The General Retirement System of the City of Detroit

Annual Actuarial Valuation of Component I (Hybrid) as of June 30, 2023

800.521.0498 | P: 248.799.9000 | www.grsconsulting.com

February 5, 2024

Board of Trustees
The General Retirement System
of the City of Detroit

Re: The General Retirement System of the City of Detroit Actuarial Valuation of Component I as of June 30, 2023

Dear Board Members:

The results of the June 30, 2023 Annual Actuarial Valuation of Component I of the General Retirement System of the City of Detroit (DGRS) are presented in this report.

The funding level and estimated costs of the Plan shown in this report are based on the actuarial assumptions disclosed in Section F. This report includes some risk metrics, but does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the Plan's financial condition.

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 other parties only in its entirety and only with the permission of the Board. Authorized or unauthorized use of this report by other parties does not create a liability between Gabriel, Roeder, Smith & Company and the other party.

The purposes of the valuation are:

- To measure the System's funding progress;
- To provide a five-year funding projection. The five-year projection is to assist the Board with its duties related to Section 9.5 of the Combined GRS Plan; and
- To provide Actuarially Determined Employer Contribution (ADEC) amounts for fiscal year 2025. Users of this report should be aware that contributing these amounts does not guarantee benefit security.

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.

One Towne Square | Suite 800 | Southfield, Michigan 48076-3723

The findings in this report are based on data and other information through June 30, 2023. 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; 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.

This valuation assumes 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 valuation was based upon information furnished by the Retirement System staff, 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 information. We are not responsible for the accuracy or completeness of the information provided by the Retirement System staff. More details are provided in the data section of this report.

This report was prepared using certain assumptions as described in the section of this report entitled Methods and Assumptions. The actuarial cost method is the Entry Age Actuarial Cost Method as prescribed by Section 9.3(1) of the Combined GRS Plan. The assumed rate of return is 6.75% for valuations through June 30, 2023 as prescribed by Section 1.16(3) of the Combined GRS Plan. The actuarial cost method and assumed rate of investment return of 6.75% are, therefore, prescribed methods and assumptions set by another party as discussed in Actuarial Standard of Practice No. 4. In our judgment, all of the actuarial assumptions used for the valuation are reasonable for purposes of the measurement being taken. The combined effect of the assumptions is expected to have no significant bias (i.e., not significantly optimistic or pessimistic).

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 Component I of the General Retirement System of the City of Detroit 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.

Jamal Adora, Judith A. Kermans and James R. Sparks are Members of the American Academy of Actuaries (MAAA) and 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

Jamal Adora, ASA, EA, MAAA

Judith A. Kermans, EA, FCA, MAAA

James R. Sparks, ASA, FCA, MAAA

JA/JAK/JRS:sc

Table of Contents

SECTION A

INTRODUCTION

Executive Summary*
($ in Millions)

	General City	D.O.T.	DWSD	Library	June 30, 2023 Total	June 30, 2022 Total
Employer Contributions						
Contributions For Fiscal Year Ending	June 30, 2025	June 30, 2025	June 30, 2025	June 30, 2025	June 30, 2025	June 30, 2024
Amortization Period Years	14	14	14	14	14	15
Total Employer Contribution %	3.96%	3.99%	4.41%	4.92%	4.05%	4.13%
Membership						
Number of:						
Active Members	3,820	730	549	234	5,333	4,841
Retirees and Beneficiaries	305	120	198	60	683	598
Legacy Disabled (See Section E)	39	13	27	0	79	94
Inactive, Nonretired Members	306	134	344	46	830	957
Total	4,470	997	1,118	340	6,925	6,490
Valuation Payroll	$ 242.4	$ 34.7	$ 33.4	$ 12.5	$ 323.2	$ 284.4
Assets						
Voluntary Employee Contribution	$ 24.8	$ 9.9	$ 4.9	$ 0.3	$ 39.9	$ 34.1
Annuity Reserve Fund	0.0	(0.0)	0.0	-	0.1	0.1
Pension Accumulation Fund	115.3	22.1	20.8	7.3	165.5	127.3
Mandatory Employee Contribution	49.6	8.2	9.1	3.4	70.3	61.0
Market Value of Assets (MVA)	$ 189.7	$ 40.2	$ 34.8	$ 11.0	$ 275.8	$ 222.6
Funding Value of Assets (FVA)	$ 198.7	$ 42.1	$ 36.5	$ 11.6	$ 288.8	$ 241.9
Return on Market Value					5.24 %	(6.14)%
Return on Funding Value					2.43 %	2.45 %

** Results may not add due to rounding.*

Executive Summary*
($ in Millions)

	General City	D.O.T.	DWSD	Library	June 30, 2023 Total	June 30, 2022 Total
Actuarial Information						
Total Normal Cost Rate	7.96 %	7.99 %	7.83 %	7.51 %	7.94 %	7.85 %
Member Contribution Rate	4.00 %	4.00 %	4.00 %	4.00 %	4.00 %	4.00 %
Employer Normal Cost Rate	3.96 %	3.99 %	3.83 %	3.51 %	3.94 %	3.85 %
Actuarial Accrued Liability	$ 193.8	$ 42.2	$ 38.7	$ 13.6	$ 288.3	$ 253.4
Using Market Value of Assets						
Unfunded Actuarial Accrued Liability	$ 4.1	$ 2.0	$ 3.8	$ 2.5	$ 12.5	$ 30.8
Funded Ratio	97.9%	95.2%	90.1%	81.4%	95.7%	87.8%
Using Funding Value of Assets						
Unfunded Actuarial Accrued Liability	$ (4.9)	$ 0.1	$ 2.2	$ 2.0	$ (0.5)	$ 11.5
Funded Ratio	102.5%	99.7%	94.3%	85.2%	100.2%	95.5%
Risk Metrics						
Actuarial Accrued Liability Divided by Payroll					0.9	0.9
Market Value of Assets Divided by Payroll					0.9	0.8

** Results may not add due to rounding.*

Notes: VPIF is the Variable Pension Improvement Factor or ad hoc COLA.

Development of Normal Cost and Employer Rates
for Fiscal Year Ending June 30, 2025

Contributions for	General City	D.O.T.	DWSD	Library	System Total
	Contributions Expressed as a Percent of Payroll (2.0% VPIF)				
Normal Cost:					
Age & Service Pensions	5.97 %	5.20 %	5.83 %	5.52 %	5.86 %
Disability Pensions	0.15 %	0.91 %	0.15 %	0.14 %	0.23 %
Death-in-Service Pensions	0.22 %	0.19 %	0.24 %	0.19 %	0.22 %
Future Refunds	1.03 %	1.10 %	1.02 %	1.07 %	1.04 %
Administrative Expenses	0.59 %	0.59 %	0.59 %	0.59 %	0.59 %
Total	7.96 %	7.99 %	7.83 %	7.51 %	7.94 %
Members Current Contributions	4.00 %	4.00 %	4.00 %	4.00 %	4.00 %
Employer Normal Cost	**3.96 %**	**3.99 %**	**3.83 %**	**3.51 %**	**3.94 %**

Development of Liabilities
Retirement System Totals

	General City	D.O.T.	DWSD	Library	System Total
Present Value of Future Benefits	$ 317,018,573	$ 57,401,032	$ 54,926,270	$ 18,659,075	$ 448,004,950
Present Value of Future Normal Costs	123,221,390	15,184,981	16,259,476	5,084,286	159,750,133
Actuarial Accrued Liability	$ 193,797,183	$ 42,216,051	$ 38,666,794	$ 13,574,789	$ 288,254,817
Market Value of Assets (MVA)	189,720,183	40,181,199	34,830,140	11,043,708	275,775,230
Unfunded Actuarial Accrued Liability (UAAL)	$ 4,077,000	$ 2,034,852	$ 3,836,654	$ 2,531,081	$ 12,479,587
Funded Ratio	97.9%	95.2%	90.1%	81.4%	95.7%
Funding Value of Assets (FVA)	198,656,966	42,073,937	36,470,816	11,563,923	288,765,642
Unfunded Actuarial Accrued Liability (UAAL)	$ (4,859,783)	$ 142,114	$ 2,195,978	$ 2,010,866	$ (510,825)
Funded Ratio	102.5%	99.7%	94.3%	85.2%	100.2%

Actuarially Determined Employer Contribution (ADEC) for Fiscal Year Ending June 30, 2025

	($ Millions)				
	General City	D.O.T.	DWSD	Library	System Total
Actuarial Accrued Liability	$ 193.8	$ 42.2	$ 38.7	$ 13.6	$ 288.3
Funding Value of Assets (FVA)	198.7	42.1	36.5	11.6	288.8
UAAL as of June 30, 2023	$ (4.9)	$ 0.1	$ 2.2	$ 2.0	$ (0.5)
Anticipated Employer Normal Cost	9.6	1.4	1.3	0.4	12.7
Anticipated POA Contribution	(9.7)	(1.6)	(1.5)	(0.6)	(13.4)
Interest at 6.75%	(0.3)	0.0	0.1	0.1	(0.1)
Projected UAAL as of June 30, 2024	$ (5.3)	$ (0.0)	$ 2.2	$ 2.0	$ (1.2)
Actuarially Determined Employer Contributions for FY 2025					
Remaining Amortization Years	14	14	14	14	14
UAAL Contribution	-0.20%	-0.01%	0.58%	1.41%	
$0 Minimum UAAL Contribution	0.00%	0.00%	0.58%	1.41%	0.11%
Normal Cost Contribution	3.96%	3.99%	3.83%	3.51%	3.94%
Total Contribution %	3.96%	3.99%	4.41%	4.92%	4.05%
Estimated Contribution $	$ 9.9	$ 1.4	$ 1.5	$ 0.6	$ 13.5

Contributions use the Funding Value of Assets which incorporates a 3-year smoothing period for recognition of past investment gains or losses.

Contributions Comparative Schedule

Valuation Date June 30	Mandatory Employee Contributions	Employer Contributions for: Normal Cost	Employer Contribution in Excess of Normal Cost&	Amount for UAAL	Total Employer Contribution	Amount for Rate Stabilization*	Contributions For Fiscal Year Ending June 30,	Employer Contribution Type#
2014	4.00%	4.03%	0.97%	0.97%	5.00%	0.00%	2016	Mandated
2015	4.00%	3.98%	1.02%	1.02%	5.00%	0.00%	2017	Mandated
2016	4.00%	4.25%	0.75%	0.75%	5.00%	0.00%	2018	Mandated@
2017	4.00%	4.43%	0.57%	0.57%	5.00%	0.00%	2019	Mandated
2018	4.00%	4.50%	0.50%	0.50%	5.00%	0.00%	2020	Mandated
2019	4.00%	4.58%	0.42%	0.42%	5.00%	0.00%	2021	Mandated
2020	4.00%	4.67%	0.33%	0.33%	5.00%	0.00%	2022	Mandated@
2021^	4.00%	3.81%	1.19%	1.19%	5.00%	0.00%	2023	Mandated
2022	4.00%	3.85%	0.27%	0.27%	4.12%	0.00%	2024	ADEC
2023	4.00%	3.94%	0.11%	0.11%	4.05%	0.00%	2025	ADEC

& *Employer Contributions are set at 5.0% of covered compensation per year until fiscal year 2024.*

"Mandated" (Chapter 9.3(2)) if specified by Plan document and POA. The Actuarial Determined Employer Contribution (ADEC) was first computed with the June 30, 2022 Actuarial Valuation to determine the contribution for the 2024 fiscal year.

* *Rate Stabilization Contributions, if any, are determined by the City.*

@ *In an effort to improve the funding position of the System, the City elected to pay an additional contribution of: $3.1 million in June 30, 2018; and $2.69 million in June 30, 2022.*

^ *After changes in actuarial assumptions and/or methods.*

Comments

Comment 1 – Plan Experience

Plan experience was less favorable than assumed in the year ending June 30, 2023. The plan experienced a net loss of $8.1 million consisting of a net liability gain of $3.2 million and asset loss (on a funding value basis) of $11.3 million. The liability gains were driven in large part by significantly more terminations than expected. Additional information about gains and losses is shown in Section B. The $11.3 million asset loss is due to phased-in investment loss experience.

Comment 2 – Actuarial Assumptions

The COLA or VPIF provided in the Plan is a 2.0% simple post-retirement increase at the beginning of each plan year starting the later of: 1) July 1, 2018; 2) one year after retirement; or 3) age 62. However, Section 9.5 of the Plan imposes several limitations on when the COLA can be paid (or clawed back). For purposes of this report the Board has elected to use an average COLA equivalent to 2.0%. Future Plan experience, Board policy, and Plan interpretation regarding the administration of Section 9.5 may result in changes to this assumption.

We understand that the Board may continue to explore changes in the assumed rate of return. However, per legal counsel, we also understand that for the annual actuarial valuation the 6.75% assumed rate of return cannot be changed until the June 30, 2024 actuarial valuation, including for purposes of calculating the actuarially determined employer contribution. We recommend the Board review the investment return assumption prior to the June 30, 2024 valuation. As the actuary, we are required to assess the reasonability of this assumption each year.

We anticipate the next comprehensive review of experience to cover the period from July 1, 2020 to June 30, 2025.

Comment 3 – Option Factors

The Board adopted option factors for the Plan in 2018. We have assumed the new factors apply to all retirements after the valuation date. We will continue to work with the System in the calculation of optional forms of payment. In particular, the Board may want to consider updating the assumptions used in optional forms of payment in order to recognize changes following the most recent experience study.

Comment 4 – Workshare Service Credit

We understand that the bankruptcy court has granted a change to the Component I (Hybrid) Plan to allow members in workshare to get credit for that time. This report includes the impact of granting the service. As with last year, our understanding is that the June 30, 2023 census data does not include partial months of service rendered while in workshare. In order to estimate the impact of granting the partial service earned while in workshare, we have included a liability of $4.78 million in this report. The liability was based on our analysis dated May 13, 2022 (with interest). Once the prorated service is provided in the valuation data, this estimate can be replaced by results based on actual data.

Comment 5 – New Data System

We understand that the Retirement System is in the process of moving to a new data system and that future valuation data will be provided from that system beginning with the 2024 valuation. We also understand that data may have gone through additional cleaning/auditing as it has been entered into the new system. We anticipate that data will be more precise for valuation purposes once the new system is providing that data. Please note that changes in data may impact future valuation results and generate gains or losses.

Comment 6 – Annuity Reserve Fund and Liabilities

There is currently $53,705 in the Annuity Reserve Fund (ARF). However, the value of the associated retiree annuity liabilities is $739,914. Given the relative magnitude of the difference, we recommend the Board review administrative procedures and/or consider a transfer related to the ARF. We will continue to monitor differences between the ARF and the associated liabilities.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

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:

1. **Investment Risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability Mismatch Risk** – 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;
3. **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;
4. **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **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 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 rate do not necessarily guarantee benefit security.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Plan Risk 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.

In our discussions with the Board and Investment Committee, we illustrated various investment return scenarios as part of the funding policy analysis. This type of analysis may also be considered a quantitative risk assessment. We recommend that the Board consider similar periodic analysis as appropriate under the Risk Controls of the newly approved funding policy.

The Board approved funding policy calls for illustrating the table of risk measures shown below. Please see the funding policy for additional information. In the table below, the acronyms are as follows: FVA = Funding Value of Assets; MVA = Market Value of Assets; AAL = Actuarial Accrued liability; UAAL = Unfunded Actuarial Accrued Liability.

Funded Ratio

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.

Rate of Return, Geometric Average, and Standard Deviation

Investment return is probably the largest single risk that most systems face. The year-by-year return and the geometric average give an indicator of the realism of the System's assumed return.

Duration of the Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, a duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Ratio of Unfunded Actuarial Accrued Liability to Payroll

The ratio of unfunded liability to payroll gives an indication of the plan's sensitivity to differences between assumed and actual experience related to the employer contributions. A value above approximately 300% or 400% may indicate high volatility relative to small gains and losses.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Ratio 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 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% 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 of 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 Non-Investment 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, and stress tests. We can provide additional risk assessments at the Board’s request.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

	2023	2022
(i) Classic measures		
– Funded ratio		
MVA	95.7%	87.8%
FVA	100.2%	95.5%
– UAAL amortization period	14	15
– Portfolio rate of return		
MVA	5.24%	-6.14%
FVA	2.43%	2.45%
– Geometric average portfolio rate of return[1]		
5-year		
MVA	-0.61%	-6.14%
FVA	2.44%	2.45%
10-year		
MVA	-0.61%	-6.14%
FVA	2.44%	2.45%
– Standard deviation of return[1]		
5-year		
MVA	8.05%	0.00%
FVA	0.01%	0.00%
10-year		
MVA	8.05%	0.00%
FVA	0.01%	0.00%
(ii) Modified Duration of the PVFB	20.3	20.6
(iii) Total UAAL / Covered Payroll		
MVA	0.0	0.1
FVA	(0.0)	0.0
(iv) Total Assets / Covered Payroll		
MVA	0.9	0.8
FVA	0.9	0.9
(v) Total AAL / Covered Payroll	0.9	0.9
(vi) Non-Investment Cash flow / Beginning of year MVA	18.2%	10.5%
(vii) MVA / Benefit Payments	39.3	30.1
(viii) Solvency Liability ($ millions)[2]	$ 287.4	$ 256.2

[1] These are developed prospectively from 2022 and consequently do not yet reflect full 5 or 10 years of experience.

[2] See discussion on the following pages.

Low-Default-Risk Obligation Measure (Solvency Liability)

Introduction

In December 2021, the Actuarial Standards Board (ASB) adopted a revision to Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions. The revised ASOP No. 4 requires the calculation and disclosure of a liability referred to by the ASOP as the "Low-Default-Risk Obligation Measure" (LDROM). The rationale that the ASB cited for the calculation and disclosure of the LDROM was included in the Transmittal Memorandum of ASOP No. 4 and is presented below (emphasis added):

"The ASB believes that the calculation and disclosure of this measure provides **appropriate, useful information for the intended user regarding the funded status of a pension plan**. The calculation and disclosure of this additional measure **is not intended to suggest that this is the "right" liability** measure for a pension plan. However, the ASB does believe that **this additional disclosure provides a more complete assessment of a plan's funded status and provides additional information regarding the security of benefits that members have earned as of the measurement date.**

Comparing the Accrued Liabilities and the LDROM

One of the fundamental financial objectives of the System is to finance each member's retirement benefits. To fulfill this objective, the discount rate that is used to value the accrued liabilities is set equal to the **expected return** on the System's diversified portfolio of assets (referred to sometimes as the investment return assumption). For the System, the investment return assumption is 6.75%.

The LDROM is meant to approximately represent the lump sum cost to a plan to purchase low-default-risk fixed income securities whose resulting cash flows essentially replicate in timing and amount the benefits earned (or the costs accrued) as of the measurement date. The LDROM is very dependent upon market interest rates at the time of the LDROM measurement. The lower the market interest rates, the higher the LDROM, and vice versa. The LDROM results presented in this report are based on the projected unit credit actuarial cost method (i.e. accrued benefits) and discount rates based upon the June 2023 Treasury Yield Curve Spot Rates (monthly average). The 1-, 5-, 10- and 30-year rates follow: 5.29%, 3.99%, 3.61% and 3.84%. This measure may not be appropriate for assessing the need for or amount of future contributions. This measure may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligation.

For purposes of solvency liability, the actuarial cost method has been changed from entry age normal to unit credit to reflect benefits accrued as of the valuation date with the following technical details:

- Accrued benefits as of the valuation date are based on 1.5% times Average Final Compensation as of the valuation date times Credited Service as of the valuation date.

Presented below are the actuarial accrued liability and the LDROM (Solvency Liability) as of June 30, 2023.

Type of Liability	Valuation Actuarial Accrued Liability	LDROM (Solvency) Actuarial Accrued Benefits
Defined Benefit	$ 247,576,808	$ 246,743,439
Annuity Funds	40,678,009	40,678,009
Total	**$ 288,254,817**	**$ 287,421,448**

Low-Default-Risk Obligation Measure (Solvency Liability)

Commentary Regarding the LDROM

Some ways in which the LDROM can assist the Board of Trustees in a decision-making process include:

(1) It provides information to potentially allow for better risk management for the System;
(2) It places the appropriateness of potential employer contribution rate reductions or benefit enhancements in a better context; and
(3) It provides more complete information regarding the benefit security of the membership's benefits earned as of the measurement date.

Potentially Allows for Better Risk Management: A very useful risk metric to exhibit potential contribution rate volatility (or amortization period volatility for fixed rate plans) is the ratio of assets to payroll or AAL to payroll. How could we reduce that potential contribution rate volatility (or amortization period volatility for fixed rate plans)? The LDROM and liability driven investing (LDI) are closely related concepts.

Other than reducing benefits, all other things being equal, the only way to reduce that volatility is to immunize (i.e., LDI) a portion of the System's liability. This does not mean that the System needs to immunize all of the liability. For example, if they could immunize half of it, they could reduce the contribution rate volatility in half. This would require the actuary to use a cash flow matching method to value that portion of the liabilities. This means that the actuary would not use the System's investment return assumption for this portion of the liability, but the yield curve resulting from the fixed income portfolio that is being used to immunize the liability. The value of the assets (i.e., fixed income portfolio) and the value of the immunized liability would move in tandem with any changes (up or down) in future interest rates. The result being that the immunized portion of the System's liability would reduce the potential of producing new unfunded actuarial accrued liabilities. However, the fixed income portfolio would still have the minor potential for credit default risk.

Places the Appropriateness of Potential Employer Contribution Rate Reductions or Benefit Enhancements in a Better Context: Many PERS have adopted a funding policy. Many funding policies already take into account the System's funded ratio (based upon the AAL) when considering whether to allow for benefit enhancements or contribution rate reductions. For example, a System may not allow for a benefit enhancement if the funded ratio does not exceed a certain threshold. Similarly, a System may not allow for an employer contribution rate reduction in some circumstances. For example, a reduction to the employer normal cost contribution may not be allowed until the System reaches a funded ratio of 120%. Given the fact that most criteria are based upon the expectation of earning the investment return assumption, a System may want to consider extending these criteria to a funded ratio based upon the LDROM in addition to the AAL.

Provides more Complete Information Regarding the Benefit Security of the Membership's Benefits Earned as of the Measurement Date: Too often, a high funded ratio (i.e., 100% funded) on an AAL basis is interpreted as benefit security for the participants. The fact that this funded ratio is based upon an expected measure is many times overlooked. If the AAL and LDROM measures are relatively close, then the System at least has the opportunity to make benefits payable in the future more secure.

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 6.75% on the funding value of assets), it is expected that:

1) The unfunded actuarial accrued liabilities will be fully amortized 15 years after June 30, 2023.
2) The funded status of the plan will increase gradually towards a 100% funded ratio; and
3) The unfunded accrued liability will decline gradually toward $0.

We have assessed that the Actuarially Determined Employer Contribution (ADEC) calculated under the funding policy in this report is reasonable. This assessment will be made each year with the determination based on the circumstances at that time and may or may not yield the same result.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the funding value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future administrative expense contributions.
3) The measurement would produce a different result if the market value of assets were used instead of the funding value of assets, unless the market value of assets is used in the measurement.

Limitations of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Risks to Future Employer Contribution Requirements

There are ongoing risks to future employer contribution requirements to which the Retirement System is exposed, such as:

- Actual and Assumed Investment Rate of Return;
- Actual and Assumed Mortality Rates; and
- Amortization Policy.

Scenario Testing/Sensitivity Testing

If the Board would like to see additional projections, we would be happy to perform such projections.

SECTION B

FUNDING RESULTS

Actuarial Liabilities as of June 30, 2023

Actuarial Present Value of	Total Present Value	Portion Covered by Future Normal Cost Contributions	Actuarial Accrued Liabilities (1) – (2)
Age and service allowances based on total service likely to be rendered by present active members	$276,329,024	$ 89,014,156	$187,314,868
Disability benefits likely to be paid to present active members	8,361,089	5,062,461	3,298,628
Death-in-service benefits likely to be paid on behalf of present active members	10,823,714	4,679,321	6,144,393
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	73,275,325	60,994,195	12,281,130
Benefits attributed to voluntary member contributions	39,938,095	0	39,938,095
Reserve for Refunds Due	0	0	0
Benefits likely to be paid to vested inactive members	13,098,115	0	13,098,115
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees (including annuities)	26,179,588	0	26,179,588
Other Reserves	4,859,783	0	4,859,783
Total	$452,864,733	$ 159,750,133	$293,114,600
Funding Value of Assets	$288,765,642	$ 0	$288,765,642
Liabilities to be covered by Future Contributions	$164,099,091	$ 159,750,133	$ 4,348,958

Actuarial Balance Sheet
(2.0% VPIF)

Assets and Present Value of Expected Future Contributions

A. Present Funding Value of Assets		
1. Net assets from System financial statements	$	275,775,230
2. Adjustment for Valuation Assets		12,990,412
3. Funding Value of Assets		288,765,642
B. Actuarial Present Value of Expected Future Employer Contributions		
1. For Normal Costs		71,707,482
2. For Unfunded Actuarial Accrued Liability		4,348,958
3. Total		76,056,440
C. Actuarial Present Value of Expected Future Member Contributions		88,042,651
D. Total Present and Expected Future Resources	$	452,864,733

Present Value of Expected Future Benefit Payments and Reserves

A. To Retirees and Beneficiaries (Including Annuities)	$	26,179,588
B. To Vested Terminated Members		13,098,115
C. To Present Active Members		
1. Allocated to Service Rendered Prior to Valuation Date – Actuarial Accrued Liability		209,039,019
2. Allocated to Service Likely to Be Rendered after Valuation Date		159,750,133
3. Total		368,789,152
D. Voluntary Member Contributions		39,938,095
E. Other Reserves*		4,859,783
F. Total Actuarial Present Value of Expected Future Benefit Payments and Reserves	$	452,864,733

** Reserves for future adverse deviation (assets in excess of liabilities, if any).*

Liability by Division

	General	D.O.T.	DWSD	Library	Totals
Accrued Pension Liabilities					
Retirees and beneficiaries	$ 13,237,256	$ 4,627,699	$ 5,406,122	$ 2,168,597	$ 25,439,674
Inactive members future deferred pensions	6,034,974	2,516,659	3,757,886	788,596	13,098,115
Active members	149,260,551	25,027,742	24,460,952	10,289,774	209,039,019
Total accrued pension liabilities	168,532,781	32,172,100	33,624,960	13,246,967	247,576,808
Pension fund balances (MVA)	164,883,139	30,271,258	29,887,625	10,741,408	235,783,430
Unfunded accrued pension liabilities	3,649,642	1,900,842	3,737,335	2,505,559	11,793,378
Accrued Annuity Liabilities (Due to Voluntary Member Contributions)					
Retirees and beneficiaries	$ 443,378	$ 126,666	$ 144,348	$ 25,522	$ 739,914
Members annuities & future refunds	24,821,024	9,917,285	4,897,486	302,300	39,938,095
Total accrued annuity liabilities	25,264,402	10,043,951	5,041,834	327,822	40,678,009
Annuity fund balances (MVA)	24,837,044	9,909,941	4,942,515	302,300	39,991,800
Unfunded accrued annuity liabilities	427,358	134,010	99,319	25,522	686,209
Totals - Market Value of Assets (MVA)					
Actuarial Accrued Liabilities	$ 193,797,183	$ 42,216,051	$ 38,666,794	$ 13,574,789	$ 288,254,817
Market Value of Assets*	189,720,183	40,181,199	34,830,140	11,043,708	275,775,230
Unfunded Actuarial Accrued Liabilities	**$ 4,077,000**	**$ 2,034,852**	**$ 3,836,654**	**$ 2,531,081**	**$ 12,479,587**
Funded Ratio	97.9%	95.2%	90.1%	81.4%	95.7%
Totals - Funding Value of Assets (FVA)					
Actuarial Accrued Liabilities	$ 193,797,183	$ 42,216,051	$ 38,666,794	$ 13,574,789	$ 288,254,817
Funding Value of Assets	198,656,966	42,073,937	36,470,816	11,563,923	288,765,642
Unfunded Actuarial Accrued Liabilities	**$ (4,859,783)**	**$ 142,114**	**$ 2,195,978**	**$ 2,010,866**	**$ (510,825)**
Funded Ratio	102.5%	99.7%	94.3%	85.2%	100.2%

** Assets are allocated by division and by the System's staff.*

The funded status measure is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status is appropriate for assessing the need for future UAAL contributions if all actuarial assumptions are met.

Development of Actuarial Gain or Loss

Funding Value of Asset Basis

	Actuarial Accrued Liability (AAL) (A)	Funding Value of Assets (B)	Unfunded Actuarial Accrued Liability (C) = (A) - (B)
(1) Beginning of Year (BOY)	$ 253,427,043	$ 241,929,337	$ 11,497,706
(2) Total Normal Cost*	27,238,136	N/A	27,238,136
(3) Total Contributions	N/A	33,864,446	(33,864,446)
(4) Administrative Expenses	N/A	(2,022,440)	2,022,440
(5) Benefit Payments and Refunds	(7,013,533)	(7,013,533)	-
(6) Other^	-	15,642,655	(15,642,655)
(7) Interest	17,788,906	17,696,131	92,775
(8) Expected End of Year Before Changes	$ 291,440,552	$ 300,096,596	$ (8,656,044)
(9) Assumption Changes	-	-	$ -
(10) Benefit Changes	-	-	-
(11) Expected End of Year After Changes	$ 291,440,552	$ 300,096,596	$ (8,656,044)
(12) Actual End of Year	288,254,817	288,765,642	(510,825)
(13) Gain or Loss	$ 3,185,735	$ 11,330,954	$ (8,145,219)
	Gain	Loss	Loss
(14) Percent of BOY AAL (10)/(1A)	1.26%	4.47%	(3.21)%

** Normal Cost is based on the prior valuation and includes current year voluntary member contributions.*
^ Includes Annuity Savings Fund excess interest transfers.

Breakdown of Gain or Loss by Source

Type of Risk Area	Gain (Loss) in Period* Totals ($ in Millions)	Gain (Loss) in Period* Percent of Beginning of Year Liabilities
Data Changes^	$ (4.5)	(1.8)%
Risks Related to Assumptions		
Economic Risk Areas:		
Pay Increases	(2.2)	(0.9)%
Investment Return (FVA)	(11.3)	(4.5)%
VPIF	0.0	0.0 %
Demographic Risk Areas:		
Full and Reduced Service Retirements	0.1	0.0 %
Death Benefits	(0.0)	0.0 %
Disability Benefits	(0.1)	0.0 %
Other Terminations	8.5	3.3 %
Post-Retirement Mortality	1.5	0.6 %
Other	0.0	0.0 %
Total Gain (or Loss) During Period (FVA)	$ (8.1)	(3.2)%

** Results are approximate due to limitations in data.*
^ Includes changes in service other than one year.

SECTION C

FIVE-YEAR FUNDED STATUS PROJECTIONS

Section 9.5, Fiscal Responsibility, of the Combined GRS Plan contains several provisions for adjusting contributions and/or benefits to be determined based on a 5-year projection of the funded status of the plan. This section calls for two different funded status projection tests:

- Section 9.5(1) test for the funded status falling below 100%; and
- Section 9.5(2) test for the funded status falling below 80%.

Section 9.5(2) specifically states that actions taken under Section 9.5(1)(a) should be reflected in the projections but that actions taken under Section 9.5(1)(b) and 9.5(1)(c) should be excluded in the projections. Section 9.5(3) specifies the interest rate to be used in the projections. Other assumptions used in the projections were adopted by the Board based on the recommendation of the Investment Committee and are included in the Funding Policy.

Results to Determine if VPIF May Be Awarded

5-Year Projection Assuming 6.75% Investment Return in all Future Years - No (0%) VPIF (COLA) Except for First Year

		A	B	C = (B/A)
Valuation Date June 30,	**Fiscal Year June 30,**	**Total AAL**	**Assets (Net of RSF)**	**Funded Ratio**
2023	2024	$ 253,413,292	$ 275,775,230	109%
2024	2025	290,039,743	317,517,082	109%
2025	2026	328,845,000	361,616,087	110%
2026	2027	370,024,711	408,550,045	110%
2027	2028	413,731,201	458,505,460	111%
2028	2029	460,160,981	511,715,422	**111%**

As shown above, the Funded Ratio is above 100% by the end of the 5-year projection period. According to Section 9.5(1), the Board is not prohibited from awarding the VPIF (to any retiree) since the Funded Ratio is above 100%.

Results to Determine if Remedial Action under Section 9.5(1) Shall Be Taken

Since the test to determine if a VPIF may be awarded results in a Funded Status above 100% by the end of the 5-year projection, the test required to determine if remedial actions under Section 9.5(1) shall be taken also results in a Funded Status above 100% by the end of the 5-year projection. **We believe this means that Board actions under Section 9.5(1)(b), and 9.5(1)(c) are not required.**

Results to Determine if Remedial Action under Section 9.5(2) Shall Be Taken

Since the test required to determine if remedial action under Section 9.5(1) shall be taken results in a Funded Status above 100% by the end of the 5-year projection, the test required to determine if remedial actions under Section 9.5(2) shall be taken also results in a Funded Status above 80% by the end of the 5-year projection. **We believe this means that Board actions under Section 9.5(2) are not required.**

History of VPIF Granted to Retirees

Plan Year beginning July 1 of	Actual*
(1)	(2)
2014	0.0%
2015	0.0%
2016	0.0%
2017	0.0%
2018	0.0%
2019	0.0%
2020	0.0%
2021	0.0%
2022	0.0%
2023	0.0%

** First increase could not be granted until July 1, 201*

Average VPIF	
Last five years	0.0%
Last three years	0.0%

Section 9.5 in its entirety is shown below:

Section 9.5 Fiscal Responsibility: Increased Funding Obligations and Benefit Reductions

(1) To safeguard the long-term actuarial and financial integrity of the Retirement System, in the event the funding level of Component I of the Retirement System projected over a five-year period falls below one hundred percent (100%), the following remedial action shall be required in the order set forth below, beginning with the Plan Year following the Plan Year in which such determination is made and continuing until the funding level is restored to not less than one hundred percent (100%):

(a) The Trustee may not award the variable pension improvement factor (escalator) described in Section 6.2 to any Retiree;
(b) All amounts credited to the Rate Stabilization Fund shall be transferred to the Pension Accumulation Fund for the purposes of funding benefits payable under Component I of the Retirement System; and
(c) Member Mandatory Employee Contributions shall be increased from four percent (4%) of Compensation to five percent (5%) of Compensation for up to the next following five Plan Years.

(2) In the event the funding level of Component I of the Retirement System determined as provided in Section 9.5(1) is projected to fall below eighty percent (80%), the following remedial action shall be required in the order set forth below, beginning with the Plan Year following the Plan Year in which such determination is made and continuing until the funding level is projected to be not less than eighty percent (80%) on a market value basis within the next five years:

(a) The remedial action required in Section 9.5(1) shall be implemented or continued;
(b) The Retirement Allowance payable to a Retiree shall not include the variable pension improvement factor (escalator) that was most recently added to the Retiree's Retirement Allowance for a Plan Year;
(c) Member Mandatory Employee Contributions shall be increased from five percent (5%) of Compensation to six percent (6%) of Compensation for up to the next following five Plan Years;
(d) The Retirement Allowance payable to a Retiree shall not include the variable pension improvement factor (escalator) that was most recently added to the Retiree's Retirement Allowance for the Plan Year preceding the Plan Year referenced in paragraph (b) above; and
(e) The Retirement Allowance accrued by Members for up to the next five Plan Year period shall be determined as provided in Section 6.1, except that one percent (1 %) shall be substituted for one and one-half percent (1.5%) wherever it appears in said Section 6.1.

In determining whether the eighty percent (80%) funding level under this Section 9.5(2) has been achieved, the Plan's Actuary shall calculate the funding percentage of the Retirement System after taking into account the elimination of the variable pension improvement factor (escalator) pursuant to Section 9.5(1)(a) but prior to taking into account the remedial steps provided in Sections 9.5(1)(b) and (c).

(3) For purposes of this Section 9.5, the "funding level" of Component I of the Retirement System shall mean the ratio of the market value of the assets of Component I of the Retirement System to the actuarial accrued liability of Component I of the Retirement System. The actuarial accrued liability shall be calculated by the Plan's Actuary utilizing an interest rate assumption of six and three-quarters percent (6.75%) and other reasonable assumptions as directed by the Board upon the recommendation of the Investment Committee. The market value of assets shall be determined on the basis of a three-year lookback period of smoothed investment returns.

SECTION D

FUND ASSETS

Statement of Plan Assets
(Assets at Market Value)

Item	June 30, 2023	June 30, 2022
A. Cash and Cash Equivalents	$ 89,112,213	$ 58,569,358
B. Investments at Fair Value	179,314,163	158,886,943
C. Receivables	5,487,506	2,775,516
D. Cash and Investments Held as Collateral for Securities Lending	7,325,738	8,023,839
E. Capital Assets - Net	3,049,750	3,425,327
F. Accounts Payable	(8,514,140)	(9,094,639)
G. Total Market Value of Assets Available for Benefits	$ 275,775,230	$ 222,586,344
H. Voluntary Member Contributions	39,938,095	34,143,974
I. Market Value Net of Voluntary Member Contributions	$ 235,837,135	$ 188,442,370

The above schedule shows results for the Hybrid (Component I) plan **only.** We understand that, for purposes of determining investment return, Hybrid and Legacy assets are comingled and that resulting investment return is prorated between the two plans proportionate to the total assets within each system.

Plan Assets by Fund and Division
(Assets at Market Value)

	June 30, 2023	June 30, 2022
Voluntary Employee Contribution		
General	$ 24,821,024	$ 21,068,071
D.O.T.	9,917,285	8,654,579
DWSD	4,897,486	4,154,636
Library	302,300	266,688
Totals	$ 39,938,095	$ 34,143,974
Annuity Reserve Fund		
General	$ 16,020	$ 69,546
D.O.T.	(7,344)	(2,781)
DWSD	45,029	55,063
Library	-	-
Totals	$ 53,705	$ 121,828
Pension Accumulation Fund		
General	$ 115,289,655	$ 87,572,531
D.O.T.	22,081,435	17,432,610
DWSD	20,754,802	16,368,727
Library	7,334,344	5,967,846
Totals	$ 165,460,236	$ 127,341,714
Mandatory Employee Contribution		
General	$ 49,593,484	$ 42,697,851
D.O.T.	8,189,823	7,133,134
DWSD	9,132,823	8,135,543
Library	3,407,064	3,012,300
Totals	$ 70,323,194	$ 60,978,828
Retirement System Totals	$ 275,775,230	$ 222,586,344

Reconciliation of Plan Assets

Item	June 30, 2023	June 30, 2022
A. Market Value of Assets at Beginning of Year	$ 222,586,344	$ 213,893,857
B. Revenues and Expenditures		
1. Contributions		
a. Member Contributions	$ 18,737,570	$ 16,110,403
b. Employer Contributions	15,126,876	15,689,188
c. State Contributions	0	0
d. Purchased Service Credit	0	0
e. Total	$ 33,864,446	$ 31,799,591
2. Investment Income		
a. Interest, Dividends, and Other Income	$ 5,485,299	$ 4,649,052
b. Net Realized and Unrealized Gains/(Losses)	8,515,526	(17,355,371)
c. Investment Expenses	(1,283,067)	(1,151,622)
d. Net Investment Income	$ 12,717,758	$ (13,857,941)
3. Benefits and Refunds		
a. Refunds	$ 5,197,344	$ 5,932,689
b. Regular Monthly Benefits	1,816,189	1,463,040
c. Partial Lump-Sum Benefits Paid	0	0
d. Other	0	0
e. Total	$ 7,013,533	$ 7,395,729
4. Administrative and Miscellaneous Expenses	$ 2,022,440	$ 1,894,415
5. Other	$ 15,642,655	$ 40,981
C. Market Value of Assets at End of Year	$ 275,775,230	$ 222,586,344

Reconciliation of Plan Assets by Fund

	Voluntary Employee Contribution Fund	Annuity Reserve Fund	Pension Accumulation Fund	Mandatory Employee Contribution Fund	Total Funds
Balance July 1, 2022	$ 34,143,974	$ 121,828	$ 127,341,714	$ 60,978,828	$ 222,586,344
Adjustment	-	-	-	-	-
Restated Balance July 1, 2022	34,143,974	121,828	127,341,714	60,978,828	222,586,344
Revenues					
Member contributions	6,588,107	-	-	12,149,463	18,737,570
Employer contributions	-	-	15,126,876	-	15,126,876
Other	-	-	15,642,655	-	15,642,655
Transfer In	38,439	-	-	-	38,439
Recognized investment income	1,559,822	-	11,157,936	-	12,717,758
Total	$ 8,186,368	$ -	$ 41,927,467	$ 12,149,463	$ 62,263,298
Expenditures					
Benefit payments	-	68,123	1,748,066	-	1,816,189
Refund of member contributions	2,392,247	-	-	2,805,097	5,197,344
Transfer out	-	-	38,439	-	38,439
Administrative expenses	-	-	2,022,440	-	2,022,440
Total	$ 2,392,247	$ 68,123	$ 3,808,945	$ 2,805,097	$ 9,074,412
Balance, June 30, 2023	$ 39,938,095	$ 53,705	$ 165,460,236	$ 70,323,194	$ 275,775,230
Market Value Rate of Return	4.30%	0.0%	7.92%	0.0%	5.24%
Funding Value Rate of Return					2.43%

Reconciliation of Plan Assets by Group

	General City	DOT	DWSD	Library	Total
Balance July 1, 2022	$ 151,407,999	$ 33,217,542	$ 28,713,969	$ 9,246,834	$ 222,586,344
Adjustment	-	-	-	-	-
Restated Balance July 1, 2022	151,407,999	33,217,542	28,713,969	9,246,834	222,586,344
Revenues					
Member contributions	13,919,563	2,465,564	1,864,334	488,109	18,737,570
Employer contributions	11,349,488	1,624,527	1,617,301	535,560	15,126,876
Other	10,640,469	2,334,422	2,017,926	649,838	15,642,655
Transfer In	419,395	(317,025)	(122,305)	(18,504)	(38,439)
Recognized investment income	8,519,380	2,078,858	1,643,499	476,020	12,717,757
Total	$ 44,848,295	$ 8,186,346	$ 7,020,755	$ 2,131,023	$ 62,186,419
Expenditures					
Benefit payments	959,916	360,992	315,371	179,909	1,816,188
Refund of member contributions	3,781,095	876,902	450,621	88,726	5,197,344
Transfer out	419,395	(317,025)	(122,305)	(18,504)	(38,439)
Administrative expenses	1,375,706	301,818	260,898	84,018	2,022,440
Total	$ 6,536,112	$ 1,222,687	$ 904,585	$ 334,149	$ 8,997,533
Balance, June 30, 2023	$ 189,720,182	$ 40,181,201	$ 34,830,139	$ 11,043,708	$ 275,775,230
Market Value Rate of Return	5.12%	5.83%	5.31%	4.80%	5.24%
Funding Value Rate of Return					2.43%

Funding Value of Assets

	2021	2022	2023	2024	2025
A. Funding Value Beginning of Year	$ 152,560,705	$ 213,893,857	$ 241,929,337		
B. Market Value End of Year	213,893,857	222,586,344	275,775,230		
C. Market Value Beginning of Year	152,560,705	213,893,857	222,586,344		
D. Contributions During Year:					
D1. City Contributions	11,690,984	15,689,188	15,126,876		
D2. Member Contributions	14,517,267	16,110,403	18,737,570		
D3. Other	-	-	15,642,655		
D4. Total	26,208,251	31,799,591	49,507,101		
E. Disbursements:					
E1. Benefits Paid During Year	986,731	1,463,040	1,816,189		
E2. Refunds	4,131,674	5,932,689	5,197,344		
E3. Transfers	-	-	-		
E4. Administrative Expenses*	N/A	1,894,415	2,022,440		
E5. Total	5,118,405	9,290,144	9,035,973		
F. Investment Income:					
F1. Average Funding Value	157,260,136	225,148,581	262,164,901		
F2. Assumed Rate	6.75%	6.75%	6.75%		
F3. Amount for Immediate Recognition: F1 X F2		15,197,529	17,696,131		
F4. Market Total: B - C - D4 + E5	40,243,306	(13,816,960)	12,717,758		
F5. Amount for Phased-In Recognition: F4-F3		(29,014,489)	(4,978,373)		
G. Phased-In Recognition of Investment Income:					
G1. Current Year: F5/3		(9,671,496)	(1,659,458)		
G2. 1st Prior Year		-	(9,671,496)	$ (1,659,458)	
G3. 2nd Prior Year		-	-	(9,671,497)	$ (1,659,457)
G4. Total Recognized Investment Gain		(9,671,496)	(11,330,954)	(11,330,955)	(1,659,457)
H. Total Interest Distributed - Current Year: F3 + G4	40,243,306	5,526,033	6,365,177		
I. Funding Value End of Year:					
I1. Preliminary Funding Value End of Year: A + D4 - E5 + H		241,929,337	288,765,642		
I2. Upper Corridor Limit 115% x B		255,974,296	317,141,515		
I3. Lower Corridor Limit 85% x B		189,198,392	234,408,946		
I4. **Funding Value End of Year**	**$ 213,893,857**	**$ 241,929,337**	**$ 288,765,642**		
J. Difference Between Market & Funding Value: B - I4	-	(19,342,993)	(12,990,412)		
K. Recognized Rate of Return: H / F1	25.59%	2.45%	2.43%		
L. Market Rate of Return: F4 /(C+(D4-E5/2)	25.59%	(6.14)%	5.24%		
M. Ratio of Funding Value to Market Value: I4 / B	100.00%	108.69%	104.71%		

The Funding Value of Assets recognizes assumed investment income (line F3) fully each year. Differences between actual and assumed investment income (line F5) are phased-in over a closed 3-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 intended to be unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value.

SECTION E

PARTICIPANT DATA

Data Approximations and Assumptions

As part of our review of the data received from the System, we discussed questionable or missing data with System staff and developed approximations and assumptions in order to perform the valuation. We provided System staff with a letter dated December 13, 2023 with additional information regarding data reconciliation, processing instructions, and assumptions regarding unresolved issues. Note, that letter disclosed our remaining data processing procedures and assumptions and details our reconciliation and final valuation data.

The purpose of this section in this report is to summarize any unresolved concerns about questionable data that are relevant and could have a significant effect on the valuation as disclosed in that letter. This summary also discusses any significant steps we have taken to improve the data due to identifying questionable data values or relationships, significant judgments, or assumptions we have applied to the data.

Active

These records are reported in the Access data file in the table titled GC_Benefits_Hybrid. Information from the Legacy active file (service) is appended to this file.

Deferred Vested

These records are reported in the Access data file in the table titled GC_Benefits_Vested_Hybrid. However, the file appeared to be incomplete. As a result, we used prior years data for individuals that are retired under Legacy, not in the Hybrid data, and have not refunded. Information from the Legacy inactive file (Legacy service) is appended to the Hybrid file.

Retired and Beneficiary

These records are reported in the Access data file in the table titled Retired_Life. This file is used in conjunction with information from the Master file (class code and agency). Note, General and P/F members are both reported in this table. Adjustments/assumptions include:

- In cases where the benefit is identified to be a joint and survivor benefit and a beneficiary is not listed in the data, it was assumed that male spouses were 3 years older than females; and
- Benefits for dependent children are assumed to cease at age 21.

Reconciliation of Raw Data as of June 30, 2023

Actives

A) Count reported on file	5,390
B) Deferreds - "AnnSt" = "F"	-
C) Non-active status	(32)
D) Agency "88"	-
E) Non-eligible class code & bargaining unit	-
F) Hired after val date	(13)
G) No date of hire on file	-
H) No salary on file	(12)
I) Actives	5,333

Retired

A) Number of records reported on data file	46,487
B) Number of records in P/F plan	(17,339)
C) Records not currently in receipt of benefits based on reported status codes	(17,673)
D) Coded as Legacy records	(10,792)
E) Number of records valued	683

Deferred

A) Number of records reported on data file	1,212
B) Retired (normal or early) in Legacy post 6/30/14 but not in Hybrid retiree file. Also has non-zero contribution balance	344
C) Deceased	-
D) Zero hybrid service	(165)
E) Less than 10 years of vesting service	(185)
F) Zero mandatory contribution balance	(333)
G) Terminated before 6/30/2014	(43)
H) Number of records to value	830

Notes:

In addition to the above, we have included liabilities for 79 members that were reported as Component II (Legacy) duty disabilities. These members were less than age 62 and did not have a corresponding Component I (Hybrid) record. They have all either not converted in Legacy or converted to Legacy after June 30, 2018.

Active Row C: The Active data file contains a field titled “Stat.” Active members were only valued if the record for this field had a value of “1.”

Active Row D: Agency “88” is the 36th District Court. We understand that members in that agency are not eligible to receive benefits.

Active Row E: For both this valuation and the prior valuation, we have received a separate list of Class Codes and Bargaining Units that are not eligible to receive benefits.

Retired Row C: The Retired Life file has a field named “STATUS.” We understand that if this field is not blank or equal to zero, the member is no longer receiving a benefit and should not be valued.

Deferred Row E: Service provided in the data file is benefit service. Vesting service was determined by taking service in the Legacy inactive file.

Deferred Row F: Assumed to have refunded and forfeited Hybrid defined benefit.

Reconciliation of Year-to-Year Data

	Active		Term.	Leg. Disab.	Retirees		Totals
	Count	Pay	Count	Count	Count	Annual Benefits	Count
2022	**4,841**	**$284,435,666**	**957**	**94**	**598**	**$1,513,513**	6,490
Change in Pay/Pensions	N/A	14,852,375	N/A	N/A	N/A	(100,309)	
New	1,328	65,925,810					1,328
New Beneficiary					5	16,156	5
Retired	(50)	(2,837,271)	(39)	-	95	425,498	6
Non-Duty Disabled					-	-	-
Duty Disabled			(1)		1	1,202	-
Assumed Death/Removals			(98)	(15)	(12)	(27,866)	(125)
Vested Terminated	(115)	(6,022,472)	56				(59)
Non-Vested Terminated	(717)	(35,474,200)					(717)
Rehired	46	2,277,808	(45)	-	(1)	(6,362)	-
Data Adjustment	-	-	-	-	(3)	(9,547)	(3)
2023	**5,333**	**$323,157,716**	**830**	**79**	**683**	**$1,812,284**	**6,925**

Notable Data Changes:

The 79 Legacy Disabled members are those that were reported as Component ll (Legacy) duty disabilities. These members were less than age 62 and did not have a corresponding Component l (Hybrid) record. They have all either not converted in Legacy or converted to Legacy after June 30, 2018

59 Active Vested terminations were not reported on the Terminated Vested file. We have assumed these members refunded and forfeited their defined benefit.

98 Terminated Vested members were valued last year but will not be valued this year. We have assumed these members refunded and forfeited their defined benefit.

The data adjustments relate to records where we could not specifically identify the activity during the year.

Summary of Member Data
June 30, 2023

Active Members

	General	D.O.T.	DWSD	Library	Totals
Number	3,820	730	549	234	5,333
% Change in active members from prior year	7.5 %	14.8 %	16.8 %	29.3 %	10.2 %
Annual payroll ($ millions)	$ 242.4	$ 34.7	$ 33.4	$ 12.5	$ 323.2
Average pay	$63,466	$47,596	$60,923	$53,533	$ 60,596
% Change in average pay from prior year	4.4 %	0.6 %	1.0 %	(3.1)%	3.1 %
Average age	46.8	49.4	48.7	51.1	47.5
Average eligibility service	8.5	10.9	11.4	15.5	9.5

Retired Members

	General	D.O.T.	DWSD	Library	Totals
Number	305	120	198	60	683
Annual benefits including annuities as reported	$990,081	$344,007	$346,657	$199,921	$1,880,666
Average benefits as reported	$ 3,246	$ 2,867	$ 1,751	$ 3,332	$ 2,754
% Change in average benefit	1.3 %	(3.6)%	17.8 %	20.1 %	5.0 %

*Inactive Members**

	General	D.O.T.	DWSD	Library	Totals
Number	306	134	344	46	830
Average FAC	$ 38,976	$ 35,387	$ 44,359	$38,881	$ 40,622
Average service	2.8	3.2	1.7	3.4	2.5
Annual benefits (estimated)	$642,927	$267,126	$421,497	$103,789	$1,435,339
Average benefits (estimated)	$ 2,101	$ 1,993	$ 1,225	$ 2,256	$ 1,729
% Change in average service	(10.9)%	(3.9)%	(3.5)%	(8.8)%	(8.0)%
% Change in average FAC	(2.8)%	(5.9)%	(0.8)%	(9.5)%	(2.5)%

*Legacy Disabled Members**

	General	D.O.T.	DWSD	Library	Totals
Number	39	13	27	0	79
Annual benefits (estimated)	$337,309	$96,936	$241,068	$ 0	$675,313
Average benefits (estimated)	$ 8,649	$ 7,457	$ 8,928	N/A	$ 8,548
% Change in average benefit	9.5 %	7.9 %	1.2 %	N/A	6.6 %

** Benefits unavailable. Benefits were estimated using AFC and service projected from 2014 to conversion age.*

Active Members as of June 30, 2023
by Attained Age and Years of Service
Retirement System Totals

Attained Age	Years of Service to Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	Totals No.	Valuation Payroll
Under 20	25							25	$ 798,281
20-24	148	0						148	5,449,481
25-29	336	22	0					358	17,723,251
30-34	460	87	2	1				550	30,776,526
35-39	361	120	15	11	0			507	30,584,230
40-44	309	101	28	30	25	0		493	29,311,493
45-49	314	125	29	55	72	23	0	618	38,493,954
50-54	288	142	33	54	132	98	18	765	48,139,429
55-59	251	130	33	49	130	154	79	826	53,284,871
60-64	163	108	37	39	78	88	142	655	41,896,195
65-69	61	68	17	18	26	30	54	274	18,545,658
70-74	28	19	7	6	6	8	14	88	6,488,946
75-79	6	3	3	3	4	2	5	26	1,665,401
Totals	**2,750**	**925**	**204**	**266**	**473**	**403**	**312**	**5,333**	**$323,157,716**

Historical Summary of Active Member Data

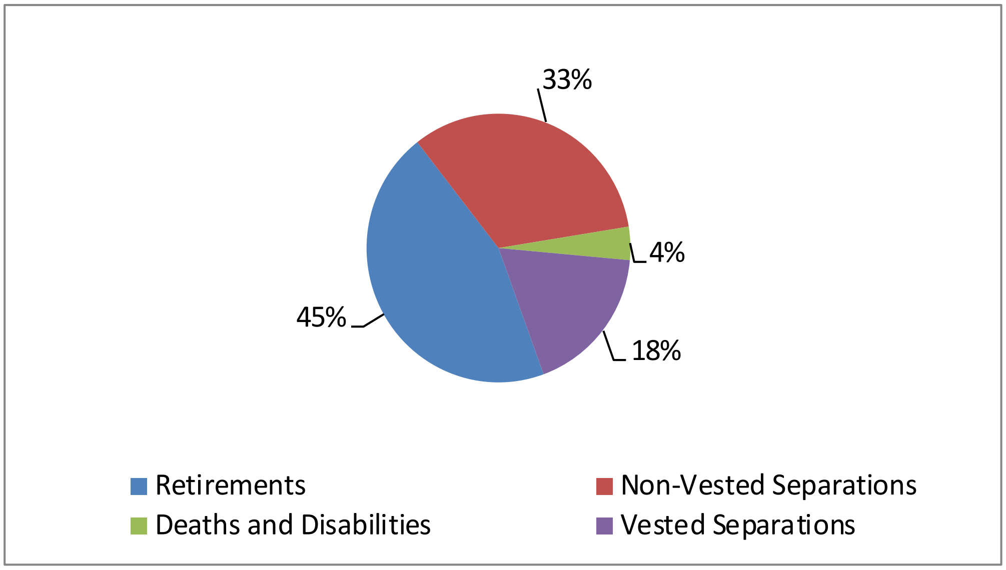
Valuation	Active Members		Covered Payroll		Average Salary		Average		
Date	No.	% Increase	$ Amount	% Increase	$ Amount	% Increase	Age	Service	Entry Age
2014#	4,881	N/A	$ 203,507,079	N/A	$ 41,694	N/A	49.2	16.0	33.2
2015	4,981	2.0%	199,135,119	(2.1)%	39,979	(4.1)%	48.6	15.3	33.3
2016	4,235	(15.0)%	169,014,411	(15.1)%	39,909	(0.2)%	47.7	13.1	34.6
2017	5,117	20.8%	229,954,351	36.1%	44,939	12.6%	46.4	11.3	35.1
2018	5,629	10.0%	263,291,986	14.5%	46,774	4.1%	45.9	10.6	35.3
2019	5,794	2.9%	280,105,756	6.4%	48,344	3.4%	45.9	10.3	35.6
2020	5,106	(11.9)%	271,410,800	(3.1)%	53,155	10.0%	47.5	11.1	36.4
2021	4,715	(7.7)%	266,986,666	(1.6)%	56,625	6.5%	48.3	11.4	36.9
2022	4,841	2.7%	284,435,666	6.5%	58,756	3.8%	47.4	10.1	37.3
2023	5,333	10.2%	323,157,716	13.6%	60,596	3.1%	47.5	9.5	38.0

\# *Payroll shown for 2014 is based on payroll reported for Component II (Legacy Plan). Covered Payroll information under Component I payroll definitions was not available. 2014 Valuation results were adjusted to estimate the difference between the Component I and Component II Covered Pay.*

Summary of Membership Data by Category

	June 30, 2023	June 30, 2022
Active Members		
Number	5,333	4,841
Average age (years)	47.5	47.4
Average service (years)	9.5	10.1
Average salary	$60,596	$58,756
Total payroll supplied, annualized	$323,157,716	$284,435,666
Vested Inactive Members		
Number	830	957
Average age (years)	57.7	57.2
Total calculated deferred benefits ($ millions)	$1.4	$1.8
Average annual deferred benefit (estimated)	$1,729	$1,895
Service Retirees		
Number	666	586
Average age (years)	68.6	67.1
Total annual benefits ($ millions) (excluding annuities)	$1.8	$1.5
Average annual benefit (estimated) (excluding annuities)	$2,705	$2,535
Disability Retirees		
Number	1	1
Average age (years)	62.1	64.4
Total annual benefits ($ millions) (excluding annuities)	$0.0	$0.0
Average annual benefit (estimated) (excluding annuities)	$1,202	$3,762
Beneficiaries (Including death-in-service)		
Number	16	11
Average age (years)	25.0	67.8
Total annual benefits ($ millions) (excluding annuities)	$0.0	$0.0
Average annual benefit (estimated) (excluding annuities)	$2,538	$2,222
Legacy Disability Retirees		
Number	79	94
Average age (years)	56.6	56.4
Total annual benefits ($ millions) (estimated)	$0.7	$0.8
Average annual benefit (estimated)	$8,548	$8,017

Expected Terminations from Active Employment for Current Active Members



The chart above shows the expected future development of the present population in simplified terms. The Retirement System presently covers 5,333 active members. Eventually, 1,752 people are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 3,372 people are expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. 209 people are expected to incur death-in-service or disability benefits. Vested Separations may include members eligible to retire in the Component II (Legacy) plan but not yet eligible to retire in this Component I (Hybrid) plan. A detailed discussion on how members eligible to retire in Component II (Legacy) but not eligible to retire in Component I (Hybrid) are treated is included in Section F of this report.

SECTION F

METHODS AND ASSUMPTIONS

Summary of Assumptions and Methods Used for Actuarial Valuations Adopted by Board of Trustees

Funding Methods

The entry age actuarial cost method was used in determining liabilities and normal cost as prescribed by Section 9.3(1) of the Combined GRS Plan. Under this method, each individual's normal cost is determined as a level percent of pay based on a replacement life normal cost. Normal cost for each member is based on the Component I benefits and eligibilities applicable to that member and is determined to be the level percent of payroll from hire date to the age of last decrement necessary to fund the benefits. This method is based on the objective of the plan to separately fund Transition Cost and future accruals. The application of this method differs for funding and accounting.

A Level Percent of Payroll amortization method shall be used to systematically eliminate (pay off) the Unfunded Actuarial Accrued Liability (UAAL) over a closed 15-year period from the later of July 1, 2023 or the applicable fiscal year after the funded status falls below 100%.

Summary of Assumptions and Methods Used for Actuarial Valuations Adopted by Board of Trustees

All demographic assumptions are estimates of future experience except as noted. The rationale for the assumptions is based on experience studies where noted.

Economic Assumptions

Actuarial Assumptions
The assumptions and methods are those adopted by the Board with the exception of the discount rate. For purposes of plan funding, the discount rate is 6.75% as prescribed by Section 1.16(3) of the Combined GRS Plan.

The investment return rate used was 6.75% per year, compounded annually (net after investment expenses). This assumption is prescribed by the Eighth Amended Plan for the Adjustment of Debts of the City of Detroit (POA).

Pay increase assumptions for individual active members are shown on the following pages. Part of the assumption for each age is for a merit and/or seniority increase, and the other recognizes wage inflation.

Wage inflation is assumed to be 3.0% per year. The rationale is based on the 2015-2020 Experience Study.

Price inflation is not directly used in the valuation. For purposes of assessing the reasonableness of the assumed rate of return, we assumed a price inflation of 2.50% per year. The rationale is based on the 2015-2020 Experience Study.

Administrative expenses are assumed to be 0.59% of payroll. The rationale is based on the 2015-2020 Experience Study.

Non-Economic Assumptions

The mortality table used to measure healthy retiree mortality was the PubG-2010(B) Below-Median General mortality table decreased by 3% for males and increased 26% for females for healthy retirees. For disabled retiree mortality PubNS-2010 Non-Safety Disabled Retiree table increased by 4% for males and decreased 2% for females was used for disabled retiree. Pre-retirement mortality is based on the PubG-2010(B) Below-Median General Employee mortality table with no adjustments. 25% of the pre-retirement mortality was assumed to be duty-related. The tables are projected to be fully generational, based on the 2-dimensional, sex distinct mortality improvement scale MP-2021 (which was intended to be used with Pub-2010). The rationale is based on the 2015-2020 Experience Study.

The probabilities of retirement for members eligible to retire are shown on the following pages. The rationale is based on the 2015-2020 Experience Study.

The probabilities of separation from service (excluding *death-in-service* and including *disability*) are shown for sample ages on the following pages. The rationale is based on the 2015-2020 Experience Study.

Sample Salary Adjustment Rates

Sample Ages	Salary Increase Assumptions for an Individual Member: Merit & Seniority	Wage (Economic)	Increase Next Year
20	4.9%	3.0%	7.9%
25	4.9%	3.0%	7.9%
30	4.1%	3.0%	7.1%
35	3.0%	3.0%	6.0%
40	2.3%	3.0%	5.3%
45	1.8%	3.0%	4.8%
50	1.0%	3.0%	4.0%
55	0.2%	3.0%	3.2%
60	0.0%	3.0%	3.0%
Ref	572		

The rationale is based on the 2015-2020 Experience Study.

Single Life Retirement Values

Based on PubG-2010(B) Below-Median General
97% of Male Rates / 126% of Female Rates
Using Projection Scale MP-2021

Sample Attained Ages in 2023	Future Life Expectancy (Years): Men	Women
45	37.66	40.13
50	32.73	35.07
55	28.35	30.48
60	24.11	25.96
65	19.99	21.49
70	16.01	17.15
75	12.36	13.14
80	9.15	9.59

Probabilities of Age/Service Retirement

Retirement Ages	Percent of Eligible Active Members Retiring within Next Year with Unreduced Benefits: E.M.S.	D.O.T.	Others
62	40%	20%	20%
63	40%	20%	20%
64	40%	20%	20%
65	40%	20%	20%
66	40%	20%	20%
67	40%	30%	20%
68	40%	30%	20%
69	40%	30%	20%
70	100%	100%	20%
71	100%	100%	20%
72	100%	100%	20%
73	100%	100%	20%
74	100%	100%	20%
75	100%	100%	20%
76	100%	100%	20%
77	100%	100%	20%
78	100%	100%	20%
79	100%	100%	20%
80	100%	100%	100%
Ref	2160	3304	3305

All members are assumed to retire while eligible for Component I (Hybrid) retirement only.

The rationale is based on the 2015-2020 Experience Study.

Probabilities of Early Retirement for Members Eligible for Early Retirement

Retirement Ages	Percent of Eligible Active Members Retiring within Next Year with Reduced Benefits
55	6.5%
56	6.5%
57	6.5%
58	7.5%
59	8.5%
60	9.5%
61	9.5%
62	9.5%
Ref	3303

All members are assumed to retire while eligible for Component I (Hybrid) retirement only.

The rationale is based on the 2015-2020 Experience Study.

Sample Rates of Separation from Active Employment before Retirement

Sample Ages	Years of Service	% of Active Members Separating within Next Year — Withdrawal: E.M.S.	D.O.T.	Others: Men	Others: Women
ALL	0	16.00%	28.00%	28.00%	28.00%
	1	15.00%	19.00%	19.00%	19.00%
	2	15.00%	15.00%	15.00%	15.00%
	3	11.00%	14.00%	14.00%	14.00%
	4	11.00%	14.00%	14.00%	14.00%
25	5 & Over	10.05%	13.00%	13.00%	13.00%
30		8.85%	11.91%	11.91%	11.91%
35		7.80%	9.25%	9.25%	9.25%
40		6.60%	7.19%	7.19%	7.19%
45		5.10%	5.91%	5.91%	5.91%
50		3.60%	5.00%	5.00%	5.00%
55		3.00%	5.00%	5.00%	5.00%
60		3.00%	5.00%	5.00%	5.00%
Ref		1405	1406	1406	1406
		1608	1609	1609 x 1	1609 x 1

Sample Ages	% of Active Members Becoming Disabled within Next Year — D.O.T.: Ordinary	D.O.T.: Duty	Others: Ordinary	Others: Duty
25	0.16%	0.24%	0.03%	0.03%
30	0.19%	0.28%	0.04%	0.04%
35	0.26%	0.39%	0.05%	0.05%
40	0.37%	0.56%	0.08%	0.08%
45	0.56%	0.84%	0.12%	0.12%
50	0.70%	1.05%	0.15%	0.15%
55	0.82%	1.23%	0.17%	0.17%
60	0.94%	1.41%	0.20%	0.20%
Ref	1238 x 1.20	1238 x 1.80	1238 x 0.25	1238 x 0.25

The rationale is based on the 2015-2020 Experience Study.

Miscellaneous and Technical Assumptions

Administrative Expenses	Administrative expenses are assumed to be 0.59% of payroll and are to be included in the employer contribution.
Average Final Compensation (AFC)	AFC is estimated by assuming the payroll provided in the valuation will increase at the pay-increase rate. We understand that the payroll provided for the valuation is consistent with the definition of AFC.
Benefit Service	Exact Fractional service is used to determine the amount of benefit payable.
Data Adjustments	Assumptions regarding incomplete or missing data are reviewed annually with the System and adjusted as directed by the System.
Decrement Operation	Disability and mortality decrements do not operate during the first five years of service. Disability and withdrawal do not operate during 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.
Deferred Vested Benefit Commencement Age	Members are assumed to commence benefits at the age in which they are first eligible for unreduced benefits.
Disability Benefits	Duty Disability benefits were increased by 27% to account for the Death While Disabled provision.
Eligibility Testing	Eligibility for benefits is determined based upon the age nearest birthday and rounded service on the date the decrement is assumed to occur.
Forfeiture Assumption	It is assumed that 0% of members will elect to forfeit their benefit.
Incidence of Contributions	Employer contributions are assumed to occur on a bi-weekly basis.

Miscellaneous and Technical Assumptions

IRC Section 401(a)(17) Limit All of the member salary provided falls below the 401(a)(17) limit. The limit is assumed to grow with wage inflation.

IRC Section 401(h) Limit We did not test for the 401(h) limit on employer contributions for medical benefits. No employer contributions are anticipated in this valuation.

IRC Section 415 Limit No adjustments have been made for 415 limits. The limit is assumed to grow with wage inflation.

Marriage Assumption 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes.

New Entrant Assumption New entrants are assumed to replace the current workforce as members separate from service under current valuation assumptions. Total payroll is expected to grow with wage inflation.

Normal Form of Benefit Straight life is the normal form of benefit.

No adjustments have been made for Actuarial Equivalent benefits. The Board adopted assumptions for Actuarial Equivalence to be an 80%/20% unisex blend of RP-2014 mortality (Male/Female) with Blue Collar Adjustment, set ahead one year for males and females, projected 11 years with MP-2014, an interest rate of 6.75%, and a 0.5% simple COLA starting the later of one year after retirement or age 62 for optional forms of payment and early retirement reduction. Assumptions for annuitizing member contributions are the same except for using a 60%/40% unisex blend, a 5.25% assumed rate of interest, and no COLA. Prior to the use of these factors, actuarial equivalent factors were based on 7.5% interest and the 1984 Group Annuity Mortality table.

Pay Increase Timing End of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts to be paid to members during the year starting on the valuation date.

Pop-Up Benefits For current retirees with a pop-up benefit, the value of the pop-up was estimated by valuing a non-pop-up option and increasing the associated liabilities by 2%.

Post-Retirement COLA / Variable Pension Improvement Factor (VPIF) The valuation assumption is that on average future COLA's will be 2.0%. Unless otherwise stated, all costs shown in this report are based on a 2.0% VPIF. Transition Costs are based on a 0.0% VPIF.

Miscellaneous and Technical Assumptions

Service Credit Accruals	Service accruals for calculating benefits end as of June 30, 2014 for Component II (Legacy) and begin as of June 30, 2014 for Component I (Hybrid). However, service in Component I (Hybrid) and Component II (Legacy) may be used to satisfy benefit eligibility requirements in both plans.
Voluntary Employee Contribution Fund Interest Credits	For purposes of determining the plan's funded status, Voluntary Employee Contributions are included in both the assets and the liabilities of the plan. For the valuation, future voluntary contributions will be reflected in future valuations as they occur. With exception of the Section 9.5 projection, no adjustments have been made to reflect future interest crediting to voluntary contributions.
Workers Compensation	Workers compensation for duty death-in-service benefits was assumed to equally offset the 10% AFC minimum benefit.

The rationale for the miscellaneous and technical assumptions is based on the 2015-2020 Experience Study, modified as necessary for changes in data or administration.

SECTION G

PLAN PROVISION SUMMARY (AS APPROVED BY STAFF)

City of Detroit General Retirement System
Summary of Component I Benefit Provisions Evaluated

Plan Year

The Plan Year is the 12-month period commencing on July 1, and ending on June 30. The first plan year starts July 1, 2014.

Full Time Employees

Full-Time Employees are individuals who are required to work 600 hours per year. Part-time transit operators working 25 hours per week are not full-time employees. Special Service Operators are required to work 1,440 hours per year. However, once a Special Service Operator meets the requirement in any year, he or she is deemed to meet it in all future years.

Plan Membership

The membership of the Retirement System shall consist of all persons who are Full-Time Employees of the City of Detroit except persons who are members of the Police and Fire Retirement System of the City of Detroit and those individuals who are active members in any other public employee pension plan adopted by either the State of Michigan (other than the Michigan National Guard), or any other political subdivision of the State of Michigan.

Service Credit

Credited Service: A member is credited with one month of Credited Service for each calendar month in which the individual performs 140 hours or more of service for the employer as an employee. Credited Service is recorded from the later of July 1, 2014, or the date of hire, whichever is later.

Prior Service: Refers to service credit awarded to a member prior to July 1, 2014 under the terms of the Retirement System in effect on June 30, 2014.

Vesting Service: A member is credited with a year of vesting service for each Plan Year commencing on or after July 1, 2014 during which the member performs 1,000 or more hours of work for the employer. Prior Service, as defined above, is also Vesting Service.

Military Service: A member who enters the military while employed by the City and returns to employment with the City following military service receives service credit in the Retirement System for the military service time as though there had been no interruption of employment. In order to receive such service credit, the individual must pay contributions to the Retirement System for the military service time upon return to employment.

City of Detroit General Retirement System
Summary of Component I Benefit Provisions Evaluated

Average Final Compensation

Compensation: Compensation is base salary or wages, excluding bonuses, overtime pay, payment of unused accrued sick leave, longevity pay, payment for unused accrued vacation, the cost or value of fringe benefits, termination or severance pay, reimbursement of expenses or other extra payment of any kind. Compensation includes deferred compensation and “picked up” employee contributions to the Retirement System. Compensation is limited by IRC Section 401(a)(17).

Average Final Compensation: The average of the compensation received during the 10 consecutive years of Credited Service (including Prior Service) immediately preceding the date of the members last termination with the employer. If the member has less than ten years of Credited Service (including Prior Service), the Average Final Compensation is the average of the compensation received during all years of Credited Service.

Normal Retirement

Normal Retirement Age: The Normal Retirement Age is 62. For individuals who were active employees and who had 10 or more years of Vesting Service as of June 30, 2014 the normal retirement age is reduced as follows.

Age as of July 1, 2014	Normal Retirement Age
52 years or younger	62 Years
53 years	61 years and 9 months
54 years	61 years and 6 months
55 years	61 years and 3 months
56 years	61 years
57 years	60 years and 9 months
58 years	60 years and 6 months
59 years	60 years and 3 months
60 years	60 years
61 years	60 years

Normal Retirement Date: The later of 10 years of Vesting Service and attainment of Normal Retirement Age.

Normal Retirement Amount: The retirement allowance payable to a member who retires on or after the normal retirement date is 1.5% times Average Final Compensation times Credited Service (after June 30, 2014) measured to the nearest month.

Early Retirement

Eligibility: Age 55 with 30 or more years of credited service plus prior service.

Early Retirement Amount: The early retirement amount is the Actuarial Equivalent of the deferred retirement allowance that would be payable to the member on the Normal Retirement Date, assuming that the member terminated employment on the early retirement date.

City of Detroit General Retirement System
Summary of Component I Benefit Provisions Evaluated

Deferred Retirement (Vested Benefit)

Eligibility: 10 years of Vesting Service.

Benefit Commencement: *A*ge 62.

Annual Amount: Same as Normal Retirement but based on Average Final Compensation and Credited Service at the time of termination.

Disability Retirement

Eligibility: The individual must be eligible for long-term disability benefits under a policy or plan of insurance or self-insurance maintained by the employer.

Amount: The Normal Retirement Allowance payable at Age 62. For members disabled in the line of duty, credited service accrues while a member is entitled to receive long-term disability under the employer's plan or policy.

Accidental (Line of Duty) Death before Retirement

Eligibility: Death resulting directly from performance of duty in the service of the employer or as a result of illness contracted or injuries received while in the service of the employer.

Amount: The surviving spouse is eligible to receive a monthly amount equal to the member's Retirement Allowance at time of death (minimum 10% of Average Final Compensation), unreduced for early payment, and payable until the surviving Spouse's death. Amounts payable from Worker's Comp or similar programs are offset against the amount payable to the spouse.

Ordinary (Other than Line of Duty) Death before Retirement

Eligibility: 10 or more years of credited service (or death during disability, but prior to commencement of the retirement allowance). The individual must be employed by the employer at time of death.

Amount: The Surviving Spouse shall receive a retirement allowance computed as though the member had retired the day before death, notwithstanding that the death was prior to the normal retirement date, elected the Joint and 100% Option in favor of the spouse, and then died. Amounts payable from Worker's Comp or similar programs are offset against the amount payable to the spouse.

City of Detroit General Retirement System
Summary of Component I Benefit Provisions Evaluated

Refund of Mandatory Contributions

A member who ceases to be an employee for reasons other than death, or disability, may elect to receive a refund of mandatory Accumulated Contributions (without interest) in lieu of any other Component I benefit payable. In the case of a member who dies while employed by the City, or following termination of employment with the City, if no Surviving Spouse benefit is payable, the accumulated mandatory Employee Contributions (without interest) are paid to the member's estate.

Variable Pension Improvement Factor (VPIF Escalator)

Eligibility: Attainment of at least Age 62, and in receipt of a retirement allowance for at least 12 months as of the first day of the Plan Year.

Amount: Beginning July 1, 2018 and effective the first date of each Plan year thereafter, the Board may determine that a retiree's Component I Retirement Allowance shall be increased by 2% of the original retirement allowance. The VPIF Escalator may not be awarded in the event that the funding level of Component I of the Retirement System projected over a 5-year period falls below 100%. The VPIF escalator is not compounded.

Contributions

Members: 4% of Compensation. Member contributions are "picked up" in accordance with IRC 414(h).

Employers: 5% of Compensation commencing July 1, 2014 and ending June 30, 2023, to be split between the Pension Accumulation Fund and the Rate Stabilization reserve. For Plan years beginning July 1, 2023 and later, contributions shall be determined by an Actuary using reasonable and appropriate assumptions approved by the Board and the Investment Committee.

Voluntary Employee Contributions

Eligibility: Non-union member, or union member with Coverage by a collective bargaining agreement that permits the member to make Voluntary Employee Contributions to Component I.

Amount: 3%, 5%, or 7% of compensation at the election of the member. All voluntary employee contributions are made on an after-tax basis.

Earnings Crediting: Each Plan Year, accounts are credited with earnings at a rate equal to the net investment rate of return of Retirement System Assets for the second Plan Year immediately preceding the Plan Year in which earnings are to be credited. The earnings rate may not be less than 0% and may not exceed 5.25%.

Distribution: Upon termination of employment, accounts may be distributed in a lump sum, in equal monthly installments for a period not exceeding three years, or, at the option of the member, in the form of an actuarially equivalent life annuity payable in the same form as and added to the member's Retirement Allowance. The determination of actuarial equivalent for this purpose is based upon market rates of investment return and other market-related assumptions. In the case of a member who dies before receiving a distribution of his or her voluntary account, the value of the account is payable to the nominated beneficiary, or to the estate.

Forms of Payment

Normal Form of Payment: The normal form of payment is a straight life allowance with no death benefit, and, in particular, no residual refund of mandatory employee contributions. Until the date the first Retirement Allowance payment check is issued, any Member may elect to receive payment either in the Normal Form or in the Actuarial Equivalent of the Normal Form computed as of the effective date of retirement and payable in one of the forms described below.

Option One. Modified Cash Refund Annuity: If a Retiree who elected a Modified Cash Refund Annuity dies before payment has been received in an aggregate amount equal to, but not exceeding the Retiree's Accumulated Mandatory Employee Contributions at the time of retirement, the difference between said Accumulated Mandatory Employee Contributions and the aggregate amount of annuity payments already received, shall be paid in a single lump sum to a Beneficiary nominated by written designation duly executed by the Member and filed with the Board. If there are no such designated Beneficiaries surviving said Retiree, any such difference shall be paid to the Retiree's estate.

Option Two. Joint and One Hundred Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and One Hundred Percent Survivor Allowance, one hundred percent of the reduced Retirement Allowance shall be paid to and continued throughout the life of the Beneficiary nominated by written designation duly executed and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Option "A". Joint and Seventy-Five Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and Seventy-Five Percent Survivor Allowance, seventy-five percent of the reduced Retirement Allowance shall be continued throughout the life of and paid to the Beneficiary nominated by written designation duly executed by the Member and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Option Three. Joint and Fifty Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and Fifty Percent Survivor Allowance, fifty percent of the reduced Retirement Allowance shall be continued throughout the life of and paid to the Beneficiary nominated by written designation duly executed by the Member and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Option "B". Joint and Twenty-Five Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and Twenty-Five Percent Survivor Allowance, twenty-five percent of the reduced Retirement Allowance shall be paid throughout the life of the Beneficiary nominated by written designation duly executed and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Joint and Survivor Optional Forms of Payment: The Joint and Survivor Optional Forms of Payment provided under the Retirement System shall be made available in either the standard form or the pop-up form, as follows:

> ***Standard Form:*** Under the Standard Form, the reduced Retirement Allowance shall be paid throughout the lifetime of the Retiree.

Pop-Up Form: Under the Pop-Up Form, the reduced Retirement Allowance shall be paid throughout the lifetime of the Retiree and the designated Beneficiary. In the event of the death of the designated Beneficiary during the lifetime of the Retiree, the amount of the Retirement Allowance shall be changed to the amount that would have been payable had the Retiree elected the Straight Life Retirement Allowance Form of Payment.

Coordination of Benefits: According to such rules and regulations as the Board shall adopt, until the first payment of a Retirement Allowance becomes due, but not thereafter, a Member under age sixty-five may elect to have the Member's Straight Life Retirement Allowance provided for under Component I equated on an Actuarial Equivalent basis to provide an increased Retirement Allowance payable to age sixty-two or age sixty-five, and to provide a decreased Retirement Allowance thereafter. The increased Retirement Allowance payable to such age shall approximate the total of the decreased Retirement Allowance payable thereafter and the estimated social security benefit. If a Member elects to receive increased and then decreased Retirement Allowance payments provided for in this paragraph, he or she may also elect to have such payments reduced by electing one of the optional forms of payment described above.

Disposition of Residue: If under a Joint and One Hundred Percent Survivor allowance, a Joint and Seventy-Five Percent Survivor allowance, a Joint and Fifty Percent Survivor allowance, or a Joint and Twenty-Five Percent Survivor allowance as provided above, both the Retiree and the Beneficiary die before they have received, in Retirement Allowance payments, an aggregate amount equal to the Retiree's Accumulated Mandatory Employee Contributions at the time of retirement, the difference between the said Accumulated Mandatory Employee Contributions and the aggregate amount of Retirement Allowances paid to the Retiree and Beneficiary, shall be paid in a single lump sum to such person or persons nominated by written designation of the Retiree duly executed and filed with the Board. If there are no such person or persons surviving the Retiree and the Beneficiary, any such difference shall be paid to the estate of the second to die of the Retiree or Beneficiary.

Rehire before or after Retirement

A non-vested former member who is reemployed (except as a part time transit operator) within 6 years of termination may repay mandatory contributions. In such case, forfeited Credited Service and Vesting service are restored. If the member is reemployed more than 6 years following separation, mandatory contributions cannot be repaid. Vesting Service and Credited Service start over beginning with the date of reemployment.

A former member who is vested but has not yet begun to receive a Retirement Allowance and who is rehired **prior to being separated for six years** shall have the benefit pertaining to total Credited Service earned on and after July 1, 2014 calculated in accordance with the terms of Component I of the Retirement System in effect at the time of the last separation from service. If the former member has previously withdrawn mandatory accumulated contributions, and such withdrawn contributions are not repaid within two years of the rehire date, only the Credited Service earned on and after the rehire date shall be taken into consideration in determining the retirement allowance.

A former member who is vested but has not begun to receive a Retirement Allowance and **who is rehired after being separated for more than six years** shall be entitled to two separate and distinct pension benefits under Component I, each to be calculated in accordance with the provisions of Component I of the Retirement System in effect at the time of each separation from service. If the former member has previously withdrawn mandatory accumulated contributions, and such withdrawn contributions are not repaid within two years of the rehire date, only the Credited Service earned on and after the rehire date shall be taken into consideration in determining the retirement allowance.

Retirement benefits for a Retiree who returns to active full-time employment with an Employer shall be subject to the following provisions:

- A Retiree who returns to work will have the Retirement Allowance suspended upon re-employment. The variable pension improvement factor (escalator) shall not be added to the amount of the original Retirement Allowance during the Retiree's re-employment period.
- A Retiree who returns to work will be entitled to receive a second Retirement Allowance in accordance with the provisions of the Retirement System in effect during the re-employment period.
- A Retiree's Average Final Compensation for purposes of determining the second Retirement Allowance will be based upon the Compensation earned by the Retiree after the return to work.
- An individual who retires for a second time will not be allowed to change the payment option selected with respect to the original Retirement Allowance. However, the individual may select a separate payment option with respect to the second Retirement Allowance.
- The Coordination of Benefits (Equated Social Security) option will not be available with respect to payment of the second Retirement Allowance.

SECTION H

GLOSSARY

Glossary

Accrued Service	The service credited under the plan which was rendered before the date of the actuarial valuation.
Actuarial Accrued Liability (AAL)	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
Actuarial Assumptions	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement, and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
Actuarial Cost Method	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
Actuarially Determined Employer Contribution	The employer’s periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan’s actuarial funding policy.
Actuarial Equivalent	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV)	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
Actuarial Present Value of Future Benefits (APVFB)	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Funding Value of Assets, and related Actuarial Present Values for a plan.

Glossary

AFC	Average Final Compensation.
Amortization Method	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase. Under the Level Principal method, the Amortization Payment is one of a stream of decreasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Principal method, the principal payment remains constant, while the interest portion is reduced over time.
Amortization Payment	That portion of the plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Amortization Period	The period used in calculating the Amortization Payment.
ARF	Average Reserve Fund.
ASF	Annuity Savings Fund of the Component II (Legacy) Plan.
Closed Amortization Period	A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc.
COLA	Cost-of-Living Adjustment.
Contribution Budgeting Liability	An expected return-based measure of pension obligation.
DIA	Detroit Institute of Arts.
D.O.T	Department of Transportation.
Duration	An approximate measure of sensitivity to changes in interest rates.
DWSD	Detroit Water and Sewerage Department.
Employer Normal Cost	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.

Glossary

E.M.S.	Emergency Medical Service.
Equivalent Single Amortization Period	For plans that do not establish separate amortization bases (separate components of the UAAL), this is the same as the Amortization Period. For plans that do establish separate amortization bases, this is the period over which the UAAL would be amortized if all amortization bases were combined upon the current UAAL 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 valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience; e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience; i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.
Funded Ratio	The ratio of the Funding Value of Assets to the Actuarial Accrued Liability.
Funding Value of Assets (FVA)	The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the actuarially determined employer contribution (ADEC).
FY	Fiscal Year.
GASB	Governmental Accounting Standards Board.
GASB Statement No. 67 and GASB Statement No. 28	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. GASB Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while GASB Statement No. 67 sets the rules for the systems themselves.
GLWA	Great Lakes Water Authority.
MVA	Market Value Assets.
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.

Glossary

Open Amortization Period	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.
PAF	Pension Accumulation Fund.
POA	The 8^{th} Amended Plan for the Adjustment of the Debt of the City of Detroit.
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.
RSF	Rate Stabilization Fund.
Solvency Liability	A market-based measurement of the pension obligations.
Transition Cost	Initial unfunded liability as described in Section E-16 of the Plan document.
Unfunded Actuarial Accrued Liability (UAAL)	The difference between the Actuarial Accrued Liability and Funding Value of Assets.
Valuation Date	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.
VPIF	Variable Pension Improvement Factor. Discussed in Section 6.2 of the Plan Document.

APPENDIX

FUNDING POLICY

I. Introduction

The purpose of this Actuarial Funding Policy is to record the funding objectives and policy set by the Board of Trustees (Board) and the Investment Committee (Investment Committee) for the General Retirement System of the City of Detroit (the GRSD). The Board and the Investment Committee establish this Actuarial Funding Policy to help ensure the systematic funding of future benefit payments for members of the Plan.

In 2014, the Combined Plan document for the GRSD was written and approved by the bankruptcy court as part of the City's Plan of Adjustment (POA). At that time, the original retirement plan was split into two retirement plans: Component I (Hybrid) and Component II (Legacy) (collectively the "Plans"). In accordance with the POA, employer contributions and certain assumptions cannot be changed until fiscal year 2024. This Policy is intended to establish a funding policy for the period beginning in fiscal year 2024, when employer contributions must be determined on an actuarial basis. Nothing in this Policy is intended to prevent the Board and the Investment Committee from altering the Policy prior to fiscal year 2024 as conditions change or additional information becomes available to the Board.

This Policy shall be regularly reviewed by the Board and the Investment Committee.

II. Definitions

"Actuarial Accrued Liability (AAL)" means 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."

"Actuarial Assumptions" means the 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" means 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 Gain (Loss)" means 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. For example, if during a given year the assets earn more than the investment return assumption, the amount of earnings above the assumption will cause an unexpected reduction in UAAL, or "actuarial gain" as of the next valuation. These include contribution gains and losses that result from actual contributions made being greater or less than the level determined under the policy.

"Actuary" means a person who is trained in the applications of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries (MAAA). The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA and ultimately to Fellowship with the designation FSA.

"Amortization" means 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.

"*Board*" or "*Board of Trustees*" shall mean the Board of Trustees of the General Employees Retirement System of the City of Detroit.

"*Committee*" or "*Investment Committee*" shall mean the Investment Committee of the General Employees Retirement System of the City of Detroit.

"Division" shall mean the General City, DDOT, Library and/or DWSD divisions in the City of Detroit.

"Experience Study" means an actuarial investigation of demographic and economic experiences of the system during the period studied. The investigation was made for the purpose of updating the actuarial assumptions used in valuing the actuarial liabilities.

"Funding Value of Assets" means the value of current plan assets recognized for valuation purposes. Generally based on a phased-in recognition of all or a portion of market related investment return. Sometimes referred to as Actuarial Value of Assets or Smoothed value of Assets.

"*GRSD*" shall mean the General Employees Retirement System of the City of Detroit.

"Market Value of Assets" means the fair value of plan assets as reported in the plan's audited financial statements.

"Normal Cost (NC)" means 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.

"Unfunded Actuarial Accrued Liability (UAAL)" means the positive difference, if any, between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."

"Unit Credit Normal Actuarial Cost Method" means a funding method that calculates the Normal Cost as the present value of the change in accrued benefits for active members.

II. Funding Objectives

1. Provide benefit security to members of the GRSD:
   A. For purposes of this policy, benefit security means having adequate liquidity to pay benefits when due.
2. Establish an appropriate employer contribution based on the following objectives:
   A. Upon the recommendation of the GRSD Actuary and after review and consideration of the decision of Judge Thomas J. Tucker with respect to the City of Detroit's Motion to Enforce Plan of Adjustment and Require 30-Year Amortization of the Accrued Liability in the Police and Fire Retirement System filed in the US Bankruptcy Court In re: City of Detroit, Michigan (Case No. 13-53846) (herein after the "Legacy Amortization Motion"); to fully fund the Legacy Plan liability in 30 years from June 30, 2023; and
   B. Fully funding the Hybrid plan liability in 15 years from June 30, 2023; and
   C. Managing employer contribution volatility.

3. Provide a reasonable margin for adverse experience to help offset risks.
4. Measure and monitor funding status, post-2024 contribution estimates and risks.
   A. Perform annual valuations; and
   B. Include post-2024 actuarial determined employer contributions (based on this Policy) in annual actuarial valuations performed for fiscal years before 2024.

III. Elements of the Actuarial Funding Policy

The Plans will have annual actuarial valuations each June 30. Employer contributions will be determined for the fiscal year ending two years after the valuation date. For example, the actuarially determined employer contribution for the fiscal year ending June 30, 2024 will be determined by the June 30, 2022 annual actuarial valuation.

Annual actuarial valuations may or may not also serve other purposes such as for Legacy plan restoration, Hybrid plan Section 9.5 fiscal responsibility calculations, and/or Annuity Savings Fund excess interest transfers between components. Unless otherwise stated, those purposes are not subject to this Policy.

For funding purposes, annual actuarial valuations will include the following elements of the Actuarial Funding Policy:

1. Actuarial Cost Method

A. Hybrid Plan: The Entry Age actuarial cost method shall be used in determining the Actuarial Accrued Liability (AAL) and Normal Cost with the entry age based on the date of hire. Since this component was created in July 2014 and granted eligibility and vesting service prior to July 2014 (for members hired before that date), this plan had an unfunded actuarial accrued liability on the plan effective date, known as the transition liability.

B. Legacy Plan: The Unit Credit Normal actuarial cost method shall be used in determining Actuarial Accrued Liability (AAL) and Normal Cost. Since this component is closed and accrued benefits are frozen as of June 30, 2014, this method results in no normal costs and an AAL that equals the Present Value of Accrued Benefits (PVAB) of each member.

2. Asset Smoothing Method

A. For determining (or estimating) employer contributions on or after fiscal year 2024, the Funding Value of Assets will be based on a method that employs smoothing of market gains and losses over a closed period. The smoothing period for recognize market gains and losses (above or below the assumed rate of return) will be a 3-year period.

B. The Funding Value of Assets shall not diverge from the Market Value of Assets by more than 15%.

C. The annual valuation will calculate results on both the smoothed value of assets and the (non-smoothed) Market Value of Assets beginning with the June 30, 2022 valuation (the Funding Value of Assets will initially be set to the Market Value of Assets as of June 30, 2021 with smoothing beginning prospectively). The post-2024 contribution estimate will always be based on the smoothed value of assets. Other results (UAAL, Funded Status, etc.) will be based on the Market Value of Assets prior to 2024 and the smoothed value of assets starting in 2024.

3. Amortization Method

A. Hybrid Plan

a) A Level Percent of Payroll amortization method shall be used to systematically eliminate (pay off) the Unfunded Actuarial Accrued Liability (UAAL) over a closed 15-year period from the later of July 1, 2023 or the applicable fiscal year after the funded status falls below 100%.

b) If the funded status for a division is above 100%, the contribution requirements for the division's UAAL will be $0 (thereby creating a minimum employer contribution of employer normal cost).

c) Layered amortizations will be considered by the Board for contributions after fiscal year 2024. Considerations for layering could include

   (i) Length of initial period remaining;

   (ii) Source of liability being amortized (i.e., new liabilities related to benefit changes and assumptions changes may be amortized over specific shorter periods (i.e., less than 15 years)). It is the intention of the Board and IC to align the amortization period in the appropriate circumstances with the corresponding benefit payment time-period;

   (iii) Magnitude of base that could be added in the current year;

   (iv) The change in contribution levels from the prior year (i.e., if a previous base is falling off and the current base is going in the opposite direction, it might be better to roll it into an existing base in order to levelized contributions).

d) Each division shall be responsible for funding its liability. Funding for any division that is at risk of depleting its divisional assets may be accelerated. Divisions shall not be permitted to have a funded status below 0% and contributions shall be accelerated as appropriate.

B. Legacy Plan

a) The Level Principal amortization method shall be used to systematically eliminate (pay off) the Unfunded Actuarial Accrued Liability (UAAL) over a closed period of 30 years from July 1, 2023, as reflected in the Plan of Adjustment (POA) and consistent with the decision of Judge Thomas J. Tucker with respect to the City's Legacy Amortization Motion.

b) If the funded status for a division is above 100%, the contribution requirements for the division's UAAL will be $0 (thereby creating a minimum employer contribution of administrative expenses).

c) Layered amortizations will be considered by the Board for contributions after fiscal year 2024. Considerations for layering could include:

   (i) Length of initial period remaining;

   (ii) Source of liability being amortized (i.e., new liabilities related to benefit changes and assumptions changes may be amortized over specific shorter periods (i.e., less than the UAAL amortization period adopted by the Board and IC)). It is the intention of the Board and IC to align the amortization period in the appropriate circumstances with the corresponding benefit payment time period;

   (iii) Magnitude of base that could be added in the current year;

   (iv) The change in contribution levels from the prior year (i.e., if a previous base is falling off and the current base is going in the opposite direction, it might be better to roll it into an existing base in order to levelized contributions); and

   (v) The City has applied for the Protecting MI Grant Program. If approved, any new liabilities related to benefit changes for active employees or retirees in the Legacy Plan must be fully funded when granted.

d) Each division shall be responsible for funding its liability. Funding for any division that is at risk of depleting its divisional assets may be accelerated. Divisions shall not be permitted to have a funded status below 0% and contributions shall be accelerated as appropriate.

4. Funding Target and Cash Flow Projections

A. The targeted funded ratio shall be 100%.

B. The Legacy annual actuarial valuation shall include projections of estimated employer contributions, expected benefit payments and estimated funded status to the later of fiscal year 2054 or 30 years after the applicable employer contribution fiscal year.

C. Section 9.5 of the plan details the actions to be taken if the 5-year projected funded status falls below 100% (Hybrid, only).

5. Risk Management

A. Assumption Changes

a) The actuarial assumptions to be used shall be those last adopted by the Board based on the most recent experience study and upon the advice and recommendation of the actuary. In accordance with the City Ordinance, the actuary shall conduct an experience study at least every five years. The results of the study shall be the basis for the actuarial assumption changes recommended to the Board;

b) The actuarial assumptions may be updated at any time, as advised by the actuary, if significant plan design changes or other significant events occur that would dictate such a change; and

c) Even though the investment rate of return may not be changed for determining employer contributions until after June 30, 2023, the Board may elect to show valuation results under an alternative reasonable assumed rate of investment return prior to 2023.

B. Risk Measures

a) Risk measures will be included in the annual actuarial valuations. Below is a list of potential measures to be included. The measures may be changed over time as deemed appropriate.

(i) Classic measures

- Funded ratio (assets / liability) on both a market value and funding value (if funding value is not equal to market).
- UAAL amortization period (years required to pay down the UAAL based on current funding rates).
- Portfolio rate of return for the year on both the market value and funding value of assets.
- 5-year and 10-year geometric average portfolio rate of return on both the market value and funding value of assets (developed prospectively).
- 5-year and 10-year standard deviation of return on both the market value and funding value of assets (developed prospectively).

(ii) Duration of the Actuarial Accrued Liability

- Measures the sensitivity of the liability to a 1% change in assumed rate of return. A decrease in this measure indicates a decrease in assumed rate sensitivity and vice versa.

(iii) Total UAAL / Covered Payroll

- Measures the risk associated with contribution rates relative to the impact on the ability to fund the UAAL. A decrease in this measure indicates a decrease in UAAL contribution risk and vice versa.
- Consideration will be given to using total payroll or revenue source, if available.

(iv) Total Assets / Covered Payroll

- Measures the risk associated with the potential impact of asset experience on contributions. A decrease in this measure indicates a decrease in asset risk and vice versa.
- Consideration will be given to using total payroll or revenue source, if available.

(v) Total AAL / Covered Payroll

- Measures the risk associated with the potential impact of liability experience on contributions. A decrease in this measure indicates a decrease in experience risk and vice versa. This also provides a long-term measure of the asset risk where the GRSD has a target funded ratio of 100%.
- Consideration will be given to using total payroll or revenue source, if available.

(vi) Non-Investment Cash Flow / Beginning of year assets

- Measures depletion risk, sensitivity to annual investment gains and losses risk and the maturity of the plan. For a mature open plan, this may converge to the negative of the real rate of return assumption (investment return less wage inflation). A less negative number (or a positive number) indicates a less mature plan and/or a plan that is at lower risk of fund depletion and less sensitive to annual gains and losses. A more negative number indicates a more mature plan and/or a plan that is more at risk of fund depletion and more sensitive to annual gains and losses. For a super-mature closed plan such as the Legacy plan, this may become more negative over time as liquidity needs increase.

(vii) Market Value of Assets / Benefit Payments

- Measure depletion risk. A low value estimates the number of years to depletion disregarding future contributions and investment return.

(viii) Solvency Liability

- Measures the estimated cost of accrued benefits as a result of minimizing investment risk in the portfolio.

b) Risk Control: The Board shall carefully monitor the risk measures above and shall consider steps to mitigate risk, particularly as the Legacy Plan funded ratio increases. Examples of risk mitigating techniques include, but are not limited to:

(i) Reviewing investment risk in accordance with the Board's Investment Policy;

(ii) Adding provisions for adverse deviation in the actuarial assumptions; and

(iii) Increasing employer contributions (through a change in methods, assumptions, or amortization period).

IV. Hybrid Plan Section 9.5 Projection Assumptions

Section 9.5 of the Combined Plan titled *"Fiscal Responsibility: Increased Funding Obligations and Benefit Reductions"*, provides generally in the event the funding level of Component I of the Retirement System, projected over a five-year period, falls below specified targets, the Board is required to take established remedial actions. The stated intention of this Section is to "safeguard the long-term actuarial and financial integrity of the Retirement System." Section 9.5(3) further provides that "the actuarial accrued liability of Component I shall be calculated by the Plan's Actuary utilizing an interest rate assumption of six and three-quarters percent (6.75%) and other reasonable assumptions as directed by the Board upon the recommendation of the Investment Committee."

In December, 2016, both the Board and the Investment Committee adopted the following guidelines to be utilized by the actuary in completing the five-year projections as required in Section 9.5 of the Hybrid Plan:

1. The five-year projections should be based on the general valuation assumptions as previously adopted by the Board (e.g., inflation, mortality, retirement, withdrawal, etc.).
2. Section 9.5(1) provides that Variable Pension Improvement Factor ("VPIF") benefits will only be granted in the event the plan is projected to be over 100% funded. It is the considered opinion of the Board and the Investment Committee that the mandatory employee contributions as set forth in the plan based upon the five-year projections required by Section 9.5 are intended to fund base benefits in the normal course and not VPIF benefits. Accordingly, it is the funding policy of the Board to not include any projected future VPIF benefits in the five-year projection calculations. However, in the future and to the extent that VPIF benefits have been granted to retirees at the time of the five-year projection, that Actuary shall assume continuation of those previously granted VPIF benefits except as otherwise provided in Section 9.5(2) of the Combined Plan.
3. For purposes of completing the five-year projection in any given year, an initial projection is to be completed demonstrating the effect of an award of the VPIF benefit to qualified retirees in the following Plan Year. If the Plan continues to be funded at a level greater than 100%, the VPIF may be awarded by the Board and IC in accordance with the Plan provisions. In the event the funding level in the initial projection is less than 100%, a second projection shall be performed to verify if any of the remedial measures required under Section 9.5 are necessary.
4. Transition Costs should not include an assumption of future VPIF benefits. Since there is a separate funding source established in the Combined Plan for payment of Transition costs through 2023 [Section E-16(c)], Transition Costs should be excluded from the Section 9.5 tests until fiscal year 2024. The Transition Costs shall be determined as of July 1, 2014 (without an assumption for payment of future VPIF benefits and financing of the Transition costs shall be calculated based upon a level dollar amortization of the Initial Transition Cost over a 9-year fixed amortization period and the Retirement System's Investment Return Assumption of 6.75%.
5. Component II (Legacy Plan) ASF balances are assumed to be withdrawn as a level dollar amount over the next 10 years, however voluntary employee contributions into the Component Annuity Savings Fund shall be assumed to continue at the historical levels as previously contributed to the Component II ASF. For Transition Funding purposes, an appropriate arbitrage of the difference between the assumed rate of investment return of 6.75% and the maximum interest rate that can be credited to the ASF Accounts of 5.25% should be used for both the Hybrid Plan (Component I) and Legacy Plan (Component II) ASF Accounts. However, for asset transfers based on a lookback period, actual market returns will be used, if known.
6. The Hybrid Plan assets shall include the Rate Stabilization Fund to the extent the plan is less than 100% funded.
7. The Annual Actuarial Valuation for the fiscal year ending June 30, 2015, shall generate the first five-year projection. Upon receipt of the June 30, 2015 valuation, a determination shall be made whether any remedial action is required. In the event remedial action is required, such remedial action shall be effective July 1, 2017 [Section 9.5(1)].
8. The funding value of plan assets for purposes of Section 9.5 testing of the Hybrid Plan (Component I) funding level would otherwise be based upon a three (3) year smoothing method wherein the assumed investment income of 6.75% will be recognized fully each year and the differences between actual and

assumed investment income shall be phased in over a closed three (3) year period. The Actuary has opined that since the projection period is for a five (5) year period, the use of a three (3) year smoothing period is of no consequence and would result in an asset value that is not materially different than projecting the current market value of assets out five (5) years at the assumed rate of return of 6.75%. Accordingly, the projection shall utilize the market value of the portfolio using the 6.75% rate of return [Section 9.5(3)].

9. The forgoing assumptions shall be utilized for both the 100% projection test in Section 9.5(1) and the 80% projection test in Section 9.5(2).

10. The required actions set for in Section 9.5(2), if any, shall be reflected in the projections by the addition of each item in the order listed until the appropriate threshold is reached. Illustrated as follows:

    Perform the first projection ignoring all the 9.5(2) actions. If the projected funded status was less than 80%, then the Actuary is to re-perform the projection reflecting the action in 9.5(2)(a). If the projection results in a funding level that is still below 80%, the projection is to be re-performed reflecting the action in 9.5(2)(b): and so on. Once the 80% threshold is met, such projection would reflect the required actions under Section 9.5(2) that are to be taken.