City of Ann Arbor Employees' Retirement System

Annual Actuarial Valuation
as of June 30, 2022

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November 10, 2022

Retirement Board
City of Ann Arbor Employees' Retirement System
Ann Arbor, Michigan

Re: City of Ann Arbor Employees' Retirement System Actuarial Valuation as of June 30, 2022 Actuarial Disclosures

Dear Board Members:

The results of the June 30, 2022 Annual Actuarial Valuation of the City of Ann Arbor Employees' Retirement System are presented in this report. This valuation updates the report originally delivered October 6, 2022 to incorporate information provided by the City in accordance with its Funding Policy.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the System's funding progress, and to determine the employer contribution rate for the fiscal year ending June 30, 2024. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The contribution amount in this report is determined using the actuarial assumptions and methods disclosed in Section C of this report. This report includes risk metrics in the appendix but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The findings in this report are based on data and other information through June 30, 2022. The valuation was based upon information furnished by the City, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the Plan Administrator.

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This report was prepared using assumptions adopted by the Board. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. All actuarial assumptions and methods used in the valuation follow the guidance in the applicable Actuarial Standards of Practice. Additional information about the actuarial assumptions is included in Section C of this report.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the City of Ann Arbor Employees' Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

James D. Anderson, Richard C. Koch Jr., and Francois Pieterse are Members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this valuation and report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

James D. Anderson

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SECTION A

VALUATION RESULTS

Summary of Key Actuarial Valuation Results

Valuation Date	June 30, 2022	June 30, 2021
Summary of Member Data		
Number of Members Included in Valuation		
Active Members	711	707
Inactive Members (Deferred and Retirees & Beneficiaries)	1,258	1,226
Total	1,969	1,933
Annual Payroll (Average)	$ 80,561	$ 77,861
Annual Benefit Payments (Average)		
Inactive Members	$ 16,216	$ 15,231
Retirees and Beneficiaries	$ 37,135	$ 36,053
Summary of Assets		
Market Value	$571,174,716	$626,250,148
Market Value Rate of Return	-5.11%	27.19%
Funding Value	$570,654,330	$554,096,977
Funding Value Rate of Return	7.42%	11.08%
Summary of Liabilities		
Total Actuarial Accrued Liability	$652,441,776	$627,144,090
Unfunded Actuarial Liability (UAL)	$ 81,787,446	$ 73,047,113
Funded Ratio	87.46%	88.35%
Employer Actuarially Determined Contribution (ADC)		
Total Normal Cost Rate	18.03%	18.35%
Employee Contribution Rate (weighted avg.)	5.09%	5.24%
Employer Normal Cost Rate	12.94%	13.11%
Amortization of UAL Rate	12.20%	11.14%
Total Employer ADC	25.14%	24.25%
Actual/Statutory Contribution Rate	30.23%	33.13%
Amortization Period (years)	19	20

Funding Objective

The funding objective of the Retirement System is to establish and receive contributions that will accumulate assets during each member's working years which, together with regular interest, will be sufficient to pay promised benefits after retirement.

Contribution Rates

The Retirement System is supported by member contributions, City contributions and investment income from Retirement System assets.

Contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

(1) Cover the actuarial present value of benefits allocated to the current year by the actuarial cost methods described in Section C (the normal cost); and

(2) Finance over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (the unfunded actuarial accrued liability).

Computed contribution rates for the fiscal year ending June 30, 2024 are shown on page A-3.

Contributions to Provide Benefits Computed June 30, 2022 for Fiscal Year Ending June 30, 2024

Contributions for	General	General Hybrid	Police	Police Hybrid	Fire	Fire Hybrid	Total[3]
Normal Cost of Benefits:							
1. Age & service	16.59 %	8.12 %	26.19 %	13.31 %	26.09 %	11.19 %	16.81 %
2. Disability	0.69 %	0.35 %	0.92 %	0.40 %	0.23 %	0.13 %	0.57 %
3. Death-in-service	0.40 %	0.15 %	0.34 %	0.10 %	0.46 %	0.00 %	0.32 %
4. Refunds of member contributions	0.43 %	0.38 %	0.19 %	0.19 %	0.15 %	0.24 %	0.33 %
5. Total normal cost	18.11 %	9.00 %	27.64 %	14.00 %	26.93 %	11.56 %	18.03 %
6. Member contributions (average)	6.00 %	3.00 %	6.00 %	3.00 %	6.38 %	3.00 %	5.09 %
7. Employer Normal Cost (5. - 6.)	12.11 %	6.00 %	21.64 %	11.00 %	20.55 %	8.56 %	12.94 %
8. Payment for Unfunded Actuarial Liabilities (UAL)[1]	$ 3,801,116	$ 45,513	$ 2,196,828	$ 1,043	$ 1,442,482	$ 936	$ 7,487,918
9. Payment for UAL as a Percentage of Projected Payroll	16.79 %	0.23 %	19.74 %	0.65 %	18.67 %	0.69 %	12.20 %
10. Projected Fiscal Year Payroll	$ 22,634,348	$ 19,573,689	$ 11,127,392	$ 159,427	$ 7,726,896	$ 136,606	$ 61,358,358
11. Preliminary Actuarially Determined Contribution (ADC) (7. * 10. + 8.)	**$ 6,542,136**	**$ 1,219,934**	**$ 4,604,796**	**$ 18,580**	**$ 3,030,359**	**$ 12,630**	**$ 15,428,435**
12. Preliminary ADC as a Percent of Projected Payroll	**28.90 %**	**6.23 %**	**41.38 %**	**11.65 %**	**39.22 %**	**9.25 %**	**25.14 %**
13. Prior Fiscal Year Budgeted Contribution[2]							**$ 14,529,276**
14. Prior Fiscal Year Budgeted Contribution with 2% Increase							**$ 14,819,862**
15. Estimated City Contribution (Greater of 11. & 14.)							**$ 15,428,435**

(1) *Amortized as a level dollar amount over a closed period of 19 years.*

(2) *Provided by the City.*

(3) *Total Employer Normal Cost is a weighted average and applying this percentage to projected fiscal year payroll may not match the preliminary ADC due to rounding.*

All percents in the table above are expressed as a percent of active member payroll.

Determining Employer Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollars – and then promptly contributed to the Retirement System.

The recommended procedure is: (1) ***at the end of each payroll period, multiply the active member payroll for the period by the employer normal cost percent;*** (2) ***add the payment for unfunded actuarial liabilities divided by the number of payroll periods from (1);*** and (3) ***promptly contribute the dollar amount so determined***.

Present Value of Future Benefits and Accrued Liabilities

	June 30, 2022							June 30, 2021
	General	General Hybrid	Police	Police Hybrid	Fire	Fire Hybrid	Total	Total
A. Accrued Liability								
1. For retirees and beneficiaries	$ 234,762,445	$ 0	$ 146,772,121	$ 0	$ 93,468,716	$ 0	$ 475,003,282	$ 441,946,252
2. For vested terminated members	9,013,721	0	2,412,545	0	$ 711,163	0	12,137,429	11,519,901
3. For present active members								
a. Value of expected future benefit payments	118,168,839	18,305,688	70,821,046	232,052	51,507,243	157,546	259,192,414	259,863,762
b. Value of future normal costs	30,743,817	14,340,037	28,590,377	141,166	19,999,936	76,016	93,891,349	86,185,825
c. Active member accrued liability: (a) - (b)	87,425,022	3,965,651	42,230,669	90,886	31,507,307	81,530	165,301,065	173,677,937
4. Total accrued liability	331,201,188	3,965,651	191,415,335	90,886	125,687,186	81,530	652,441,776	627,144,090
B. Present Assets (Funding Value)[1]	289,683,154	3,468,533	167,420,288	79,493	109,931,552	71,310	570,654,330	554,096,977
C. Unfunded Accrued Liability: (A.4) - (B)	41,518,034	497,118	23,995,047	11,393	15,755,634	10,220	81,787,446	73,047,113
D. Funding Ratio: (B) / (A.4)	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%	88.4%

[1] *Funding Value of Assets was allocated to each group based on total accrued liability.*

Development of Funding Value of Retirement System Assets
June 30, 2022

Valuation Date June 30:	2021	2022	2023	2024	2025	2026
A. Funding Value Beginning of Year (BOY)	$520,439,737	$554,096,977				
B. Market Value End of Year (EOY)	626,250,148	571,174,716				
C. Market Value BOY	512,676,260	626,250,148				
D. Audit Adjustment	(43,329)	78,468				
E. Non-Investment Net Cash Flow	(22,702,041)	(23,773,466)				
F. Investment Income						
1) Market Total: B-C-D-E	136,319,258	(31,380,434)				
2) Interest Rate	6.9%	6.8%	6.7%			
3) Amount for Immediate Recognition (F2 x (A + D + 0.5 x E))	35,124,132	36,875,632				
4) Amount for Phased-In Recognition F1 - F3	101,195,126	(68,256,066)				
G. Phased-In Recognition of Investment Income						
1) Current Year: 0.20 x F4	20,239,025	(13,651,213)				
2) First Prior Year	(2,395,675)	20,239,025	$ (13,651,213)			
3) Second Prior Year	(800,488)	(2,395,675)	20,239,025	$ (13,651,213)		
4) Third Prior Year	(14,929)	(800,488)	(2,395,675)	20,239,025	$ (13,651,213)	
5) Fourth Prior Year	4,250,545	(14,930)	(800,486)	(2,395,676)	20,239,026	$ (13,651,214)
6) Total Recognized Investment Gain	21,278,478	3,376,719	3,391,651	4,192,136	6,587,813	(13,651,214)
H. Funding Value EOY: A + D + E + F3 + G6	554,096,977	570,654,330				
I. Difference Between Market Value and Funding Value	72,153,171	520,386				
J. Net Funding Value Rate of Return	11.08%	7.42%				
K. Net Market Value Rate of Return	27.19%	-5.11%				
L. Funding Value / Market Value	88.5%	99.9%				

The Funding Value of Assets recognizes assumed investment income (line E2) fully each year. Differences between actual and assumed investment income (line E3) are phased-in over a closed five-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. The Funding Value of Assets is ***unbiased*** with respect to Market Value. At any time, it may be either greater or less than Market Value.

Historical Asset Rate of Return

Year ending June 30	Actuarial Value Annual Recognized Rate of Return	Market Value Annual Recognized Rate of Return
2013	4.04%	12.28%
2014	11.18%	14.23%
2015	9.96%	4.22%
2016	6.22%	0.37%
2017	8.42%	11.96%
2018	6.96%	6.98%
2019	6.07%	6.21%
2020	6.02%	4.62%
2021	11.08%	27.19%
2022	7.42%	-5.11%

Derivation of Experience Gain (Loss)
Year Ended June 30, 2022

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses often offset one another over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below:

	2021-2022	2020-2021
(1) UAAL* at start of year	$ 73,047,113	$ 93,637,486
(2) Normal cost from last valuation	10,138,694	10,397,330
(3) Actual contributions	19,478,054	18,478,311
(4) Interest	6.80%	6.90%
(5) Interest accrual: (1) x (4) + ((2) - (3)) x (4) / 2	$ 4,649,665	$ 6,182,193
(6) Expected UAAL before changes: (1) + (2) - (3) + (5)	68,357,418	91,738,698
(7) Change from revised actuarial assumptions	6,549,597	7,166,449
(8) Expected UAAL after changes: (6) + (7)	74,907,015	98,905,147
(9) Actual UAAL at end of year	81,787,446	73,047,113
(10) Gain (loss): (8) - (9)	(6,880,431)	25,858,034
(11) Gain (loss) as percent of actuarial accrued liabilities at start of year $(627,144,090)	(1.1%)	4.2%

* *Unfunded Actuarial Accrued Liability.*

Comments and Recommendation

Comment 1: Aggregate experience during the year ending June 30, 2022 was less favorable than assumed, generating an overall experience loss of approximately $6.9 million as indicated on page A-7. The actuarial loss was approximately 1.1% of the beginning of year Actuarial Accrued Liabilities, arising primarily from active member pays increasing at higher than assumed rates, retirees living longer than expected, minimum benefits increasing by more than anticipated and new retirees benefits being higher than expected. After reflecting the experience described above and the update to the investment return assumption noted in Comment 2, computed contribution requirements increased from the prior year from $14.3 million to $15.4 million. In addition, valuation assets represent 87.5% of accrued liabilities; last year the ratio was 88.4%. If the valuation results were based on market value of assets instead of smoothed funding value, the funded percent of the plan would be 87.5%.

Comment 2: This valuation reflects a change in the investment return assumption from 6.80% to 6.70% as adopted by the Retirement Board. Therefore, all calculated liabilities in the June 30, 2022 valuation were based on the new 6.70% interest rate. This resulted in a $6.5 million increase in the actuarial accrued liability and a $0.8 million increase in the actuarially determined contribution. Note that development of the smoothed actuarial value of assets on page A-5 of this report employs a rate of 6.80%, since the new 6.70% rate is not effective until the end of the period. Said another way, the fund expected 6.80% investment return during the period July 1, 2021 through June 30, 2022 and 6.70% thereafter. This is the prevalent approach used in public sector pension and VEBA asset smoothing.

Comment 3: Investment return of -5.1% was lower than the assumed level of 6.8% on a market value basis. However, under the asset valuation method, investment gains and losses are spread over a five-year period. Partial recognition of this year's loss was combined with the continued phase-in of investment gains and losses from prior years resulting in a net recognized asset gain for 2022. The Market Value of Assets now exceeds the Funding Value by approximately $520,000 (see page A-5), which is the net amount of unrecognized prior year gains and losses to be recognized over the coming four years.

Comment 4: Reserve transfers between the active and retired life accounts are required whenever retired life liabilities differ from the Reserve for Retired Benefit Payments. If a reserve is maintained for the City of Ann Arbor, the Reserve for Retired Benefit Payments should be equal to $475,003,282 (the actuarial accrued liability for retired lives).

Comment 5: Under Public Act 202 of the State of Michigan, Michigan municipalities are required to report liabilities under uniform assumption guidelines. While the current guidelines are only for reporting purposes (and not funding), governments may be encouraged to use these assumptions for funding.

The uniform assumptions include the following:

- Investment return no higher than 6.85%;
- Assumed wage inflation no lower than 3.0%*;
- Mortality assumption that uses a version of the PUB-2010 table with generational mortality improvements using scale MP-2020*; and
- Amortization period no longer than 17 years for Pension Plans and 27 years for Retiree Health Plans.

** Or based on an actuarial experience study performed in the last five years.*

The information needed to satisfy PA 202 reporting requirements are provided in the appendix of this report.

PA 202 also requires an actuarial audit be performed every eight years. GRS will work with the Board and Staff to ensure compliance.

Comment 6: Demographic assumptions were last updated for the June 30, 2018 valuation after a review was performed by the prior actuary. The Retirement Board elected to change the investment return assumption from 6.80% to 6.70% for the June 30, 2022 valuation. The State of Michigan requires experience studies once every 5 years, consistent with guidelines set by the Government Finance Officers Association (GFOA). Accordingly, GRS plans to perform an experience study for the City of Ann Arbor Employees Retirement System in the first 3-6 months of 2023, with any updated assumptions approved by the Board first applying to the June 30, 2023 valuation.

Comment 7: Please see the appendix to this valuation for presentation of information related to Actuarial Standard of Practice ("ASOP") No. 51 entitled "Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions."

Comment 8: This report was prepared during the recent and still-developing COVID-19 pandemic, which is likely to influence demographic and economic experience, at least in the short term. Results in this report are developed based on available data without adjustment. We will continue to monitor these developments and their impact on the Retirement System. Actual experience will be reflected in each subsequent report, as experience emerges.

Actuarial Accrued Liabilities and Valuation Assets Comparative Statement

Valuation Date	Actuarial Accrued Liability (AAL)	Funding Value of Assets	Unfunded Actuarial Accrued Liability (UAAL)	Ratio of Present Assets to AAL	Ratio of UAAL to Valuation Payroll
2013	$ 507,435,000	$ 407,170,000	$ 100,265,000	80.2 %	222.5 %
2014	523,461,000	433,854,000	89,607,000	82.9 %	186.8 %
2015	533,198,000	459,480,000	73,718,000	86.2 %	151.2 %
2016	548,201,000	470,029,000	78,172,000	85.7 %	156.2 %
2017	571,074,000	489,943,000	81,131,000	85.8 %	151.4 %
2018[(1),(2)]	583,601,000	505,015,000	78,586,000	86.5 %	147.6 %
2019	601,108,981	513,611,366	87,497,615	85.4 %	158.3 %
2020[(3)]	614,077,223	520,439,737	93,637,486	84.8 %	166.6 %
2021[(3)]	627,144,090	554,096,977	73,047,113	88.4 %	132.7 %
2022[(3)]	652,441,776	570,654,330	81,787,446	87.5 %	142.8 %

(1) *Actuarial assumptions revised.*
(2) *Valuation results for 2018 and prior years were calculated by the City's prior actuary.*
(3) *Reflects a change in the investment return assumption.*

The Ratio of Valuation Assets to AAL is a traditional measure of a system's funding progress. Except in years when the system is amended or actuarial assumptions are revised, this ratio can be expected to move gradually toward 100%.

The Ratio of UAAL to Valuation Payroll is another relative index of condition. Actuarial unfunded liabilities represent debt, while active member payroll represents the system's capacity to collect contributions to pay toward debt. The lower the ratio, the greater the financial strength – and vice-versa.

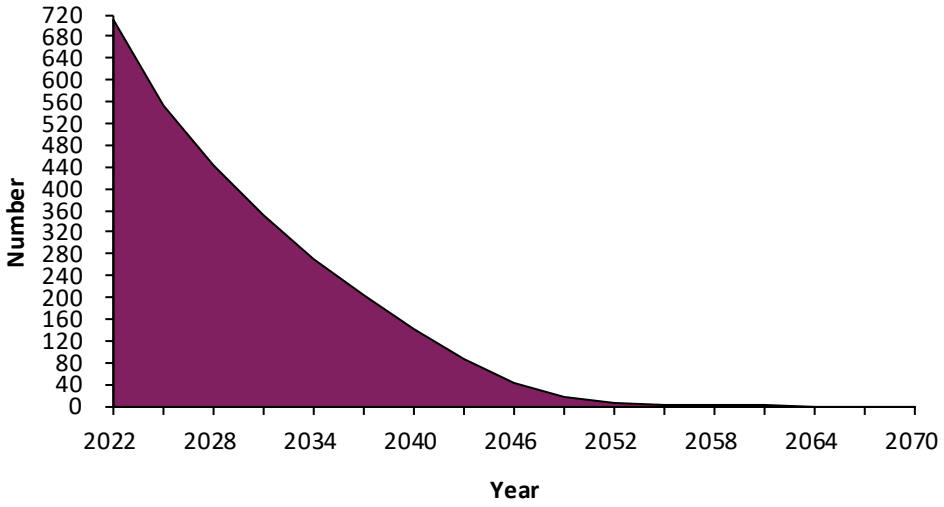
Solvency Test

	(1)	(2)	(3)				
	Actuarial Liabilities (in thousands)						
Valuation Date	Active Member Contributions	Inactive Members	Active Members (Employer-Financed Portion)	Valuation Assets (in thousands)	Portion of Accrued Liabilities Covered by Assets (1)	(2)	(3)
2013	$ 2,858	$ 353,683	$ 150,895	$ 407,170	100.00%	100.00%	33.55%
2014	2,948	356,397	164,116	433,854	100.00%	100.00%	45.40%
2015	3,013	361,314	168,871	459,480	100.00%	100.00%	56.35%
2016	3,139	374,798	170,264	470,029	100.00%	100.00%	54.09%
2017	3,325	389,354	178,395	489,943	100.00%	100.00%	54.52%
2018[(1)]	3,185	413,119	170,478	505,015	100.00%	100.00%	52.04%
2019	3,085	423,401	174,623	513,611	100.00%	100.00%	49.89%
2020	3,103	433,954	177,020	520,440	100.00%	100.00%	47.10%
2021	2,989	453,466	170,689	554,097	100.00%	100.00%	57.20%
2022	3,013	487,141	162,288	570,654	100.00%	100.00%	49.60%

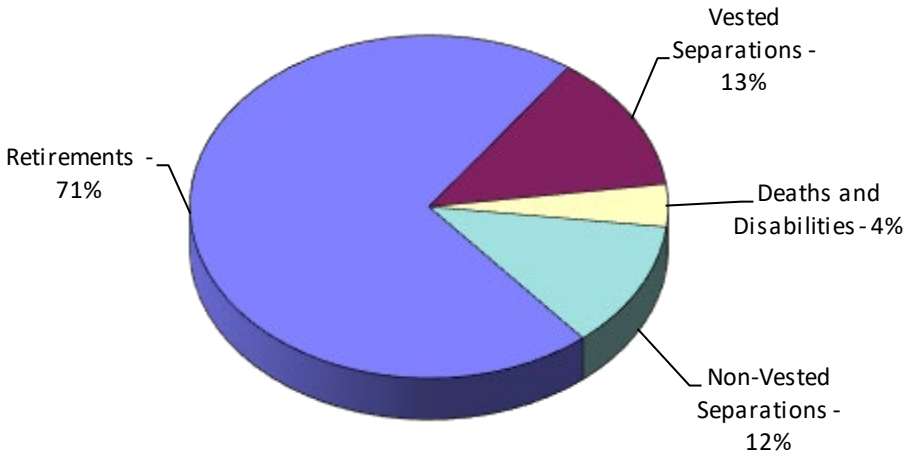
(1) *Valuation results for 2018 and prior years were calculated by the City's prior actuary.*

Expected Development of Present Population

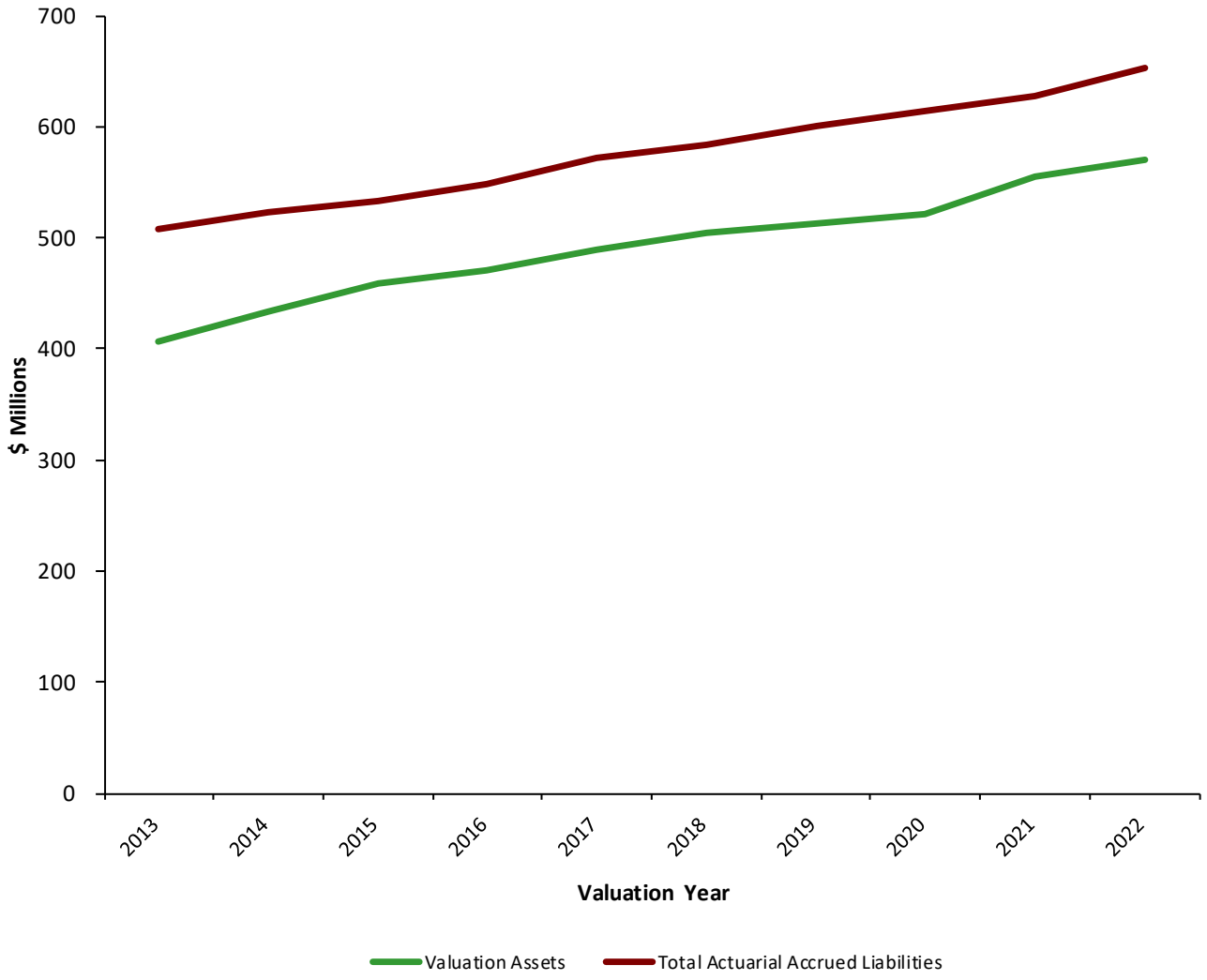
Closed Group Active Population Projection



Expected Terminations from Active Employment for Current Active Members



Assets and Accrued Liabilities



SECTION B

SUMMARY OF VALUATION DATA

Retirees and Beneficiaries Added to and Removed from Rolls
Comparative Schedule

Year Ended June 30	No. Added to Rolls	No. Removed from Rolls	Rolls End of Year	
			No.	Annual Allowances
2013	39	30	971	$ 31,056,330
2014	34	25	980	31,734,475
2015	36	20	996	32,249,188
2016	45	24	1,017	33,495,093
2017	53	30	1,040	34,825,341
2018	63	33	1,067	36,707,905
2019	49	35	1,081	37,768,548
2020	42	21	1,102	39,054,103
2021	48	29	1,121	40,414,900
2022	63	28	1,156	42,927,498

Retirees and Beneficiaries as of June 30, 2022
Tabulated by Attained Ages

Attained Ages	Age and Service No.	Age and Service Annual Allowances	Disability No.	Disability Annual Allowances	Total No.	Total Annual Allowances
Under 50	17	$ 747,937			17	$ 747,937
50-54	71	4,187,608	2	$ 16,013	73	4,203,621
55-59	110	5,662,440	1	15,280	111	5,677,720
60-64	195	7,465,864	3	75,019	198	7,540,883
65-69	216	8,178,212			216	8,178,212
70-74	207	7,458,140	1	37,905	208	7,496,045
75-79	163	4,866,219	2	29,922	165	4,896,141
80-84	78	2,015,669			78	2,015,669
85-89	54	1,469,843			54	1,469,843
90 & Over	36	701,427			36	701,427
Totals	**1,147**	**$ 42,753,359**	**9**	**$ 174,139**	**1,156**	**$ 42,927,498**

Inactive Members Eligible for Deferred Benefits as of June 30, 2022 Tabulated by Attained Ages

Attained Ages	No.	Annual Allowances
34	1	$ 20,086
39	1	20,375
40	1	3,388
41	2	27,513
42	3	46,798
43	3	54,329
44	1	9,059
45	4	115,816
46	6	82,758
47	5	69,498
48	2	29,341
49	2	7,057
50	7	106,639
51	8	122,157
52	8	146,418
53	6	155,320
54	9	175,086
55	5	66,444
56	2	22,579
57	11	212,447
58	2	32,158
59	1	3,369
60	2	20,306
61	1	14,487
62	3	37,859
63	1	4,072
64	1	5,708
65	1	4,286
66	1	17,483
67	1	14,842
68	1	6,327
Totals	**102**	**$1,654,005**

Retirees and Beneficiaries as of June 30, 2022
Tabulated by Valuation Divisions

Valuation Divisions	No.	Annual Allowances
General	734	$21,800,915
Police	242	12,546,637
Fire	180	8,579,946
Total	1,156	$42,927,498

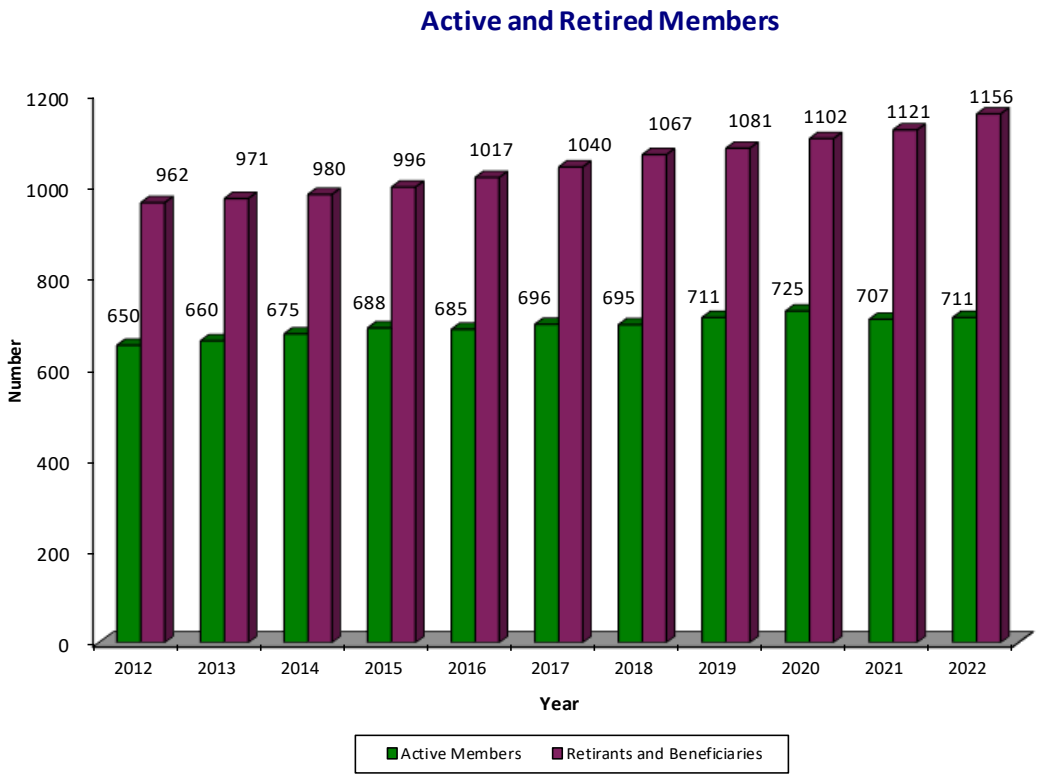
Inactive Members Eligible for Deferred Benefits as of June 30, 2022
Tabulated by Valuation Divisions

Valuation Divisions	No.	Estimated Annual Allowances
General	85	$1,241,679
Police	15	313,145
Fire	2	99,181
Total	102	$1,654,005

Active Members as of June 30, 2022
Tabulated by Valuation Divisions

Valuation Divisions	No.	Annual Payroll
General	297	$ 24,632,982
General Hybrid	235	14,768,673
Police	100	10,387,539
Police Hybrid	1	148,827
Fire	77	7,213,140
Fire Hybrid	1	127,523
Total Active Members	711	$ 57,278,684

The average accumulated contributions balance for active members is $65,101.



General Members as of June 30, 2022
by Age and Years of Service

	Years of Service to Valuation Date							Totals	
Age	0-4	5-9	10-14	15-19	20-24	25-30	30 Plus	No.	Valuation Payroll
20-24	9							9	$ 443,020
25-29	36	6						42	2,150,953
30-34	34	14	2					50	3,247,560
35-39	28	20	4	2				54	3,802,476
40-44	34	23	12	10	1			80	5,949,750
45-49	21	29	15	18	11	1		95	7,354,727
50-54	21	14	14	18	12	6	1	86	6,965,094
55-59	18	6	11	10	12	3	1	61	5,036,322
60	3	2		1	1	3	1	11	878,163
61	2		1	2	1		1	7	597,594
62	2	2	1	1	2			8	614,153
63	1		1	2	2			6	582,056
64		4	1	1			1	7	551,772
65	1	1		3				5	439,101
66	3		2	1				6	462,166
68	1							1	74,693
69			1	1				2	144,707
70	2							2	107,348
Totals	**216**	**121**	**65**	**70**	**42**	**13**	**5**	**532**	**$ 39,401,655**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

	Non-Hybrid	Hybrid	Total
Count:	297	235	532
Age:	49.23	40.91	45.55
Service:	14.15	2.41	8.96
Annual Pay:	$82,939	$62,845	$74,063

Police Members as of June 30, 2022
by Age and Years of Service

	Years of Service to Valuation Date							Totals	
Age	0-4	5-9	10-14	15-19	20-24	25-30	30 Plus	No.	Valuation Payroll
20-24	2							2	$ 71,840
25-29	10							10	766,881
30-34	7	9	1					17	1,622,265
35-39	6	12	4	1				23	2,327,241
40-44	4	8						12	1,215,819
45-49	2	2		1	16			21	2,499,452
50-54				1	4	5		10	1,230,682
55-59		1			1	1	1	4	578,845
60							1	1	115,668
62						1		1	107,673
Totals	**31**	**32**	**5**	**3**	**21**	**7**	**2**	**101**	**$ 10,536,366**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

	Non-Hybrid	Hybrid	Total
Count:	100	1	101
Age:	40.01	48.12	40.09
Service:	11.48	4.46	11.41
Annual Pay:	$103,875	$148,827	$104,320

Fire Members as of June 30, 2022
by Age and Years of Service

	Years of Service to Valuation Date							Totals	
Age	0-4	5-9	10-14	15-19	20-24	25-30	30 Plus	No.	Valuation Payroll
20-24	4							4	$ 236,573
25-29	9	1						10	620,601
30-34	9	3						12	913,616
35-39	3	8						11	921,972
40-44		3	1	1				5	486,659
45-49		1		4	8	4		17	1,942,970
50-54		1	2	3	7	2		15	1,733,732
55-59	1					1	1	3	375,893
61					1			1	108,647
Totals	**26**	**17**	**3**	**8**	**16**	**7**	**1**	**78**	**$ 7,340,663**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

	Non-Hybrid	Hybrid	Total
Count:	77	1	78
Age:	40.51	56.88	40.72
Service:	12.15	4.54	12.05
Annual Pay:	$93,677	$127,523	$94,111

Active Members Added to and Removed from Rolls

General Members

Year	No. Added During Year[2]	Terminations During the Year: Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals: Vested A	Withdrawals: Other[3] A	Withdrawals: Total A	Withdrawals: Total E	Active Members End of Year
2018[1]	59	23	26	0	1	0	1	13	21	34	20	499
2019	56	16	19	0	1	0	1	0	26	26	21	513
2020	51	17	19	1	1	1	0	1	22	23	22	522
2021	49	16	20	0	1	0	0	3	34	37	22	518
2022	86	23	21	0	1	0	1	5	44	49	21	532
5-Year Total		**95**	**105**	**1**	**5**	**1**	**3**	**22**	**147**	**169**	**106**	

Police Members

Year	No. Added During Year[2]	Terminations During the Year: Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals: Vested A	Withdrawals: Other[3] A	Withdrawals: Total A	Withdrawals: Total E	Active Members End of Year
2018[1]	6	5	12	0	0	0	0	2	2	4	3	118
2019	11	8	8	0	0	1	0	1	1	2	3	118
2020	10	3	6	0	0	0	0	0	3	3	2	122
2021	3	9	10	0	0	0	0	1	1	2	2	114
2022	8	17	13	0	0	0	0	0	4	4	2	101
5-Year Total		**42**	**49**	**0**	**0**	**1**	**0**	**4**	**11**	**15**	**12**	

Fire Members

Year	No. Added During Year[2]	Terminations During the Year: Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals: Vested A	Withdrawals: Other[3] A	Withdrawals: Total A	Withdrawals: Total E	Active Members End of Year
2018[1]	4	5	7	0	0	0	0	1	0	1	1	78
2019	5	3	4	0	0	0	0	0	0	0	1	80
2020	6	4	3	0	0	0	0	0	1	1	1	81
2021	3	7	5	0	0	1	0	1	0	1	1	75
2022	10	4	5	1	0	0	0	1	1	2	1	78
5-Year Total		**23**	**24**	**1**	**0**	**1**	**0**	**3**	**2**	**5**	**5**	

A = Actual
E = Expected

(1) *Revised actuarial assumptions.*
(2) *Includes individuals transferring into a group.*
(3) *Includes individuals transferring out of a group.*

Summary of Current Asset Information

Balance Sheet

Valuation Assets	
Cash, receivables, accruals and other short-term	$ 16,068,040
Equity securities	371,111,394
Debit securities	96,881,171
Real Estate	68,961,983
Infrastructure	16,754,904
Other - Sundry, Notes, and Mortgages	5,171,172
Accounts payable	(3,773,948)
Funding value adjustment	(520,386)
Total Current Assets	$570,654,330

Revenues and Expenditures

	2021-2022	2020-2021
Balance - July 1	$626,250,148	$512,676,260
Audit Adjustment	78,468	(43,329)
Revenues		
Member contributions	3,222,809	3,194,016
Employer contributions	16,255,245	15,284,295
Recognized investment income	(31,380,434)	136,319,258
Total	(11,902,380)	154,797,569
Expenditures		
Benefit payments	41,681,450	39,937,793
Refund of member contributions	867,852	638,555
Administrative expenses	702,218	604,004
Total	43,251,520	41,180,352
Balance - June 30	$571,174,716	$626,250,148
Net investment income/mean assets	-5.1%	27.2%

SECTION C

SUMMARY OF VALUATION METHODS, ASSUMPTIONS, AND BENEFIT PROVISIONS

Basic Financial Objective and Operation of the Retirement System

Benefit Promises Made Which Must Be Paid For. A retirement program is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit they are, in effect, handed an "IOU" which reads: "Your Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."

The principal related financial question is: When shall the money required to cover the "IOU" be contributed? This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The Constitution of the State of Michigan is directed to the question:

> "Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities."

This Retirement System meets this constitutional requirement by having the following ***Financial Objective: To establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level*** from year-to-year and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

> ***Normal Cost*** (the current value of benefits likely to be paid on account of members' service being rendered in the current year)
>
> . . . plus . . .
>
> ***Interest on the Unfunded Actuarial Accrued Liability*** (the difference between the actuarial accrued liability and current system assets).

If contributions to the retirement program are less than the preceding amount, the difference, ***plus investment earnings not realized thereon***, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate; that is:

B = C + I - E

Benefit payments to any group of members and their beneficiaries cannot exceed the sum of:

Contributions received on behalf of the group

. . . plus . . .

Investment earnings on contributions received and not required for immediate payment of benefits

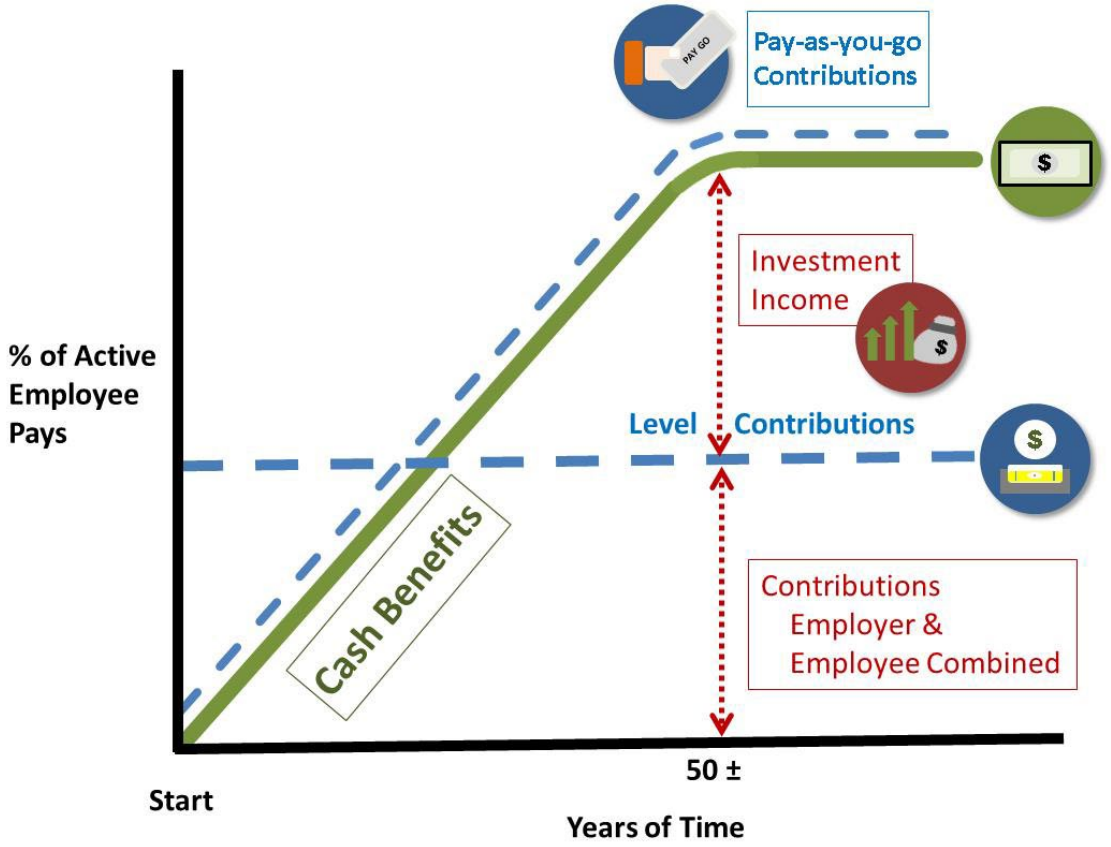
. . . minus . . .

Expenses incurred in operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. Lured by artificially low present contributions, the inevitable consequence is a relentlessly increasing contribution rate to a level greatly in excess of the level percent-of-payroll rate. ***This method of financing is prohibited in Michigan by the state constitution.***

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Invested assets are a by-product of level percent-of-payroll contributions, not the objective. ***Investment income becomes the major contributor*** to the retirement program, and the amount is directly related to the amount of contributions and investment performance.

Computed Contribution Rate Needed to Finance Benefits. From a given schedule of benefits and from the data furnished him, the actuary calculates the contribution rate ***by means of an actuarial valuation*** - the technique of assigning monetary values to the risks assumed in operating a retirement program.

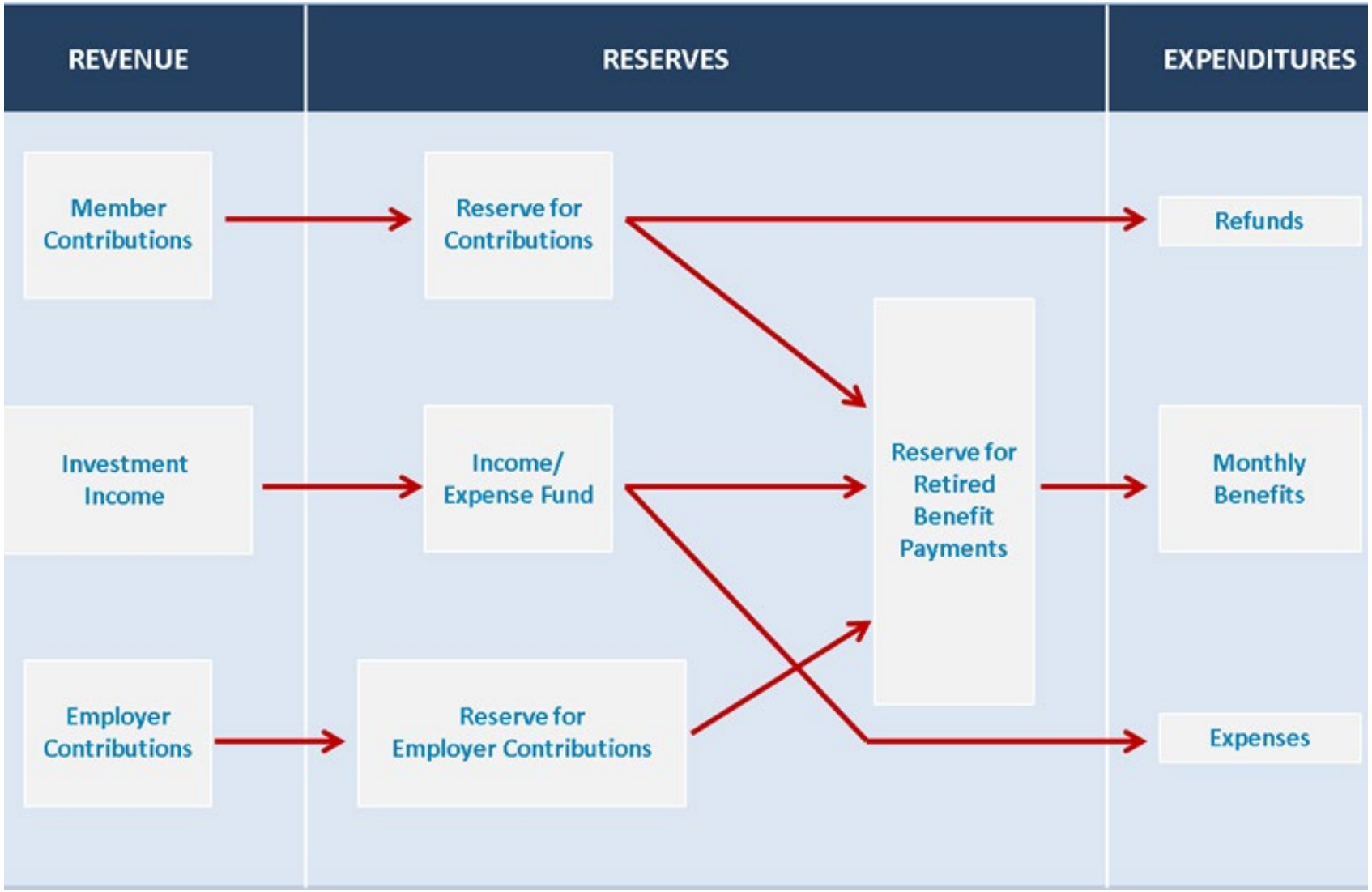


CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- **Economic Risk Areas**
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- **Non-Economic Risk Areas**
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

Flow of Money Through the Retirement System



Actuarial Cost Methods

Normal Cost. Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual entry-age actuarial cost method having the following characteristics:

(i) The annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities (full funding credit if assets exceed liabilities) are amortized by level dollar contributions.

The City of Ann Arbor Employees' Retirement System is funded by Employer and Member Contributions in accordance with the funding policy adopted by the Retirement Board, based on actuarially determined contributions (ADC), which require contributions be sufficient to pay the Normal Costs of active plan members, Plan expenses, and amortize the Unfunded Actuarial Accrued Liability over a declining period. Effective with the 2017 valuation, the Board approved a change to a level dollar amortization that decreases by one year in each year until a 15-year open amortization period is obtained.

Additionally, Section 1.3 of the City of Ann Arbor General Pension Policy allows for more than the Minimum Required policy as follows:

"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

Actuarial Assumptions

The actuary calculates the contribution requirements and benefit values by applying actuarial assumptions to the benefit provisions and census data furnished, using the actuarial cost methods described on the previous page.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment return to be generated by system assets;
- Patterns of pay increases to members;
- Rates of mortality among members, retirees and beneficiaries;
- Rates of separation (withdrawal) from active membership;
- Rates of disability among active members; and
- The age patterns of actual retirement.

In a valuation, the actuary calculates the monetary effect of each assumption for as long as each covered person survives – a period of time which can be as long as a century.

Actual experience of the Fund will not coincide exactly with assumed experience, regardless of the quality of the assumptions, or the skill of the actuary and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it is appropriate to modify one or more of the assumptions to reflect experience trends (but not random year-to-year fluctuations). Actuarial assumptions were last revised for the June 30, 2018 valuation, based on an experience study performed by the City's prior actuary. Subsequently, the Board adopted an investment return assumption of 6.70% for this valuation.

Investment Return (net of investment expenses):

Investment Return	6.70%
Wage Inflation	3.50%
Price Inflation	2.50%
Spread Between Investment Return and Wage Inflation	3.20%

The investment return assumption is used to equate the value of payments due at different points in time and was first used for the June 30, 2022 valuation.

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

	% Increase in Salary at Sample Ages						
Sample	Merit and Seniority			Base	Increase Next Year		
Ages	General	Police	Fire	(Economic)	General	Police	Fire
20	4.00%	7.50%	7.29%	3.50%	7.50%	11.00%	10.79%
25	3.58%	6.60%	6.52%	3.50%	7.08%	10.10%	10.02%
30	2.82%	4.74%	4.86%	3.50%	6.32%	8.24%	8.36%
35	2.14%	3.36%	3.44%	3.50%	5.64%	6.86%	6.94%
40	1.84%	2.70%	2.70%	3.50%	5.34%	6.20%	6.20%
45	1.47%	2.38%	2.38%	3.50%	4.97%	5.88%	5.88%
50	0.98%	2.18%	2.18%	3.50%	4.48%	5.68%	5.68%
55	0.68%	2.04%	2.04%	3.50%	4.18%	5.54%	5.54%
60	0.50%	1.80%	1.90%	3.50%	4.00%	5.30%	5.40%

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

		% of Active Members Separating within Next Year			
Sample	Years of	General			
Ages	Service	Males	Females	Police	Fire
	1	6.00%	16.00%	6.00%	4.50%
	2	4.80%	13.00%	6.00%	4.00%
	3	4.00%	11.00%	4.00%	3.60%
	4	3.20%	8.00%	3.00%	3.60%
	5	2.50%	6.00%	2.50%	3.60%
25	6 & Over	3.20%	4.50%	2.40%	1.40%
30		3.20%	4.50%	2.40%	1.10%
35		3.25%	3.50%	1.75%	0.90%
40		3.25%	3.50%	0.74%	1.00%
45		3.25%	3.50%	0.48%	0.90%
50		3.25%	3.50%	0.48%	0.50%
55		3.25%	3.50%	0.48%	0.50%
60		3.25%	3.50%	0.48%	0.50%
65		3.25%	3.50%	0.48%	0.50%

The mortality tables used are as follows:

- **Healthy Pre-Retirement:** The RP-2014 Employee Generational Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

- **Healthy Post-Retirement:** The RP-2014 Healthy Annuitant Generational Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

- **Disability Retirement:** The RP-2014 Disabled Mortality Table, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

Sample Attained Ages	Healthy Pre-Retirement Future Life Expectancy (Years)[1]		Healthy Post-Retirement Future Life Expectancy (Years)[1]		Disabled Retirement Future Life Expectancy (Years)[1]	
	Men	Women	Men	Women	Men	Women
55	31.43	35.63	29.93	32.31	21.58	25.31
60	26.49	30.61	25.36	27.53	18.50	21.72
65	21.83	25.71	21.01	22.97	15.59	18.27
70	17.51	20.93	16.92	18.65	12.81	14.89
75	13.54	16.35	13.14	14.60	10.17	11.71
80	9.96	12.03	9.76	10.95	7.77	8.94

[1] *Based on retirements in 2022. Retirements in future years will reflect improvements in life expectancy.*

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Retirement	General		Police		Fire		Retirement		
Ages	Normal	Early	Normal	Early	Normal	Early	Service	Police	Fire
50	25%	10%		10%		10%	25	50%	25%
51	25%	10%		10%		10%	26	50%	25%
52	25%	10%		10%		10%	27	50%	25%
53	25%	10%		10%		10%	28	50%	25%
54	25%	10%		10%		10%	29	50%	25%
55	25%	10%	50%		25%		30	50%	25%
56	25%	10%	50%		25%		31	50%	25%
57	25%	10%	50%		25%		32	50%	25%
58	25%	10%	50%		25%		33	50%	25%
59	25%	10%	50%		25%		34	50%	25%
60	30%		100%		100%		35	100%	100%
61	30%								
62	30%								
63	30%								
64	30%								
65	60%								
66	40%								
67	40%								
68	40%								
69	40%								
70	100%								

Rates of disability among active members.

Sample	% Becoming Disabled within Next Year		
Ages	General	Police	Fire
20	0.06%	0.08%	0.02%
25	0.06%	0.08%	0.02%
30	0.06%	0.08%	0.02%
35	0.06%	0.08%	0.02%
40	0.11%	0.14%	0.03%
45	0.24%	0.32%	0.08%
50	0.42%	0.56%	0.14%
55	0.65%	0.86%	0.22%
60	0.86%	1.14%	0.29%
65	0.99%	1.32%	0.33%

For General members, 75% of the disabilities are assumed to be non-duty and 25% of the disabilities are assumed to be duty related. For Police/Fire members, 50% of the disabilities are assumed to be non-duty and 50% of the disabilities are assumed to be duty related.

City of Ann Arbor Employees' Retirement System
Brief Summary of Benefit Provisions Evaluated
June 30, 2022

Regular Retirement (no reduction factor for age):

Union	5 Year Vesting 3 Year / 36 Mo FAC[1]	10 Year Vesting 5 Year / 60 Mo FAC[2]	Eligibility	Annual Amount
Non-Union	Hired before July 1, 2011	Hired on/after July 1, 2011	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2017: 2.5% of FAC times total years of service Hired after 1/1/2017: 1.25% of FAC times total years of service
American Federation of State, County, and Municipal Employees, AFL CIO (AFSCME)	Hired before August 29, 2011	Hired on/after August 29, 2011	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2017: 2.5% of FAC times total years of service Hired after 1/1/2017: 1.25% of FAC times total years of service
Ann Arbor Police Officers Association (AAPOA)	Hired before January 1, 2012	Hired on/after January 1, 2012	25 years of service or Age 55 and vested	2.75% of FAC times total years of service
International Association of Fire Fighters (IAFF)	Hired before July 1, 2012	Hired on/after July 1, 2012	25 years of service or Age 55 and vested	2.75% of FAC times total years of service
Teamsters Fire Assistant Chief	Hired before January 1, 2016	Hired on/after January 1, 2016	25 years of service or Age 55 and vested	Hired before 1/1/2017: 2.75% of FAC times total years of service Hired after 1/1/2017: 1.375% of FAC times total years of service
Teamsters Civilian Supervisiors	Hired before July 2, 2012	Hired on/after July 2, 2012	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2017: 2.5% of FAC times total years of service Hired after 1/1/2017: 1.25% of FAC times total years of service
Teamsters Police Professional Assistants	Hired before July 2, 2012	Hired on/after July 2, 2012	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2018: 2.5% of FAC times total years of service Hired after 1/1/2018: 1.25% of FAC times total years of service
Teamsters Police Deputy Chiefs	Hired before July 2, 2012	Hired on/after July 2, 2012	25 years of service or Age 55 and vested	Hired before 6/5/2017: 2.75% of FAC times total years of service Hired after 6/5/2017: 1.375% of FAC times total years of service
Police Service Specialists	Hired before July 1, 2013	Hired on/after July 1, 2013	Age 50 with 25 years of service or Age 60 and vested	Hired before 1/1/2018: 2.5% of FAC times total years of service Hired after 1/1/2018: 1.25% of FAC times total years of service
Command Officers Association of Michigan (COAM)	Hired before July 1, 2013	Hired on/after July 1, 2013	25 years of service or Age 55 and vested	2.75% of FAC times total years of service

[1] *Highest 3 consecutive calendar years out of last 10 or the last 36 months for members with 5 year vesting.*

[2] *Highest 5 consecutive calendar years out of last 10 or the last 60 months for members with 10 year vesting.*

Annuity Withdrawal - Upon regular retirement, a member may elect to withdraw his or her accumulated contributions. If this lump sum election is made, the retirement allowance is reduced by the actuarial equivalent of the amount withdrawn.

City of Ann Arbor Employees' Retirement System
Brief Summary of Benefit Provisions Evaluated
June 30, 2022

Early Retirement (reduction factor for age):

Eligibility - *All Members:* Age 50 with 20 or more years of service.

Benefit - Computed as a regular retirement but the pension portion of the allowance is reduced by 0.33% for each month by which retirement precedes normal retirement eligibility.

Deferred Retirement (vested benefit):

Eligibility - Must be vested. Refer to table on page C-10.

Annual Amount - Computed as regular retirement but based upon service and final average compensation at time of termination. Benefit begins at age 60. A member may elect to receive all or a portion of his/her accumulated contributions at termination if the member's age plus service total at least 50 and receive a lesser benefit at age 60.

Duty Disability Retirement:

Eligibility - No age or service requirement.

Annual Amount - *Police/Fire:* Computed as a regular retirement. Minimum benefit is 25% of FAC. Upon termination of worker's compensation, additional service credit is granted for period in receipt of worker's compensation and benefit is recomputed.

All Others: Computed as a regular retirement. Minimum to age 60 is 18% of FAC. Minimum after age 60 is the sum of a) 12% of the portion of FAC not in excess of Social Security base plus b) 18% of FAC in excess of Social Security base. Upon termination of worker's compensation, additional service credit is granted for period in receipt of worker's compensation and benefit is recomputed.

Non-Duty Disability Retirement:

Eligibility - Must be vested. Refer to table on page C-10.

Annual Amount - *Police/Fire:* Computed as a regular retirement. Minimum benefit is 25% of FAC.

All Others: Computed as a regular retirement. Minimum to age 60 is 18% of FAC. Minimum after age 60 is the sum of a) 12% of the portion of FAC not in excess of Social Security base plus b) 18% of FAC in excess of Social Security base.

City of Ann Arbor Employees' Retirement System
Brief Summary of Benefit Provisions Evaluated
June 30, 2022

Duty Death Before Retirement:

Eligibility - No age or service requirements.

Annual Amount - Computed as regular retirement but actuarially reduced in accordance with a 100% joint and survivor election. If the member had less than 25 years of service at time of death, a minimum of 25 years of service will be used to compute the benefits. Worker's compensation payments made to the member's beneficiary will offset the benefits paid by the Retirement System. Upon termination of worker's compensation payments the amount paid to the beneficiary will be the greater of the annual worker's compensation payment and the computed 100% joint and survivor retirement benefit.

Non-Duty Death Before Retirement:

Eligibility - Must be vested. Refer to table on page C-10.

Annual Amount - Computed as regular retirement but actuarially reduced in accordance with a 100% joint and survivor election. If there is no named beneficiary, a lump sum will be payable to the estate.

Post-Retirement Increases:

Subject to Ordinance provisions, adjustments may be made every July 1 to retirees and beneficiaries on the rolls at least 12 months. Adjustments are funded by financial gains and are not guaranteed.

Member Contributions:

AFSCME, Non-Union and Teamsters hired on/after 1/1/2017, Assistant Fire Chiefs hired on/after 7/1/2017, Police Deputy Chiefs hired on/after 6/5/2017, Police Service Specialist and Police Professional Assistants hired on/after 01/01/2018: 3.0% of annual compensation.

Fire hired prior to 7/1/2012: 6.0% of annual compensation until 1/1/2022.
Fire hired on/after 7/1/2012: 6.5% of annual compensation.

All Others: 6.0% of annual compensation.

Miscellaneous and Technical Assumptions
June 30, 2022

Benefit Service:	Exact Fractional service is used to determine the amount of benefit payable.
Decrement Operation:	Disability and mortality decrements do not operate during the first five years of service. Disability also does not operate during normal retirement eligibility.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed dollar amount shown in this report.
Liability Adjustments:	None.
Minimum Benefit Adjustments:	Benefit amounts for members impacted by the minimum benefit provision pursuant to Section 1:574(1) of Chapter 18, Employees Retirement System of the City of Ann Arbor Code of Ordinances were assumed to increase 2.0% per year.
Normal Form of Benefit:	A straight life benefit is the normal form of benefit.
Pay Adjustments:	For any active members who were on a leave of absence during the year, the prior year valuation pay was used.
Pay Increase Timing:	Middle of (Fiscal) year.
Service Credit Accruals:	It is assumed that members accrue one year of service credit per year.

Glossary

Actuarial Accrued Liability	The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."
Accrued Service	The service credited under the plan which was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
Actuarial Equivalent	A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.
Actuarial Present Value	The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
Amortization	Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
Experience Gain (Loss)	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, in accordance with the actuarial cost method being used.

Glossary

Normal Cost	The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.
Plan Termination Liability	The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for the future service and salary. The termination liability will generally be less than the liabilities computed on a "going-concern" basis and is not normally determined in a routine actuarial valuation.
Reserve Account	An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.
Unfunded Actuarial Accrued Liability	The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."
Valuation Assets	The value of current plan assets recognized for valuation purposes. Generally related to market value in a manner which spreads unexpected gains or losses over a period of future years.

SECTION D

PROJECTIONS

Projection Assumptions and Methods

For purposes of the funding projection, the following assumptions were used:

- 6.70% discount rate for determining liability.
- The Actuarial Value of Assets reflects the deferred gains and losses generated by the smoothing method. The current deferred amounts are recognized in the first four years of the projections.
- Actuarial assumptions and methods as described in Section C. All future demographic experience is assumed to be exactly realized.
- The actuarially calculated contribution rate is determined as a percent of total payroll and contributed each year.
- Projections assume a 0% increase in the total active member population. All new future members are expected to enter the plan upon date of hire, under applicable plan provisions.
- The projections are based on the impact of the Minimum Required Policy.
- The projections were developed utilizing the GRS Foresight™ modelling tool.
- For the Sensitivity Analysis, all assumptions and methods are the same except investment returns on the Fair Value of Assets are assumed as follows:

Base:	6.70% for all future years
Optimistic:	7.70% for all future years
Pessimistic:	5.70% for all future years

Projected Actuarial Results – Base
Assumes 6.70% Returns in Future Years

Valuation as of June 30,	Employee Contributions	Employer Contributions	Total Contributions	Benefit Payments	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio	Unfunded Actuarial Accrued Liability	Fiscal Year Ending June 30,	Actuarially Determined Contribution	Estimated Funding Plan Contribution
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)	(7)	(8) = (6) / (7)	(9) = (7) - (6)	(10)	(11)	(12)
2022	$ 3,222,809	$ 16,255,245	$ 19,478,054	$ 42,549,302	$ 570,654,330	$ 652,441,776	87.46%	$ 81,787,446	2024	$ 15,428,435	$ 15,428,435
2023	3,106,452	14,529,276	17,635,728	44,221,058	584,085,113	661,701,711	88.27%	77,616,598	2025	15,503,744	15,737,004
2024	3,144,616	15,428,435	18,573,051	45,670,963	598,648,390	670,477,242	89.29%	71,828,852	2026	15,334,433	16,051,744
2025	3,181,646	15,737,004	18,918,650	46,945,878	615,526,222	678,732,968	90.69%	63,206,746	2027	14,840,488	16,372,779
2026	3,233,847	16,051,744	19,285,591	48,086,143	612,307,176	686,573,560	89.18%	74,266,385	2028	16,382,708	16,700,235
2027	3,285,806	16,372,779	19,658,585	49,049,232	621,898,845	694,136,641	89.59%	72,237,796	2029	16,367,966	17,034,240
2028	3,351,522	16,700,235	20,051,757	49,977,970	631,561,164	701,454,003	90.04%	69,892,838	2030	16,343,806	17,374,925
2029	3,425,101	17,034,240	20,459,341	50,748,049	641,526,733	708,739,725	90.52%	67,212,991	2031	16,303,237	17,722,424
2030	3,499,724	17,374,925	20,874,649	51,347,018	652,062,786	716,201,196	91.04%	64,138,411	2032	16,235,259	18,076,872
2031	3,583,182	17,722,424	21,305,606	51,837,754	663,431,392	723,982,234	91.64%	60,550,841	2033	16,124,710	18,438,409
2032	3,668,195	18,076,872	21,745,067	52,359,422	675,491,127	732,095,952	92.27%	56,604,826	2034	15,993,579	18,807,177
2033	3,754,769	18,438,409	22,193,178	52,792,865	688,385,259	740,668,721	92.94%	52,283,462	2035	15,836,305	19,183,321
2034	3,842,910	18,807,177	22,650,087	53,123,100	702,281,688	749,856,931	93.66%	47,575,243	2036	15,646,666	19,566,987
2035	3,941,579	19,183,321	23,124,900	53,489,202	717,225,293	759,679,869	94.41%	42,454,577	2037	15,420,745	19,958,327
2036	4,042,448	19,566,987	23,609,435	53,848,644	733,300,398	770,206,441	95.21%	36,906,043	2038	15,162,571	20,357,494
2037	4,135,953	19,958,327	24,094,280	54,389,039	750,395,680	781,306,177	96.04%	30,910,497	2039	14,847,032	20,764,644
2038	4,250,915	20,357,494	24,608,409	55,175,304	768,355,364	792,768,408	96.92%	24,413,044	2040	14,511,061	21,179,937
2039	4,358,578	20,764,644	25,123,222	55,958,853	787,240,723	804,632,066	97.84%	17,391,344	2041	14,130,862	21,603,536
2040	4,468,571	21,179,937	25,648,508	56,770,907	807,095,071	816,919,761	98.80%	9,824,690	2042	13,710,385	22,035,607
2041	4,591,935	21,603,536	26,195,471	57,583,554	828,005,097	829,672,567	99.80%	1,667,470	2043	13,256,956	22,476,319
2042	4,729,858	22,035,607	26,765,465	58,313,297	850,151,005	843,038,680	100.84%	(7,112,325)	2044	13,499,095	13,499,095
2043	4,871,811	22,476,319	27,348,130	58,993,061	873,680,340	857,155,960	101.93%	(16,524,380)	2045	13,902,126	13,902,126
2044	5,017,906	13,499,095	18,517,001	59,804,437	888,820,614	871,962,489	101.93%	(16,858,125)	2046	14,336,955	14,336,955
2045	5,168,260	13,902,126	19,070,386	60,744,621	904,575,531	887,362,392	101.94%	(17,213,139)	2047	14,808,830	14,808,830
2046	5,336,071	14,336,955	19,673,026	61,507,153	921,220,779	903,616,331	101.95%	(17,604,448)	2048	15,308,620	15,308,620

Section 1.3 of the City of Ann Arbor General Pension Policy states:
"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

Projected Actuarial Results – Optimistic
Assumes 7.70% Returns in Future Years

Valuation as of June 30,	Employee Contributions	Employer Contributions	Total Contributions	Benefit Payments	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio	Unfunded Actuarial Accrued Liability	Fiscal Year Ending June 30,	Actuarially Determined Contribution	Estimated Funding Plan Contribution
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)	(7)	(8) = (6) / (7)	(9) = (7) - (6)	(10)	(11)	(12)
2022	$ 3,222,809	$ 16,255,245	$ 19,478,054	$ 42,549,302	$ 570,654,330	$ 652,441,776	87.46%	$ 81,787,446	2024	$ 15,428,435	$ 15,428,435
2023	3,106,452	14,529,276	17,635,728	44,221,058	585,200,175	661,701,711	88.44%	76,501,536	2025	15,398,742	15,737,004
2024	3,144,616	15,428,435	18,573,051	45,670,963	602,158,824	670,477,242	89.81%	68,318,418	2026	14,993,546	16,051,744
2025	3,181,646	15,737,004	18,918,650	46,945,878	622,879,498	678,732,968	91.77%	55,853,470	2027	14,101,833	16,372,779
2026	3,233,847	16,051,744	19,285,591	48,086,143	625,118,066	686,573,560	91.05%	61,455,494	2028	15,046,706	16,700,235
2027	3,285,806	16,372,779	19,658,585	49,049,232	641,948,293	694,136,641	92.48%	52,188,348	2029	14,277,081	17,034,240
2028	3,351,522	16,700,235	20,051,757	49,977,970	659,678,736	701,454,003	94.04%	41,775,266	2030	13,411,526	17,374,925
2029	3,425,101	17,034,240	20,459,341	50,748,049	678,551,551	708,739,725	95.74%	30,188,174	2031	12,442,052	17,722,424
2030	3,499,724	17,374,925	20,874,649	51,347,018	698,854,600	716,201,196	97.58%	17,346,597	2032	11,355,510	18,076,872
2031	3,583,182	17,722,424	21,305,606	51,837,754	720,885,333	723,982,234	99.57%	3,096,901	2033	10,133,045	18,438,409
2032	3,668,195	18,076,872	21,745,067	52,359,422	744,555,496	732,095,952	101.70%	(12,459,544)	2034	10,090,465	10,090,465
2033	3,754,769	18,438,409	22,193,178	52,792,865	770,082,405	740,668,721	103.97%	(29,413,684)	2035	10,383,851	10,383,851
2034	3,842,910	10,090,465	13,933,375	53,123,100	788,699,636	749,856,931	105.18%	(38,842,705)	2036	10,685,215	10,685,215
2035	3,941,579	10,383,851	14,325,430	53,489,202	808,844,601	759,679,869	106.47%	(49,164,731)	2037	10,993,310	10,993,310
2036	4,042,448	10,685,215	14,727,663	53,848,644	830,634,123	770,206,441	107.85%	(60,427,682)	2038	11,313,772	11,313,772
2037	4,135,953	10,993,310	15,129,263	54,389,039	853,989,982	781,306,177	109.30%	(72,683,805)	2039	11,623,487	11,623,487
2038	4,250,915	11,313,772	15,564,687	55,175,304	878,796,699	792,768,408	110.85%	(86,028,291)	2040	11,965,112	11,965,112
2039	4,358,578	11,623,487	15,982,066	55,958,853	905,142,153	804,632,066	112.49%	(100,510,087)	2041	12,317,182	12,317,182
2040	4,468,571	11,965,112	16,433,683	56,770,907	933,150,711	816,919,761	114.23%	(116,230,951)	2042	12,685,804	12,685,804
2041	4,591,935	12,317,182	16,909,117	57,583,554	962,974,344	829,672,567	116.07%	(133,301,777)	2043	13,083,061	13,083,061
2042	4,729,858	12,685,804	17,415,662	58,313,297	994,870,390	843,038,680	118.01%	(151,831,711)	2044	13,499,095	13,499,095
2043	4,871,811	13,083,061	17,954,872	58,993,061	1,029,082,844	857,155,960	120.06%	(171,926,884)	2045	13,902,126	13,902,126
2044	5,017,906	13,499,095	18,517,001	59,804,437	1,065,676,286	871,962,489	122.22%	(193,713,797)	2046	14,336,955	14,336,955
2045	5,168,260	13,902,126	19,070,386	60,744,621	1,104,691,607	887,362,392	124.49%	(217,329,215)	2047	14,808,830	14,808,830
2046	5,336,071	14,336,955	19,673,026	61,507,153	1,146,551,109	903,616,331	126.88%	(242,934,778)	2048	15,308,620	15,308,620

Section 1.3 of the City of Ann Arbor General Pension Policy states:
"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

Projected Actuarial Results – Pessimistic
Assumes 5.70% Returns in Future Years

Valuation as of June 30,	Employee Contributions	Employer Contributions	Total Contributions	Benefit Payments	Actuarial Value of Assets	Actuarial Accrued Liability	Funded Ratio	Unfunded Actuarial Accrued Liability	Fiscal Year Ending June 30,	Actuarially Determined Contribution	Estimated Funding Plan Contribution
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)	(7)	(8) = (6) / (7)	(9) = (7) - (6)	(10)	(11)	(12)
2022	$ 3,222,809	$ 16,255,245	$ 19,478,054	$ 42,549,302	$ 570,654,330	$ 652,441,776	87.46%	$ 81,787,446	2024	$ 15,428,435	$ 15,428,435
2023	3,106,452	14,529,276	17,635,728	44,221,058	582,970,051	661,701,711	88.10%	78,731,660	2025	15,608,746	15,737,004
2024	3,144,616	15,428,435	18,573,051	45,670,963	595,160,257	670,477,242	88.77%	75,316,985	2026	15,673,154	16,051,744
2025	3,181,646	15,737,004	18,918,650	46,945,878	608,266,727	678,732,968	89.62%	70,466,241	2027	15,569,722	16,372,779
2026	3,233,847	16,051,744	19,285,591	48,086,143	599,742,478	686,573,560	87.35%	86,831,083	2028	17,693,035	17,693,035
2027	3,285,806	16,372,779	19,658,585	49,049,232	602,365,840	694,136,641	86.78%	91,770,801	2029	18,404,993	18,404,993
2028	3,351,522	17,693,035	21,044,557	49,977,970	605,415,527	701,454,003	86.31%	96,038,475	2030	19,070,441	19,070,441
2029	3,425,101	18,404,993	21,830,093	50,748,049	608,571,068	708,739,725	85.87%	100,168,657	2031	19,740,065	19,740,065
2030	3,499,724	19,070,441	22,570,165	51,347,018	612,078,578	716,201,196	85.46%	104,122,618	2032	20,405,069	20,405,069
2031	3,583,182	19,740,065	23,323,247	51,837,754	616,215,646	723,982,234	85.11%	107,766,588	2033	21,048,670	21,048,670
2032	3,668,195	20,405,069	24,073,263	52,359,422	620,832,152	732,095,952	84.80%	111,263,800	2034	21,693,767	21,693,767
2033	3,754,769	21,048,670	24,803,439	52,792,865	626,028,018	740,668,721	84.52%	114,640,703	2035	22,339,317	22,339,317
2034	3,842,910	21,693,767	25,536,677	53,123,100	631,945,883	749,856,931	84.28%	117,911,047	2036	22,981,734	22,981,734
2035	3,941,579	22,339,317	26,280,896	53,489,202	638,600,154	759,679,869	84.06%	121,079,716	2037	23,620,278	23,620,278
2036	4,042,448	22,981,734	27,024,181	53,848,644	646,037,231	770,206,441	83.88%	124,169,210	2038	24,262,932	24,262,932
2037	4,135,953	23,620,278	27,756,231	54,389,039	654,103,518	781,306,177	83.72%	127,202,660	2039	24,888,995	24,888,995
2038	4,250,915	24,262,932	28,513,847	55,175,304	662,606,016	792,768,408	83.58%	130,162,393	2040	25,539,280	25,539,280
2039	4,358,578	24,888,995	29,247,573	55,958,853	671,545,017	804,632,066	83.46%	133,087,049	2041	26,196,351	26,196,351
2040	4,468,571	25,539,280	30,007,850	56,770,907	680,941,289	816,919,761	83.35%	135,978,472	2042	26,866,509	26,866,509
2041	4,591,935	26,196,351	30,788,286	57,583,554	690,839,829	829,672,567	83.27%	138,832,738	2043	27,561,428	27,561,428
2042	4,729,858	26,866,509	31,596,368	58,313,297	701,383,001	843,038,680	83.20%	141,655,679	2044	28,271,855	28,271,855
2043	4,871,811	27,561,428	32,433,239	58,993,061	712,689,582	857,155,960	83.15%	144,466,379	2045	28,968,005	28,968,005
2044	5,017,906	28,271,855	33,289,762	59,804,437	724,688,642	871,962,489	83.11%	147,273,847	2046	29,695,614	29,695,614
2045	5,168,260	28,968,005	34,136,265	60,744,621	737,276,341	887,362,392	83.09%	150,086,051	2047	30,460,764	30,460,764
2046	5,336,071	29,695,614	35,031,685	61,507,153	750,719,005	903,616,331	83.08%	152,897,325	2048	31,253,732	31,253,732

Section 1.3 of the City of Ann Arbor General Pension Policy states:
"The City of Ann Arbor will strive to achieve 100% funding of the City of Ann Arbor Employees' Retirement Plan. To the extent that 100% funding has been achieved, the City will continue to fund at a minimum the Normal Cost as defined by an outside actuary. To the extent that 100% funding had not been achieved, the City shall budget each fiscal year the higher of the ADC or the existing level of funding in the current budget year adjusted annually for the change in general fund budgeted revenues. In some years this may result in an excess contribution to the Pension Fund, which will serve to pay down the unfunded actuarial accrued liability and reduce future city cost increases."

APPENDIX

Risk Measures

Actuarial Valuation Date	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Unfunded AAL (UAAL) (2) - (1)	(4) Covered Payroll	(5) Funded Ratio (1) / (2)	(6) Assets / Payroll (1) / (4)	(7) Liability / Payroll (2) / (4)	(8) Unfunded / Payroll (3) / (4)
6/30/2013	$407,170,000	$507,435,000	$100,265,000	$45,063,112	80.2 %	903.6 %	1126.1 %	222.5 %
6/30/2014	433,854,000	523,461,000	89,607,000	47,956,745	82.9	904.7	1091.5	186.8
6/30/2015	459,480,000	533,198,000	73,718,000	48,759,189	86.2	942.3	1093.5	151.2
6/30/2016	470,029,000	548,201,000	78,172,000	50,057,471	85.7	939.0	1095.1	156.2
6/30/2017	489,943,000	571,074,000	81,131,000	53,583,277	85.8	914.4	1065.8	151.4
6/30/2018 [(1), (2)]	505,015,000	583,601,000	78,586,000	53,231,121	86.5	948.7	1096.4	147.6
6/30/2019	513,611,366	601,108,981	87,497,615	55,269,697	85.4	929.3	1087.6	158.3
6/30/2020 [(3)]	520,439,737	614,077,223	93,637,486	56,188,540	84.8	926.2	1092.9	166.6
6/30/2021 [(3)]	554,096,977	627,144,090	73,047,113	55,047,831	88.4	1006.6	1139.3	132.7
6/30/2022 [(3)]	570,654,330	652,441,776	81,787,446	57,278,684	87.5	996.3	1139.1	142.8

[(1)] *Revised actuarial assumptions.*
[(2)] *Valuation results for 2018 and prior years were calculated by the City's prior actuary.*
[(3)] *Reflects a change in the investment return assumption.*

(5) The Funded Ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

(6) and (7) The ratios of assets and liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 5 and 7. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of pay. For systems that are closed to new hires, it is expected that these ratios will grow as payroll declines.

(8) The ratio of the unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 3 or 4 may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

Risk Commentary

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

- **Investment Risk** – actual investment returns may differ from the expected returns;
- **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
- **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
- **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution amount shown on page A-3 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined amounts do not necessarily guarantee benefit security.

Risk Commentary (Concluded)

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2022	2021	2020	2019	2018
Ratio of the market value of assets to payroll	9.97	11.38	9.12	9.28	9.17
Ratio of actuarial accrued liability to payroll	11.39	11.39	10.93	10.88	10.63
Ratio of actives to retirees and beneficiaries	0.62	0.63	0.66	0.66	0.65
Ratio of net cash flow to market value of assets	-4.2%	-3.6%	-4.5%	-4.2%	-4.3%

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 10.0 times the payroll, a return on assets 5% different than assumed would equal 50% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of actives to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

State Reporting Assumptions as of June 30, 2022

The Protecting Local Government Retirement and Benefits Act, Public Act 202 of 2017, was put into law effective December 20, 2017. One outcome of the law is the requirement for the local unit of government to provide select reporting disclosures to the State. Section 5(1) of the Act provides the State treasurer with the authority to annually establish uniform actuarial assumptions for purposes of developing the requisite disclosures. Below you will find information which may be used to assist the local unit of government with required reporting.

Uniform Assumptions, as applicable to the measurement and the required disclosures under uniform assumptions are denoted below. Additional discussion of PA 202 and uniform assumptions may be found on the State website in the uniform assumption memo dated December 17, 2021.

Uniform Assumption	PA 202	Valuation Assumptions Used	Uniform Assumptions Used
Investment Rate of Return Discount Rate	Maximum of 6.85%[(1)]	6.70%	6.70%
Salary Increase	Minimum of 3.00% or based on experience study within last 5 years	3.50% + Merit and longevity	3.50% + Merit and longevity
Mortality	Version of Pub-2010 tables with Generational mortality improvement using scale MP-2020 or based on experience study within last 5 years	A version of RP-2014 with Generational mortality improvement using scale MP-2014 (based on an experience study performed by the City's prior actuary)	A version of RP-2014 with Generational mortality improvement using scale MP-2014 (based on an experience study performed by the City's prior actuary)
Amortization of the Unfunded Accrued Actuarial Liability:			
Period	Maximum Period of 17 Years	19 years	**17 years**
Method	Closed Plans: Level Dollar Open Plans: Level Dollar or Level Percent of Payroll	Level Dollar	Level Dollar
Type	Closed	Closed	Closed

(1) *A blended rate calculated using GASB Statement No. 68 methodology. For periods in which projected plan assets are sufficient to make projected benefit payments – maximum of 6.85%; for periods in which projected plan assets are NOT sufficient to make projected benefit payments – 2.16%.*

State Reporting Assumptions
as of June 30, 2022

The following information has been prepared to provide some of the information necessary to complete the pension reporting requirements for the State of Michigan's Local Government Retirement System Annual Report (Form 5572). Additional resources are available on the State website.

3	**Financial Information[1]**	
4	Enter retirement pension system's assets (system fiduciary net position ending)	$ 570,654,330
5	Enter retirement pension system's liabilities (total pension liability ending)	$ 652,441,776
6	Funded ratio	Auto[5]
7	Actuarially Determined Contribution (ADC)	$ 15,428,435
8	Governmental Fund Revenues	TBD[4]
9	All systems combined ADC/Governmental fund revenues	Auto[5]
10	**Membership[1]**	
11	Indicate number of active members	711
12	Indicate number of inactive members	102
13	Indicate number of retirees and beneficiaries	1,156
14	**Investment Performance**	
15	Enter actual rate of return - prior 1-year period	TBD[4]
16	Enter actual rate of return - prior 5-year period	TBD[4]
17	Enter actual rate of return - prior 10-year period	TBD[4]
18	**Actuarial Assumptions[1]**	
19	Actuarial assumed rate of investment return[2]	6.70%
20	Amortization method utilized for funding the system's unfunded actuarial accrued liability, if any	Level Dollar
21	Amortization period utilized for funding the system's unfunded actuarial accrued liability, if any	19
22	Is each division within the system closed to new employees?	No
23	**Uniform Assumptions[3]**	
24	Enter retirement pension system's actuarial value of assets using uniform assumptions	$ 570,654,330
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$ 652,441,776
26	Funded ratio using uniform assumptions	Auto[5]
27	Actuarially Determined Contribution (ADC) using uniform assumptions	$ 15,409,382
28	All systems combined ADC/Governmental fund revenues	Auto[5]

(1) *Information on lines 4-5, lines 11-13, and lines 19-22 can be found in the Annual Actuarial valuation report.*
(2) *Net of investment expenses.*
(3) *Information on lines 24-28 is based on assumption listed on the prior page as of the most recent valuation date, June 30, 2022.*
(4) *To be supplied by the City of Ann Arbor.*
(5) *Automatically calculated by State of Michigan Form 5572.*