u>Average Age</u>	<u>Average Years of Service</u>	<u>Average Hire Age</u>
2022	749	59,394	79,298	39.5	10.5	29.0
2021	734	56,282	76,678	39.6	10.6	29.0
2020	735	53,859	73,277	39.6	10.4	29.2
2019	722	50,756	70,300	39.6	10.5	29.2
2018	691	47,935	69,370	39.6	10.5	29.1
2017	678	45,208	66,679	39.9	10.6	29.3
2016	644	43,119	66,955	40.1	10.8	29.3
2015	627	41,041	65,457	39.1	11.0	28.1
2014	616	39,495	64,155			
2013	610	37,727	61,848			
2012	590	35,849	60,762			



Table E-2:
Retired and Inactive Membership Data

Valuation Date June 30,	Number	All Annuitants					Terminated Members	
		Annual Benefits in Thousands	Average Annual Benefit	Average Current Age	Average Age at Retirement	Average Service at Retirement	Number Vested Terminated	Number Non-Vested Terminated
2022	704	31,001	44,035	64.6	52.6	24.0	51	92
2021	692	29,009	41,920	64.4	52.5	24.1	43	81
2020	678	27,589	40,691	68.7	52.5	24.0	39	72
2019	661	25,880	39,153	68.8	52.4	24.3	36	67
2018	652	24,497	37,571	66.6	51.7	23.9	41	66
2017	630	22,876	36,310	68.5	51.8	20.1	39	54
2016	621	21,568	34,731	69.3	52.6	23.7	77	27
2015	609	20,322	33,369	68.4	50.5	24.1	71	21
2014	595	19,208	32,282				66	19
2013	587	18,234	31,063				63	15
2012	571	17,066	29,889				62	13



Appendix E: Comparative Schedules

Table E-3: Contribution Rates

Valuation Date June 30,	Contribution Rates			Normal Cost Rate*	UAAL Rate**
	Employee***	Employer/State	Total		
2022	10.69 %	46.97 %	57.66 %	32.20 %	25.46 %
2021	10.69	46.97	57.66	24.86	32.80
2020	10.69	46.97	57.66	25.05	32.61
2019	10.69	46.97	57.66	24.97	32.70
2018	10.69	46.97	57.66	25.19	32.47
2017	10.69	46.97	57.66	24.99	32.67
2016	10.69	46.97	57.66	26.67	30.99
2015	10.69	46.97	57.66	26.70	30.96
2014	10.69	46.97	57.66	26.70	30.96
2013	10.69	46.97	57.66	26.59	31.07
2012	10.69	46.97	57.66	26.50	31.16

* Includes administrative expenses for the 2014 through 2021 Valuation Dates.

** The UAAL rate is the amount available to amortize the UAAL. It is equal to the total contribution rate, minus the normal cost rate.

*** Members who have elected GABA contribute 10.70% of compensation. Members who have not elected GABA contribute 9.50% of compensation. The employee contribution rate reflects the average contribution rate of all employees.



Appendix F: Financial Statement Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation as of June 30, 2022. Additional information as of the latest actuarial valuation follows.

Valuation date	June 30, 2022
Actuarial cost method	Entry Age Normal
Amortization method	Open
Remaining amortization period	12 Years
Asset valuation method	Four-year smoothed market
Actuarial assumptions:	
Investment rate of return*	7.30%
General wage growth*	3.50%
Merit salary increases	1.0% - 6.4%
*Includes inflation	2.75%



Appendix F: Financial Statement Information

Gain and Loss in Accrued Liability During Years Ended June 30 Resulting from Differences Between Assumed Experience and Actual Experience						
Type of Activity	Gain or (Loss) for Year Ending June 30, (expressed in thousands)					
	2017	2018	2019	2020	2021	2022
Investment Income on Actuarial Value of Assets	\$ 910	\$ (3,245)	\$ (2,501)	\$ (4,012)	\$ 14,399	\$ 1,093
Combined Liability Experience	(13,293)	878	(3,194)	(3,723)	(2,870)	(3,772)
(Loss)/Gain During Year from Financial Experience	\$ (12,383)	\$ (2,367)	\$ (5,695)	\$ (7,735)	\$ 11,529	\$ (2,679)
Non-Recurring Items	(17,702)	0	0	0	0	(65,995)
Composite Gain of (Loss) During Year	\$ (30,085)	\$ (2,367)	\$ (5,695)	\$ (7,735)	\$ 11,529	\$ (68,674)

Schedule of Funding Progress (expressed in thousands)						
Valuation Date June 30,	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Funded Ratio	Unfunded AAL (UAAL)	Covered Payroll	UAAL as a Percentage of Covered Payroll
2022	\$ 603,174	\$ 748,060	81%	\$ 144,887	\$ 59,394	244%
2021	555,517	646,173	86%	90,656	56,282	161%
2020	499,180	612,294	82%	113,114	53,859	210%
2019	463,085	579,103	80%	116,018	50,756	229%
2018	429,095	548,241	78%	119,146	47,935	249%
2017	397,633	522,288	76%	124,655	45,208	276%



Appendix F: Financial Statement Information

Solvency Test Aggregate Accrued Liabilities for (expressed in thousands)								
Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liability Covered by Reported Assets			
					(1)	(2)	(3)	
2022	\$ 56,109	\$ 460,310	\$ 233,161	\$ 603,180	100%	100%	37%	
2021	54,685	412,744	178,744	555,517	100%	100%	49%	
2020	52,250	395,697	164,347	499,180	100%	100%	31%	
2019	49,752	371,528	157,823	463,085	100%	100%	26%	
2018	45,908	353,334	148,999	429,095	100%	100%	20%	
2017	44,351	331,701	146,236	397,633	100%	100%	15%	



Appendix G: Glossary

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Firefighters' Unified Retirement System. Defined terms are capitalized throughout this Appendix.

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Actuarial Accrued Liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Gains and Losses

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

Actuarial Valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.



Appendix G: Glossary

Entry Age Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Market Value of Assets

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Projected Benefits

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.

Unaccrued Benefit

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

Unfunded Actuarial Accrued Liability

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.