The Police and Fire Retirement System of the City of Detroit

Annual Actuarial Valuation of Component I

June 30, 2020

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May 18, 2021

Board of Trustees
The Police and Fire Retirement System of the City of Detroit

Re: The Police and Fire Retirement System of the City of Detroit Actuarial Valuation of Component I as of June 30, 2020

Dear Board Members:

The results of the June 30, 2020 Annual Actuarial Valuation of **Component I** (Hybrid Plan) of the Police and Fire Retirement System of the City of Detroit (PFRS) are presented in this report. Component II (Legacy Plan) benefits are the subject of a separate 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 on page 6 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 parties other than the Retirement System only in its entirety and only with the permission of the Board. Authorized or unauthorized use of this report by parties other than the Board does not create a liability between Gabriel, Roeder, Smith & Company and the user of this report.

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 Plan;
- To provide illustrative actuarially determined contribution amounts for Fiscal Year 2022;
- To compare the illustrative actuarially determined contributions to the POA mandated contributions; and
- To estimate the Fiscal Year 2024 actuarially determined contributions (the first year the employer will be required to make actuarially determined contributions adopted by the Board and Investment Committee) under possible funding policy amounts. This report includes calculations based upon the Board approved funding policy shown in the Appendix.

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.

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The required contribution rate shown on page 1 is in compliance with the Plan and the City's Plan of Adjustment (POA) as approved by the Bankruptcy Court and should not be considered a recommendation by the Actuary. Users of this report should be aware that contributions made at the POA and Plan required rate do not guarantee benefit security.

The findings in this report are based on data and other information through June 30, 2020. 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 assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this Plan. A determination regarding whether or not the Plan sponsor is actually able to do so is outside our area of expertise, beyond the scope of the assignment 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 data. 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 Section F 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 PFRS Plan. The assumed rate of return is 6.75% for valuations through June 30, 2023 as prescribed by Section 1.18(3) of the Combined PFRS Plan. Except for the assumed rate of investment return, the actuarial assumptions used for the valuation are set by the Board based upon advice of the actuary and other parties. The actuarial cost method and assumed rate of investment return of 6.75% are prescribed methods and/or 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.

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 individuals 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 Police and Fire 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.

David T. Kausch, Judith A. Kermans, and Jamal Adora are Members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

The signing individuals are independent of the plan sponsor. Gabriel, Roeder, Smith & Company will be pleased to review this valuation report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,

David T. Kausch

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SECTION A

INTRODUCTION

Executive Summary
($ in Millions)

Valuation Date		June 30, 2020		June 30, 2019
Contributions for Fiscal Year Ending		June 30, 2022		June 30, 2021
Employer Contributions				
Mandated Percentage of Covered Payroll		12.25%		12.25%
Estimated Annual Amount (Mandated Contributions Only)	$	19.2	$	18.8
Membership				
Active Members (Excluding DROP)		2,559		2,488
DROP Members		106		124
Retirees and Beneficiaries		157		117
Legacy Disabled^		83		76
Inactive, Nonretired Members		701		583
Total		3,606		3,388
Valuation Payroll *	$	153.1	$	150.0
Assets				
Pension Accumulation Fund	$	126.8	$	113.4
Employee Voluntary Contribution		1.0		0.5
Employee Mandatory Contribution		50.7		41.1
Rate Stabilization Fund (RSF)@		5.6		4.0
Total Market Value	$	184.1	$	159.0
Return on Market Value (net of administrative expenses)		-0.13%		2.37 %
Actuarial Information (Assuming 0.5% VPIF)				
Total Normal Cost Rate		17.72%		17.79%
Member Contribution Rate		7.05%		6.92%
Employer Normal Cost Rate		10.67%		10.87%
Actuarial Accrued Liability	$	178.8	$	156.5
Unfunded Actuarial Accrued Liability (Including RSF)	$	(5.2)	$	(2.5)
Funded Ratio (Including RSF)		102.93%		101.60%
Funded Ratio (Excluding RSF)		99.77%		99.02%
Equivalent Single Amortization Period (Excluding RSF)		0		1
Employer Rate needed for 15-Year Amortization (Exc. RSF) #		10.67%		10.87%
Additional Funding Information (Assuming a full 1% VPIF)				
Employer Normal Cost Rate		11.68%		11.87%
Equivalent Single Amortization Period (Excluding RSF)		17		22
Employer Rate needed for 15-Year Amortization (Exc. RSF) #		12.39%		12.57%
Risk Metrics				
Actuarial Accrued Liability Divided by Payroll		1.2		1.0
Market Value of Assets Divided by Payroll		1.2		1.1

* *Payroll shown is for non-DROP members.*
\# *Based on prior Board policy to set the employer normal cost as the minimum contribution.*
^ *See Comment 13 on page 15.*
@ *This is the result of the excess ASF interest transfer from Component II (Legacy).*

Note: Results on this page are based on the Market Value of Assets (MVA).

Board Adopted Funding Policy
($ in Millions)

The Retirement Board has adopted a funding policy. We understand the Investment Committee is reviewing the policy. The Board adopted funding policy is shown in the Appendix along with the development of the Actuarial Value of Assets (AVA) to be used in the determination of the Fiscal Year 2024 Actuarially Determined Contribution. To avoid confusion with results elsewhere in this report, we have referred to the assets used in determining the Fiscal Year 2024 as the “Funding Policy Assets.” Results that consider the Board adopted funding policy are shown below:

Board Adopted Funding Policy - Using Funding Policy Assets			
Contributions For Fiscal Year (FY) Ending		2024	
Projected UAL at Beginning of FY (0.5% VPIF, Exc. RSF)	$	(19.9)	
Amortization Period (Applicable if UAAL > 0)		15	years
Employer Normal Cost Rate (0.5% VPIF)		10.50%	
Employer Contribution Rate (0.5% VPIF, Exc. RSF)		10.50%	
Employer Contribution Rate - Full VPIF (1.0% VPIF, Exc. RSF)		11.51%	

Please see pages 11 through 15 of the report for important comments regarding valuation results.

An estimate of the probability of future contributions being made was outside the scope of this project, not required by Actuarial Standards and; therefore, was not made.

Development of
Normal Cost Rates

Valuation Date June 30	2020	2019
Normal Cost for 0.5% VPIF (COLA)		
Age & service allowances	11.60%	11.51%
Disability allowances	5.23%	5.39%
Death-in-service allowances	0.43%	0.44%
Administrative expenses	0.00%	0.00%
Refunds	0.46%	0.45%
Total	17.72%	17.79%
Members Current Contributions@	7.05%	6.92%
Employer Normal Cost (0.5% VPIF)	**10.67%**	**10.87%**
Additional Normal Cost for Full 1.0% VPIF (COLA)#	1.01%	1.00%
Employer Normal Cost (1% VPIF)	**11.68%**	**11.87%**
Fixed Employer Contribution Rate+	12.25%	12.25%
Amount available for UAAL% (0.5% VPIF)	1.58%	1.38%
Amount available for UAAL% (1.0% VPIF)	0.57%	0.38%

@ Member contributions expected to be paid are a weighted average of 6% for those hired before July 1, 2014 and 8% hired after June 30, 2014.

 # Normal Cost Rates shown are based on benefits which includes a discretionary 1% compound Cost-of-Living Adjustment (COLA) beginning one year after valuation date. Plan provisions provide criteria for when a COLA can be paid. The current assumption is that on average over a members retirement years, they will receive the equivalent of a 0.5% COLA (or VPIF).

+ Employer contributions are set at 12.25% of covered compensation per year through plan year 2023.

Development of Liabilities
Retirement System Totals

Valuation Assumptions (1/2% VPIF)	Total	Rate Stabilization Fund (RSF)	Excluding RSF
Present Value of Future Benefits	$ 423,502,211	$ -	$ 423,502,211
Present Value of Future Normal Costs	244,687,857	-	244,687,857
Actuarial Accrued Liability	178,814,354	-	178,814,354
Accrued Assets	184,053,538	5,649,557	178,403,981
Unfunded Actuarial Accrued Liability (UAAL)	$ (5,239,184)	$ (5,649,557)	$ 410,373
Additional Amount for Full 1% COLA	10,346,989	-	10,346,989
UAAL with Full COLA	$ 5,107,805	$ (5,649,557)	$ 10,757,362

The COLA or VPIF provided in the Plan is a discretionary 1.0% compound post retirement increase at the beginning of each plan year starting one year after retirement. However, Section 9.5 of the Plan imposes several limitations on when the COLA can be paid (or clawed back). Based on this section of the Plan, it is reasonable to assume that the average COLA a retired member will receive over their lifetime will be less than 1%. For purposes of this valuation we have assumed that the average COLA is equivalent to 0.5%. Future Plan experience, Board policy, and Plan interpretation regarding the administration of Section 9.5 may result in changes to this assumption. If the full 1% VPIF were assumed, the present value of future benefits would be $447.9 million and the actuarial accrued liability would be $189.2 million.

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.

Contributions Comparative Schedule

Valuation Date June 30	Employee Contributions@	Employer Contributions for: Normal Cost for 0.5% VPIF (COLA)	Additional Normal Cost for Full 1.0% VPIF (COLA)	Employer Contribution in Excess of Normal Cost (1% VPIF)	Amount for UAAL	Amount for Rate Stabilization*	Contributions Effective Plan Year	Employer Contribution Type#
2014	6.20%	10.52%	0.94%	0.79%	0.79%	0.00%	2014/15	Mandated
2014	6.36%	10.36%	0.94%	0.95%	0.95%	0.00%	2015/16	Mandated
2015	6.65%	10.07%	0.95%	1.23%	1.23%	0.00%	2016/17	Mandated
2016	6.80%	10.12%	0.94%	1.19%	1.19%	0.00%	2017/18	Mandated
2017	6.77%	10.54%	0.98%	0.73%	0.73%	0.00%	2018/19	Mandated
2018	6.80%	10.59%	0.98%	0.68%	0.68%	0.00%	2019/20	Mandated
2019	6.92%	10.87%	1.00%	0.38%	TBD	TBD	2020/21	Mandated
2020	7.05%	10.67%	1.01%	0.57%	TBD	TBD	2021/22	Mandated

 # "Mandated" (Section 9.3(2)) at 12.25% of pay if specified by Plan document and POA; "Actuarially Determined" if determined by a valuation based on the Board's funding policy.

** Rate Stabilization Contributions are determined by the City through 2024.*

@ Members hired before June 30, 2014 contribute 6%, members hired after June 30, 2014 contribute 8%. Therefore, as new hires replace retiring members, the employer normal cost will decrease (in the absence of changes in the Plan or assumption changes).

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 in the appendix for additional information. In the table below, the acronyms are as follows: FPA = Funding Policy Assets; MVA = Market Value of Assets; AAL = Actuarial Accrued liability; UAAL = Unfunded Actuarial Accrued Liability).

	2020	2019
(i) Classic measures		
− Funded ratio		
MVA	102.9%	101.6%
FPA	108.6%	104.2%
− UAAL amortization period	15	
− Portfolio rate of return		
MVA	-0.13%	2.37%
FPA	3.28%	5.29%
− Geometric average portfolio rate of return[1]		
5-year		
MVA	1.11%	2.37%
FPA	4.28%	5.29%
10-year		
MVA	1.11%	2.37%
FPA	4.28%	5.29%
− Standard deviation of return[1]		
5-year		
MVA	1.25%	0.00%
FPA	1.01%	0.00%
10-year		
MVA	1.25%	0.00%
FPA	1.01%	0.00%
(ii) Duration of the Actuarial Accrued Liability	24.3	24.1
(iii) Total UAAL / Covered Payroll		
MVA	(0.0)	(0.0)
FPA	(0.1)	(0.0)
(iv) Total Assets / Covered Payroll		
MVA	1.2	1.1
FPA	1.3	1.1
(v) Total AAL / Covered Payroll	1.2	1.0
(vi) Non-Investment Cash flow / Beginning of year MVA	15.9%	21.6%
(vii) MVA / Benefit Payments	39.1	39.6
(viii) Solvency Liability ($ millions)[2]	$ 277.3	

[1]These are developed prospectively from 2019 and consequently do not yet reflect full 5 or 10 years of experience.
[2]See discussion on next page.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Funded Ratio - POA

		Defined Benefit	Voluntary Cont.	Total
A	Actuarial Accrued Liability	$ 177,862,115	$ 952,239	$ 178,814,354
B	Market Value of Assets	$ 183,101,299	$ 952,239	$ 184,053,538
C	Unfunded Actuarial Accrued Liability (A - B)	$ (5,239,184)	$ -	$ (5,239,184)
D	Funded Ratio (B/A)	102.9%	100.0%	102.9%

The POA Funded Ratio is an expected return-based measurement of the pension obligations. It is based upon the POA mandated 6.75% interest rate assumption (assumption prescribed by another party). It determines an amount that will be sufficient to provide benefits if the portfolio earns the expected 6.75% return on assets and all other assumptions are met. This measure is appropriate for assessing the need for or amount of future contributions if all assumptions are met. This measure is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligation, in other words, of transferring the obligation to a third party in a market value type transaction.

Funded Ratio - Solvency

		Defined Benefit	Voluntary Cont.	Total
A	Actuarial Accrued Liability	$ 276,372,174	$ 952,239	$ 277,324,413
B	Market Value of Assets	$ 183,101,299	$ 952,239	$ 184,053,538
C	Unfunded Actuarial Accrued Liability (A - B)	$ 93,270,875	$ -	$ 93,270,875
D	Funded Ratio (B/A)	66.3%	100.0%	66.4%

The Solvency Liability is a market-based measurement of the pension obligations. It represents the amount the plan would need to invest in low risk securities to provide the benefits with greater certainty. For this purpose, the solvency liability is computed at 2.45% as of June 30, 2020, based on the long-term municipal bond rate ("20-Year Municipal GO AA Index" rate from the Fidelity Index as of June 30, 2020). No adjustment has been made for the credit quality of the plan sponsor. 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 2.0% times Average Final Compensation as of the valuation date times Credited Service as of the valuation date
- The benefit payable under Ordinary Death Before Retirement were 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.
- Accrued benefits under Duty Disability were assumed to be payable upon decrement.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

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 is an approximate measure sensitivity to changes in interest rates. 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.

Ratio of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 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 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.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

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.

Comments

Comment 1

Experience

Overall, plan experience was more favorable than assumed. There was a net gain of $1.3 million as shown on page 18. This gain is comprised of a $11.4 million liability gain and a $10.1 million investment loss. The investment loss was partially offset by a $1.6 million related to an ASF excess interest transfer. The major source of liability gains was more terminations than assumed.

Comment 2

Funding of the Rate Stabilization Fund

In accordance with the plan document, if Transition Costs are 100% funded or more, then any excess interest transferred from the Legacy Plan is deposited into the Rate Stabilization Fund (RSF). We understand that staff has deposited the entirety of this year's excess interest transfer into the RSF.

How the RSF is Used in the Valuation

The plan document does not provide specific direction regarding how the RSF is considered in the valuation. For purposes of this report we have treated the RSF in the following manner (unless specifically stated otherwise):

- For purposes of determining a funded ratio in this report (other than with regard to the Section 9.5 testing), the Rate Stabilization Fund (RSF) has been included in the assets;
- For purposes of determining contributions starting in FY 2024, we have excluded the RSF from the assets (thereby calculating a higher contribution rate); and
- For purposes of Section 9.5 testing, the RSF is excluded from the assets.

We believe this treatment is in compliance with the plan document and the Board's Section 9.5 methods and assumptions. However, we recommend legal counsel review this treatment to confirm our understanding.

When projecting assets, we have assumed that the RSF would grow with investment return at 6.75%. However, no investment return was credited to the RSF during the year. If the Board would like us to change this assumption to reflect the current administration of crediting 0% to the RSF, please let us know and we will do so for future valuations.

Comments

Comment 3

Actuarial Assumptions

The assumed rate of return prescribed by the POA is 6.75%, net of investment and administrative expenses. We have reviewed the reasonableness of this assumption based on the plan's investment policy and the capital market assumptions of thirteen nationally recognized investment consulting firms using GRS' Capital Market Assumption Modeler. The analysis depends on the underlying price inflation and the rate of administrative expenses. Based on our analysis, the prescribed 6.75% rate of return is reasonable for the purpose of the measurement being taken. If the Board would like, we can prepare a separate report of our analysis.

We will include a review of the assumed rate of return in the next experience study which is scheduled to begin subsequent to the June 30, 2020 valuation.

Comment 4

Post Retirement COLA

This Plan has a post retirement COLA feature known as the Variable Pension Improvement Factor or VPIF of a 1% compound COLA. It can be granted only if the five-year projection shows the Plan funded status at 90% or greater at the end of the projection period based upon 6.75% future investment return. Since there are conditions under which the VPIF cannot be paid (and even clawed back) we have assumed that on average a VPIF of ½% will be paid in the development of the accrued liabilities and normal cost. We recommend that this assumption be reviewed in the next experience study. A 1% VPIF was granted on July 1, 2020. Actual versus expected VPIFs are treated as a gain or loss item for purposes of the valuation. A history of past VPIFs granted by the Board is shown on page 21.

Comment 5

Increasing Total Member Contribution Rate

Since members hired after June 30, 2014 have a higher member contribution rate than those hired before, the employer normal cost is expected to decrease as new members enter the Plan (in the absence of changes in the plan or assumption changes).

Comments

Comment 6

Transition Cost

When the RSF is excluded from the assets, the fund is nearly 100% funded. However, there does not currently exist a policy that allocates that unfunded amount between Transition Costs and non-Transition Costs. Since future excess interest transfers are affected by whether or not the Transition Costs are fully funded, we recommend that the Board adopt a method of allocating any unfunded amounts (after exclusion of the RSF) between Transition Costs and other liabilities. If the Board wishes, we can work with legal counsel and suggest a few methods for consideration and discuss the advantages and disadvantages with the Board.

For purposes of this valuation we have assumed the Transition Cost is fully funded. For this Component I (Hybrid) valuation, this assumption only affects the Section 9.5 projections. In regards to the remedial actions required by Section 9.5, the funded status of the Transition Cost would not have an effect on the remedial actions determined in this valuation. Note that in the Section 9.5 projections, the Transition Cost is scheduled to be fully amortized by June 30, 2023 under current Board procedures.

Comment 7

Funding and Transfers of Assets from Component II

Mandatory employee contributions are initially set to 6.0% (8.0% if hired after June 30, 2014) of compensation but can be increased, if necessary, to maintain funding levels at 90% or above. Employer contributions are set at 12.25% of payroll through June 30, 2023. Employer contributions are actuarially determined beginning in 2024 to be the amount necessary to fund the Plan on an actuarial basis. The 12.25% of payroll employer contribution rate exceeds the employer normal cost rate of 11.68% by 0.57% of payroll (when the normal cost rate is based on the full 1% VPIF).

The Plan requires that, in the event that the rate of interest credited to the Annuity Savings Fund (ASF) of the Component II (Legacy) Plan is less than the rate earned by the Component II trust, a transfer of the difference in rates (applied to the Component II ASF balance) to the Component I trust may occur to fund the Transition Cost. If Transition Costs are fully funded, then only 50% of the difference is transferred to Component I. Transfers cease after June 30, 2023. For purposes of this valuation, future transfers were assumed not to occur.

Based on the investment performance for Fiscal Year 2019 and 2020, it is unlikely a transfer will occur in 2021 or 2022. To date, the following transfers have been made:

- $4,030,561 in fiscal year 2019.
- $1,618,996 in fiscal year 2020.

Comments

Comment 8

It is our understanding that the amount of employer contributions credited to the Rate Stabilization Fund (RSF) is at the discretion of the Employer. We have been informed that the Employer has directed that none of the employer contributions for FY 2015 through FY 2020 will be credited to the RSF.

Comment 9

The determination of the Normal Cost is dependent on the replacement life normal cost Entry Age Normal Cost Method. Our understanding of the Plan's and City's objectives is to have a level total normal cost and a separately funded Transition Cost consistent with this method. Based on the current exposure draft of the Actuarial Standards of Practice No. 4, this method is appropriate for determining a Reasonable Actuarially Determined Contribution. If the final standard changes, we may need to re-evaluate use of this method.

Comment 10

We have excluded all members reported in the Component II DROP as of June 30, 2014 from this valuation even though some were reported as active in this plan. These people were included in the (Component II) valuation.

Comment 11

Section 12.7(1) states that the DROP shall be effective only for as long as it is cost neutral to the City. Cost neutrality for this purpose is not defined. An assessment of the cost neutrality of the DROP was outside the scope of this valuation. We suggest the Board (or other appropriate party) define "cost neutral" for this purpose and establish a schedule for periodic review of the DROP plan meeting cost neutrality. We would be happy to work with the Board (or other appropriate party) to assist with this task.

Comment 12

The results in this report assume an investment return rate of 6.75%, net of administrative expenses. We understand that the administrative expenses of the Retirement System are being split between Component I (roughly 40%) and Component II (60%). Administrative expenses may put downward pressure on the Component I funded status in the short term. As an indication of the magnitude, the FY 2020 Component I administrative expenses were approximately 0.88% of the Component I market value of assets as of June 30, 2020. As the asset base allocation grows, this rate is expected to diminish.

The computation of the rate of return net of administrative expenses will therefore be significantly lower than the gross rate of return and may differ from investment performance measures. This effect is expected to decline in Comp I over time as the trust builds up assets. The total administrative expenses as a percent of the Combined Plan (Component I and Component II) assets was approximately 16 basis points.

We estimated the rate of return during the year to be -0.13% net of administrative expenses and 0.81% gross of administrative expenses.

Comments

Comment 13

The Police and Fire Retirement System Combined Plan provides disability benefits for both Component I and Component II members. Our understanding of the Component II freeze as it relates to duty disability benefits was that the only benefit payable from Component II would be the frozen accrued benefit, payable at the time of conversion to normal retirement (for members becoming disabled after 6/30/2014) and that any benefits payable during the period of disability would be paid from Component I.

For current duty disabilities, data reported for this valuation is not consistent with that understanding. However, assets reported for this valuation appear to be consistent with this interpretation (note we do not collect sufficient information to confirm this kind of activity in the assets). We have valued the pre-conversion duty disability benefit in a manner consistent with the data (paid out of Component II). We understand that the System is in the process of moving to a new data system and expect this issue to be corrected once the new data system is in place.

For future retirees, duty disability retirement benefits prior to age 65 are assumed to be paid from Component I.

For current duty disability retirees that became disabled after June 30, 2014, we have estimated the amount that will be paid by Component I upon conversion.

Comment 14

We understand that there is a great deal of effort on Staff's part to provide improved data once the new system begins to generate the valuation data. It is unknown if this new data system (with the data improvements) will result in material differences in our liability and contributions estimates for the plan.

SECTION B

FUNDING RESULTS

Actuarial Liabilities
as of June 30, 2020

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	$281,596,247	$ 154,050,696	$127,545,551
Disability benefits likely to be paid to present active members	86,241,014	67,944,488	18,296,526
Death-in-service benefits likely to be paid on behalf of present active members	8,022,000	5,457,495	2,564,505
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	15,918,730	17,235,178	(1,316,448)
Benefits attributed to voluntary member contributions	952,239	0	952,239
Benefits likely to be paid to vested inactive members	13,689,223	0	13,689,223
Benefits to be paid to members in the DROP, current retirees, beneficiaries, and future beneficiaries of current retirees.	17,082,758	0	17,082,758
Total	$423,502,211	$ 244,687,857	$178,814,354
Less Actuarial Value of Assets	$184,053,538	$ 0	$184,053,538
Plus Rate Stabilization Fund	$ 5,649,557	$ 0	$ 5,649,557
Equals Liabilities to be covered by Future Contributions	$245,098,230	$ 244,687,857	$ 410,373
Additional Amount for Full 1% COLA	24,446,573	14,099,584	10,346,989
Total with Full COLA	$269,544,803	$ 258,787,441	$ 10,757,362

Actuarial Balance Sheet

Assets and Present Value of Expected Future Contributons (1/2% VPIF)

Valuation Date June 30:	**2020**
A. Present Actuarial Value of Assets	
1. Net assets from System financial statements	$ 184,053,538
2. Adjustment for Valuation Assets	0
3. Actuarial Value of Assets	184,053,538
B. Actuarial Present Value of Expected Future Employer Contributions	
1. For Normal Costs	143,381,633
2. For Unfunded Actuarial Accrued Liability	(5,239,184)
3. Increase for Rate Stabilization Fund	5,649,557
4. Total	143,792,006
C. Actuarial Present Value of Expected Future Member Contributions	101,306,224
D. Total Present and Expected Future Resources	$ 429,151,768

Present Value of Expected Future Benefit Payments

A. To DROP Members, Retirees and Beneficiaries	$ 17,082,758
B. To Vested Terminated Members	13,689,223
C. To Present Active Members	
1. Allocated to service rendered prior to valuation date – Actuarial Accrued Liability	147,090,134
2. Allocated to service likely to be rendered after valuation date	244,687,857
3. Total	391,777,991
D. Voluntary Member Contributions	952,239
E. Total Actuarial Present Value of Expected Future Benefit Payments	$ 423,502,211

The Actuarial Balance Sheet does not distinguish between Transition Cost and other liabilities (see Comment 6 on page 13).

Development of Actuarial Gain or Loss
(1/2% VPIF)

		Actuarial Accrued Liability (AAL) (A)	Actuarial Value of Assets (B)	Unfunded Actuarial Accrued Liability (C) = (A) - (B)
(1)	Beginning of Year (BOY)	$ 156,469,475	$ 158,967,545	$ (2,498,070)
(2)	Normal Cost for Service Accruals	26,692,462	N/A	26,692,462
(3)	Normal Cost for Vol. Employee Contributions	439,745	N/A	439,745
(4)	Total Contributions	N/A	28,394,409	(28,394,409)
(5)	Benefit Payments and Refunds	(4,707,048)	(4,707,048)	-
(6)	Interest 6.75% x (1) + 6.75% x [(2) + (3) + (4) + (5)] / 2	11,318,539	11,529,758	(211,219)
(7)	Expected End of Year (1)+(2)+(3)+(4)+(5) + (6)	$ 190,213,173	$ 194,184,664	$ (3,971,491)
(8)	Actual End of Year	178,814,354	184,053,538	(5,239,184)
(9)	Gain or Loss (7)-(8)	$ 11,398,819	$ 10,131,126	$ 1,267,693
		Gain	Loss	Gain
(10)	Percent of BOY AAL (9)/(1A)	7.29%	6.47%	0.81%
	Transfers	$ -	$ (1,618,996)	$ 1,618,996
	Gain or Loss	$ 11,398,819	$ 11,750,122	$ (351,303)

Additional detail on the gains and losses is shown below.

	Gain (Loss) in Period *	
Type of Risk Area	**Totals ($ in millions)**	**Percent of Beginning of Year Liabilities #**
Data Improvements	(0.0)	0.0 %
Excess Interest Transfers	1.6	1.0 %
Risks Related to Assumptions		
Economic Risk Areas:		
Pay Increases **	0.6	0.4 %
Investment Return	(11.8)	(7.5)%
VPIF	(0.1)	0.0 %
Demographic Risk Areas:		
Full and Reduced Service Retirements	0.2	0.2 %
Death Benefits	0.4	0.2 %
Disability Benefits	2.1	1.3 %
Other Terminations	8.1	5.2 %
Post-Retirement Mortality	0.1	0.0 %
Total Gain (or Loss) During Period	$1.3	0.8 %

 # Beginning of year liabilities were $156.5 million.

** Results may be approximate due to limitations in available data.*

*** Includes effect of payroll changes due to changes in group size, new hires and rehires.*

SECTION C

FIVE-YEAR FUNDED STATUS PROJECTION

Section 9.5, Fiscal Responsibility, of the Combined PFRS Plan contains several provisions for adjusting contributions and/or benefits to be determined based on a five-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 90%
- Section 9.5(2) test for the funded status falling below 90% and remaining below 100%

Section 9.5(3) specifies the interest rate to be used in the projections. Other methods and assumptions used in the projections are to be adopted by the Board based on the recommendation of the Investment Committee.

Projection Method:

We have been directed to use the following methods and assumptions:

- Projections based on valuation assumptions.
- VPIF assumption is ½%. This assumption will be reviewed and adjusted as experience emerges.
- Transition Cost is netted out of the Actuarial Accrued Liability.
- The Transition Cost is based on a nine-year level dollar amortization of the initial Transition Cost amount which is calculated using a ½% VPIF.
- Projected assets exclude the projected value of the Rate Stabilization Fund.
- All future Employer contributions go to the Pension Accumulation Fund (PAF).
- The June 30, 2015 valuation generates the first test.
- There is a two-year delay between the valuation date and the VPIF determination date.
- The market value is projected using a 6.75% rate of return.
- Potential future arbitrage on the voluntary contribution reserve fund was not modeled. This assumption will be revisited if the voluntary contribution reserve fund becomes material.
- Each item in Section 9.5(2) will be added in the order listed until a threshold is reached.
- Projected contributions include an expected asset transfer from the Component II Annuity Savings Fund (ASF), equal to 1.50% of the projected ASF balances. This represents the difference between the assumed rate of return of 6.75% and the maximum interest rate that can be credited to the ASF accounts of 5.25%.
- 6% of payroll member contributions for members hired as of June 30, 2014. 8% for members hired after June 30, 2014.
- 12.25% of payroll employer contributions.
- Component II ASF balances were assumed to be withdrawn as a level dollar amount over the next 10 years.
- Voluntary contributions and interest are not reflected.

Transition Cost

Under the current actuarial cost methods, members with past vesting service generate an initial liability as of June 30, 2014. This is the "Transition Cost" described in Section G-2(f) of the Combined PFRS Plan. A separate funding source was established for the Transition Cost through 2023. The projections on page 21 net the Transition Cost from the Actuarial Accrued Liability to determine projected funded status. Projected Transition Cost is based on the nine-year level dollar amortization of the initial Transition Cost amount. The initial Transition Cost amount is based on a ½% VPIF. An amortization schedule of the Transition Cost follows. Note, under this method any future gains or losses related to the Transition Cost are accounted for in the Actuarial Accrued Liability net of Transition Cost as they occur.

Transition Cost Amortization Schedule
for Projections on the Next Page

Financing Transition Cost
Calculated Using A Level Dollar Amortization (mid-year payments)
and an Investment Return Assumption of 6.75% Compounded Annually
9-Year Closed Amortization

Valuation Date June 30	Fiscal Year June 30	Transition Cost at Beginning of Fiscal Year	Annual Contributions During Fiscal Year Dollars	Transition Cost at End of Fiscal Year
2014	2015	$ 31,931,597	$ 4,693,263	$ 29,237,905
2015	2016	29,237,905	4,693,263	26,362,389
2016	2017	26,362,389	4,693,263	23,292,776
2017	2018	23,292,776	4,693,263	20,015,963
2018	2019	20,015,963	4,693,263	16,517,966
2019	2020	16,517,966	4,693,263	12,783,854
2020	**2021**	**12,783,854**	**4,693,263**	**8,797,689**
2021	2022	8,797,689	4,693,263	4,542,459
2022	2023	4,542,459	4,693,263	0

To the extent that actual funding of the Transition Cost differs from this schedule, gains and losses will accumulate in the Plan's unfunded actuarial accrued liability.

Projected Funded Status

5-Year Projection Assuming 6.75% Investment Return in all Future Years

		A	B	C = (A - B)	D	E = (D/C)
Valuation Date June 30	**Fiscal Year June 30**	**Total AAL (Net of Vol. Cont.)**	**Transition Cost at Fiscal Year**	**Net AAL**	**Assets (Net of Vol. Cont. & RSF)**	**Net Funded Ratio**
2020	2021	$ 177,862,115	$ 12,783,854	$165,078,261	$ 177,451,742	107%
2021	2022	215,504,856	8,797,689	206,707,167	217,360,105	105%
2022	2023	254,996,912	4,542,459	250,454,453	259,663,735	104%
2023	2024	296,614,269	-	296,614,269	304,536,733	103%
2024	2025	340,480,693	-	340,480,693	352,116,999	103%
2025	2026	386,760,293	-	386,760,293	402,618,043	**104%**

Comment 1: Based on this projection, the Funded Status is above 90% by the end of the five-year projection.

Comment 2: The funded status of the Transition Cost determines the amount of ASF Return Excess credited to Component I. For purposes of this valuation we have assumed the Transition Cost is fully funded. For this Component I (Hybrid) valuation, this assumption only affects the Section 9.5 projections. In regards the remedial actions required by Section 9.5, the funded status of the Transition Cost would not have an effect on the remedial actions determined in this valuation.

Comment 3: The current assumptions adopted by the Board for these projections include assumption that the current 12.25% employer contribution rate would continue during the projection period. Now that the Board has adopted a funding policy for employer contributions for FY 2024 and beyond we recommend that this assumption be reviewed. Note, if the assumption were changed this year to assume contributions at the level of the FY 2024 estimate, the result of the projection would continue to show a funded status at or above 100% after the 5-year projection.

History of VPIF Granted to Retirees

Plan Year Ending June 30 of	Actual	Assumed
(1)	(2)	(3)
2014	N/A	N/A
2015	0.0%	0.5%
2016	0.0%	0.5%
2017	1.0%	0.5%
2018	1.0%	0.5%
2019	1.0%	0.5%
2020	1.0%	0.5%

Section 9.5 in its entirety is shown below:

Sec 9.5. Fiscal Responsibility: Benefit Reductions and Increased Funding Obligations

(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 ninety percent (90%), the Trustee may not award the variable Pension Improvement Factor (Escalator) described in Section 6.2 to any individual 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 ninety percent (90%).

(2) In the event the funding level of the Retirement System projected over a five-year period falls below ninety percent (90%), 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 one hundred percent (100%) 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) All amounts credited to the Rate Stabilization Fund shall be transferred to the Pension Accumulation Fund for the purposes of funding benefits payable under the Retirement System;
(c) Mandatory Employee Contributions for active and new employees shall be increased by one percent (1%) for up to the next following five Plan Years;
(d) Mandatory Employee Contributions for active and new employees shall be increased by an additional one percent (1%) per year;
(e) Mandatory Employee Contributions for active and new employees shall be increased by an additional one percent (1%) per year;
(f) The Retirement Allowance payable to a Retiree shall not include the variable Pension Improvement Factor (Escalator) that was most recently paid to the Retiree on the date the funding level is projected to fall below ninety percent (90%);
(g) The Retirement Allowance payable to a Retiree shall not include the variable Pension Improvement Factor (Escalator) that was most recently added to the Member's Retirement Allowance for the Plan Year preceding the Plan Year referenced in paragraph (f) above;
(h) Mandatory Employee Contributions for active and new employees shall be increased by an additional one percent (1%) per year; and
(i) Contributions made to the Retirement System by the City shall be increased, consistent with applicable actuarial principles and the *Public Employee Retirement System Investment Act, as amended, MCL 38.1132 et seq*.

(3) For purposes of this Section 9.5, the "funding level" 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 look back period of smoothed investment returns.

SECTION D

FUND ASSETS

Statement of Plan Assets
(Assets at Market or Fair Value)

Item	June 30, 2020	June 30, 2019
A. Cash and Cash Equivalents	$ 10,606,829	$ 34,463,600
B. Investments		
1. Global equities	$ 72,108,439	$ 56,565,433
2. Global fixed income	32,962,595	19,971,365
3. Real assets	28,740,522	20,954,318
4. Private equity	21,203,134	12,178,552
5. Diversifying strategies	12,428,411	9,591,883
6. Total Investments	$ 167,443,101	$ 119,261,551
C. Receivables		
1. Accrued interest receivable	$ 202,153	$ 211,717
2. Contributions	4,337,723	4,274,284
3. Other accounts receivables	672,527	254,290
4. Notes receivable from participants	0	0
5. Receivables from investment sales	3,608,239	3,587,055
6. Total Receivables	$ 8,820,642	$ 8,327,346
D. Cash and investments held as collateral for securities lending		
1. Commercial paper	$ 1,305,984	$ 0
2. Money market funds	1,768,887	0
3. Certificate of deposit	1,457,973	0
4. Asset-backed securities	2,171,976	2,297,630
5. Repurchase agreements	278,353	1,668,168
6. U.S. corporate floating rate	5,007,796	7,157,221
7. Total	$ 11,990,969	$ 11,123,019
E. Capital assets - Net	$ 1,219,936	$ 776,512
F. Liabilities		
1. Claims payable to retirees and beneficiaries	$ 2,538	$ 3,198
2. Payables for investment purchases	4,104,162	3,924,018
3. Due to City of Detroit, Michigan	0	0
3. Amounts due to broker under securities lending arrangements	11,826,664	10,978,768
4. Other liabilities	94,575	78,499
5. Total Liabilities	$ 16,027,939	$ 14,984,483
G. Total Market Value of Assets Available for Benefits	$ 184,053,538	$ 158,967,545
H. Voluntary employee contribution fund	$ 952,239	$ 472,248
I. Market Value Net of Reserves	$ 183,101,299	$ 158,495,297

Reconciliation of Plan Assets

	Fiscal Year Ending June 30, 2020					FYE June 30, 2019
	Pension Accumulation Fund	Employee Voluntary Contribution	Employee Mandatory Contribution	Rate Stabilization Fund	Total	Total
Market Value Beginning	$ 113,355,746	$ 472,248	$ 41,108,990	$ 4,030,561	$ 158,967,545	$ 127,971,386
Additions:						
Employer Contributions	18,028,236	-	-	-	18,028,236	17,832,015
Member Contributions	13,221	439,745	9,913,207	-	10,366,173	9,768,283
Investment Income - Net	1,348,929	40,246	-	-	1,389,175	5,235,527
Other Income	9,503	-	-	1,618,996	1,628,499	4,042,476
Transfers	-	-	-	-	-	-
Total	19,399,889	479,991	9,913,207	1,618,996	31,412,083	36,878,301
Deductions:						
Benefit Payments	4,361,603	-	-	-	4,361,603	3,617,625
Refund of Member Contributions	-	-	345,445	-	345,445	395,733
Administrative Expenses	1,619,042	-		-	1,619,042	1,868,784
Total	5,980,645	-	345,445	-	6,326,090	5,882,142
Market Value Ending	$ 126,774,990	$ 952,239	$ 50,676,752	$ 5,649,557	$ 184,053,538	$ 158,967,545

SECTION E

PARTICIPANT DATA

Summary of Participant Data
as of June 30, 2020

Actives

A) Count Reported on file	3,313
B) Deferreds - "AnnSt" = "F"	-
C) Non-active status	(20)
D) Agency "88"	-
E) Non-eligible class code & bargaining unit	-
F) Hired after val date	-
G) No date of hire on file	-
H) No salary on file	-
I) Also in retiree file (including DROP)	(734)
J) Actives excluding DROP	2,559

Retired

A) Number of records reported on data file	44,412
B) Number of records not in P/F plan	(27,770)
C) Records not currently in receipt of benefits based on reported status codes	(7,662)
D) Coded as Legacy records	(8,717)
E) Records in DROP	(106)
F) Number of records valued	157

Deferred

A) Number of records reported on data file	173
B) Retired (normal or early) or DROPed in Legacy post 6/30/14 but not in Hybrid retiree, including DROP, file. Also has non-zero contribution balance.	548
C) Deceased	(2)
D) Zero hybrid service	(6)
E) Less than 10 years of vesting service	(10)
F) Zero mandatory contribution balance	(1)
G) Terminated before 6/30/2014	(1)
H) Number of records to value	701

Notes:

Actives 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.”

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

Actives 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.

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.

Retired Row C: The Retired Life file has a field named “STATUS”. We understand that if this field is populated with a number that is one or greater, the member is no longer receiving a benefit and should not be valued.

Reconciliation

	Active		Term. Vested	DROP		Retirees		Totals
	Count	Pay	Count	Count	Monthly Benefits	Count	Monthly Benefits	Count
2019	**2,488**	**$150,041,943**	**583**	**124**	**$ 35,913**	**117**	**$31,326**	**3,312**
Change in Pay/Pensions	N/A	5,882,146	N/A	N/A	327	N/A	458	
New	324	12,475,706	-					324
New Beneficiary						-	-	-
DROP	(13)	(1,177,013)	-	13	8,623			-
Retired	(6)	(408,147)	(2)	(29)	(7,493)	40	9,291	3
Non-Duty Disabled								-
Duty Disabled						-	-	-
Assumed Death/Removals			(14)	-	-	-	-	(14)
Vested Term	(146)	(9,500,811)	141					(5)
Non-Vested Terminated	(101)	(5,126,011)						(101)
Rehired	13	867,645	(9)	(4)	(1,078)	-	-	-
Data Adjustment	-	-	2	2	3,317	-	(26)	4
2020	**2,559**	**$153,055,458**	**701**	**106**	**$39,609**	**157**	**$41,049**	**3,523**

Notable Data Changes:

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

14 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.

3 new retirees came from nowhere. We believe most of these are a result of EDRO's.

The data adjustments relate to records where we could not specifically identify the activity during the year. This could be the result of duplicate social security numbers or corrected social security numbers.

Data Adjustments

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 March 22, 2021 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. System staff has approved the detail and final data disclosed in that letter.

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. The rationale for the demographic assumptions made for the data processing are 1) instructions/discussions with System staff and 2) professional judgement. All data assumptions have been reviewed with and approved by staff before implementation.

Active

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

We have been instructed by System Staff to use bargaining unit information to determine membership in DPLSA and DPCOA. As a result, class information was used from the 2014 valuation data to assign retirement probabilities since class code no longer has meaning under Component I. This information is used to determine DPLSA and DPCOA (and Fire equivalents) membership as defined in Component II as of June 30, 2014. In particular, for members older than 43 or with more than 17 years of service as of June 30, 2014, individuals with DPLSA and DPCOA (and Fire equivalent) class codes were assumed to be eligible for Component II 25 & Out retirement conditions and individuals with DPOA (and Fire equivalent) class codes were assumed to be eligible for Component II 20 & Out retirement conditions.

We have excluded all members reported as in the Component II DROP as of June 30, 2014 from this valuation even though some were reported as active in this plan.

After reviewing the reported payroll for Fire members, which indicated a significant decrease in reported payroll, Retirement Staff directed GRS to use the salary reported in the June 30, 2019 valuation data for this (June 30, 2020) valuation.

Deferred

These records are reported in the Microsoft Access data file in the table titled PF_Benefits_Vested_Hybrid. Information from the Legacy inactive file (Legacy service) is appended to the Hybrid file. Inactive vested members for Component I (Hybrid) have not been fully processed by Detroit staff. In particular, members that have retired or DROPed under the Legacy plan with a deferred Hybrid benefit are not included in the Inactive data sent to us. These members were processed using information from the active or retiree file with the following assumptions:

- Benefit service was calculated by using the time elapsed from June 30, 2014 to the retirement date.
- The AFC that was used to calculate the benefit is the Component II (Legacy) amount reported on the retiree file.

For the inactive vested records, if unavailable, $52,500 was used for the AFC. This estimate was determined by analyzing the AFC reported in the June 30, 2019 inactive vested data.

Retired and Beneficiary

For retirees, 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 three years older than females. Benefits for dependent children are assumed to cease at age 21.

Active Members June 30, 2020
by Attained Age and Years of Eligibility Service

Police Members

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	9							9	$ 375,759
20-24	258							258	12,024,309
25-29	395	40						435	22,257,894
30-34	180	56	23					259	14,473,177
35-39	63	33	58	33	5			192	11,967,427
40-44	16	13	38	79	90	2		238	16,598,837
45-49	4	7	21	53	162	14		261	19,571,914
50-54		3	14	34	98	16	1	166	12,395,747
55-59		2	4	13	28	7	6	60	4,267,100
60-64			1	4	5	1	3	14	972,599
65-69					1	1	1	3	218,449
70-74					1		1	2	156,217
Totals	**925**	**154**	**159**	**216**	**390**	**41**	**12**	**1,897**	**$115,279,429**

Fire Members

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	1							1	$ 10,656
20-24	28	2						30	891,180
25-29	52	21	1					74	3,258,014
30-34	48	49	3	2				102	4,786,390
35-39	13	37	9	9	3			71	4,016,929
40-44	6	10	11	32	41			100	5,819,258
45-49	2	2	5	44	63	14		130	8,392,651
50-54		1	4	17	59	27	5	113	7,740,283
55-59				5	16	9	6	36	2,567,008
60-64					4			4	278,790
65-69		1						1	14,870
70-74									0
Totals	**150**	**123**	**33**	**109**	**186**	**50**	**11**	**662**	**$37,776,029**

** Excluding DROP members.*

Total Active Members June 30, 2020
by Attained Age and Years of Eligibility Service

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	10							10	$ 386,415
20-24	286	2						288	12,915,489
25-29	447	61	1					509	25,515,908
30-34	228	105	26	2				361	19,259,567
35-39	76	70	67	42	8			263	15,984,356
40-44	22	23	49	111	131	2		338	22,418,095
45-49	6	9	26	97	225	28		391	27,964,565
50-54		4	18	51	157	43	6	279	20,136,030
55-59		2	4	18	44	16	12	96	6,834,108
60-64			1	4	9	1	3	18	1,251,389
65-69		1			1	1	1	4	233,319
70-74					1		1	2	156,217
Totals	**1,075**	**277**	**192**	**325**	**576**	**91**	**23**	**2,559**	**$153,055,458**

Summary

	Police	Fire	6/30/2020 Totals	6/30/2019 Totals
Number	1,897	662	2,559	2,488
% Change in active members from prior year	4.6 %	(1.8)%	2.9 %	(3.4)%
Annual payroll ($ millions)	$ 115.3	$ 37.8	$ 153.1	$ 150.0
Average pay	$60,769	$57,063	$59,811	$60,306
% Change in average pay from prior year	1.0 %	(6.0)%	(0.8)%	5.9 %
Average age	36.1	40.9	37.3	38.0
Average benefit service	4.1	5.2	4.4	3.9
Average eligibility service	10.0	14.0	11.1	11.7

** Excluding DROP members.*

Historical Summary of Active Member Data

Valuation	Active Members		Covered Payroll		Average Salary		Average (in Years)		
Date	No.	% Increase	$ Amount	% Increase	$ Amount	% Increase	Age	Service	Entry Age
2014	2,608	N/A	$ 132,566,687	N/A	$ 50,831	N/A	41.0	14.2	26.8
2015	2,484	(4.8)%	131,695,469	(0.7)%	53,017	4.3%	41.0	14.2	26.8
2016	2,483	(0.0)%	128,837,649	(2.2)%	51,888	(2.1)%	40.6	13.8	26.8
2017	2,523	1.6%	141,225,328	9.6%	55,975	7.9%	39.1	12.5	26.6
2018	2,575	2.1%	146,689,948	3.9%	56,967	1.8%	38.4	12.0	26.5
2019	2,488	(3.4)%	150,041,943	2.3%	60,306	5.9%	38.0	11.7	26.3
2020	2,559	2.9%	153,055,458	2.0%	59,811	(0.8)%	37.3	11.1	26.3

Summary of Retiree and Inactive Data

Retirees

	Police	Fire	6/30/2020 Totals	6/30/2019 Totals
Number	103	54	157	117
Annual benefits including annuities as reported	$ 377,825	$ 114,767	$ 492,592	$ 375,915
Average benefits as reported	$ 3,668	$ 2,125	$ 3,138	$ 3,213
% Change in average benefit from prior year	3.0 %	(11.2)%	(2.3)%	26.2 %

Deferred Members

	Police	Fire	6/30/2020 Total	6/30/2019 Total
Number	630	71	701	583
Average AFC	$52,781	$54,107	$52,915	$57,568
Average service	3.2	3.1	3.2	2.6
Annual benefits (estimated)	$ 2,120,693	$ 251,210	$ 2,371,903	$ 1,793,795
Average benefits (estimated)	$3,366	$3,538	$3,384	$3,077
% Change in average Service	17.0%	49.8%	19.5%	27.3%
% Change in average AFC	-8.4%	-4.9%	-8.1%	4.8%

DROP Members

	Police	Fire	6/30/2020 Totals	6/30/2019 Totals
Number	84	22	106	124
Annual benefits as reported	$ 363,594	$ 111,711	$ 475,305	$ 430,952
Average benefits as reported	$ 4,328	$ 5,078	$ 4,484	$ 3,475
% Change in average benefit from prior year	18.2%	72.8%	29.0%	46.3%

Legacy Disabled Members

	Police	Fire	6/30/2020 Totals	6/30/2019 Totals
Number	56	27	83	76
Annual post-conversion benefits (estimated)	$ 779,579	$ 358,919	$ 1,138,498	$ 1,014,546
Average post-conversion benefits (estimated)	$ 13,921	$ 13,293	$ 13,717	$ 13,349
% Change in average benefit from prior year	0.2%	8.7%	2.8%	

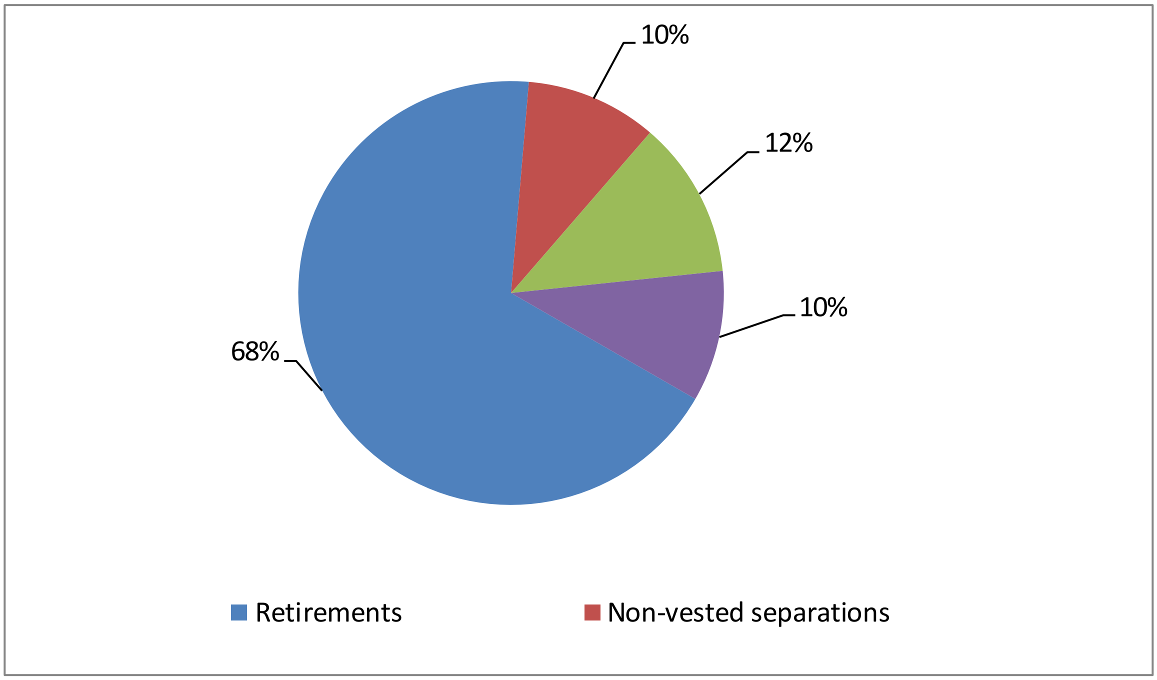
We were not provided with Hybrid specific information for members that entered duty disability after June 30, 2014. In order to value the post-conversion (age 65) benefit for these individuals, we:

- Took duty disability members listed in the Legacy data that became disabled after June 30, 2014;
- Projected Hybrid service from June 30, 2014 to age 65. This service was limited to ensure that total Legacy and Hybrid service would not be greater than 25 years; and
- Computed AFC by using the pre-conversion benefit currently being paid divided by the appropriate pre-conversion multiplier (66 2/3% or 50%).

Summary of Membership Data by Category

	June 30, 2020	June 30, 2019
Active Members (Excluding DROP)		
Number	2,559	2,488
Average age (years)	37.3	38.0
Average service (years)	11.1	11.7
Average salary	$ 59,811	$ 60,306
Total payroll supplied, annualized	$ 153,055,458	$ 150,041,943
Members in DROP		
Number	106	124
Average age (years)	54.5	54.1
Total annual benefits	$ 475,305	$ 430,952
Average annual benefit	$ 4,484	$ 3,475
Vested Inactive Members		
Number	701	583
Average age (years)	49.0	48.5
Total annual deferred benefits	$ 2,371,903	$ 1,793,795
Average annual deferred benefit	$ 3,384	$ 3,077
Service Retirees		
Number	152	112
Average age (years)	56.5	55.5
Total annual benefits	$ 392,923	$ 278,650
Average annual benefit	$ 2,585	$ 2,488
Disability Retirees		
Number	1	1
Average age (years)	60.7	59.7
Total annual benefits	$ 37,998	$ 36,205
Average annual benefit	$ 37,998	$ 36,205
Beneficiaries (Including Death in Service)		
Number	4	4
Average age (years)	24.1	23.1
Total annual benefits	$ 61,671	$ 61,061
Average annual benefit	$ 15,418	$ 15,265
Legacy Disability Retirees		
Number	83	76
Average age (years)	47.3	46.4
Total annual post-conversion benefits	$ 1,138,498	$ 1,014,546
Average annual benefit	$ 13,717	$ 13,349

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 2,559 active members. Eventually, 260 members are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 1,994 members are expected to receive monthly retirement benefits either by retiring directly from active service (including DROP), or by retiring from vested deferred status. 305 members are expected to become eligible for death-in-service or disability benefits.

SECTION F

METHODS AND ASSUMPTIONS

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 PFRS Plan. Under this method, each individual's normal cost is determined as a level percent of pay based on a replacement life normal cost. The 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 or DROP 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.

Unfunded Actuarial Accrued Liabilities - Actual employer contributions through June 30, 2023 are set at 12.25% of pay. Additional funding for Transition Costs may occur as a result of Component II ASF transfers. The amortization period and method after 2023 has not yet been established by the Board.

Present assets are set equal to the Market Value.

The data about persons now covered and about present assets was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the actuary.

Summary of Assumptions Used for DPFRS Actuarial Valuation

All demographic assumptions are estimates of future experience except as noted. The rationale for the assumptions is based on the 2002-2007 Experience Study of the Component II plan unless noted otherwise. The Board has elected to defer the next experience study until a full five years of experience is available after the City's bankruptcy. The next study is anticipated to cover the period from July 1, 2015 through July 30, 2020.

ECONOMIC ASSUMPTIONS

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

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 1.18(3) of the Combined PFRS Plan. This assumption is net of all expenses.

Pay increase assumptions for individual active members are shown on page 37. Part of the assumption for each age is for a merit and/or seniority increase, and the other recognizes wage inflation (as of June 30, 2014, assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter). The rationale for this assumption is that it is consistent with expectations by the employer used during the plan design.

Price inflation is not directly used in the valuation. For purposes of assessing the reasonableness of the assumed rate of return we assumed price inflation of 2.50% per year.

NON-ECONOMIC ASSUMPTIONS

The mortality table used to measure retired life mortality is the RP-2014 Blue Collar Annuitant Table for males and females. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. Pre-retirement mortality is the RP-2014 Blue Collar Employee Tables for males and females. The tables are projected to be fully generational, based on the two-dimensional, sex distinct mortality improvement scale MP-2014 (which was published and intended to be used with RP-2014). The rationale for the mortality assumption is based on the 2008-2013 Mortality Experience Study issued February 13, 2015.

The probabilities of age/service retirement for members eligible to retire are shown on pages 38 through 40. The rationale is based on the 2002-2007 Experience Study modified as necessary to account for the difference in eligibility of the Component I plan.

The probabilities of separation from service are shown for sample ages on page 41.

Sample Salary Adjustment Rates

	Salary Increase Assumptions for an Individual Member		
Service	Merit & Seniority	Base (Economic)*	Increase Next Year
5	5.20%	3.00%	8.20%
10	1.70%	3.00%	4.70%
15	1.00%	3.00%	4.00%
20	1.00%	3.00%	4.00%
25	1.00%	3.00%	4.00%
30	1.00%	3.00%	4.00%
35	1.00%	3.00%	4.00%

** Ultimate rate shown. Base (Economic) salary increase rates as of June 30, 2014 are assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter.*

Single Life Retirement Values Based on RP-2014 Blue Collar for Males and Females

Sample Attained Ages in 2020	Future Life Expectancy (Years) Males	Females
45	39.81	43.14
50	34.82	38.06
55	30.01	33.13
60	25.42	28.35
65	21.06	23.73
70	16.99	19.36
75	13.27	15.31
80	9.97	11.69

Probabilities of Service Retirement for Members Older Than Age 43 or with 17 or More Years of Credited Service (Including Prior Service) as of June 30, 2014

	Percent of Eligible Active Members Retiring or Entering DROP Within Next Year			
	Police		Fire	
Service	20 & Out	25 & Out	20 & Out	25 & Out
19	40%		40%	
20	40%		40%	
21	40%		40%	
22	40%		40%	
23	40%		40%	
24	100%	40%	100%	40%
25	100%	40%	100%	40%
26	100%	40%	100%	40%
27	100%	40%	100%	40%
28	100%	40%	100%	40%
29	100%	100%	100%	100%
30	100%	100%	100%	100%
31	100%	100%	100%	100%
32	100%	100%	100%	100%
33	100%	100%	100%	100%
34	100%	100%	100%	100%
35	100%	100%	100%	100%
36	100%	100%	100%	100%
37	100%	100%	100%	100%
38	100%	100%	100%	100%
39	100%	100%	100%	100%
40	100%	100%	100%	100%

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Probabilities of Service Retirement for Members Older Than Age 43 or with 17 or More Years of Credited Service (Including Prior Service) as of June 30, 2014

	Percent of Eligible Active Members Retiring or Entering DROP Within Next Year	
Age	**Police**	**Fire**
60	40%	100%
61	40%	100%
62	40%	100%
63	40%	100%
64	40%	100%
65	100%	100%
66	100%	100%
67	100%	100%
68	100%	100%
69	100%	100%
70	100%	100%

Members eligible for 20 & Out are assumed to be first eligible for normal retirement after 19 years of service due to their ability to purchase service. Members eligible for 25 & Out are assumed to be eligible for normal retirement after 24 years of service due to their ability to purchase service. Members are also eligible to retire at age 60 with no service requirement.

Probabilities of Service Retirement for Members Age 43 or Younger and with Less Than 17 Years of Service on June 30, 2014

	Percent of Eligible Active Members Retiring or Entering DROP Within Next Year	
Age	Police	Fire
50	30%	20%
51	30%	20%
52	30%	20%
53	30%	20%
54	30%	20%
55	30%	20%
56	30%	20%
57	30%	20%
58	30%	20%
59	30%	20%
60	100%	100%

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Probabilities of Separation

Sample Ages	Years of Service	% of Active Members Withdrawing within Next Year	
		Police	Fire
ALL	0	8.50%	5.00%
	1	7.50%	4.00%
	2	6.00%	3.00%
	3	5.00%	2.00%
	4	4.50%	2.00%
25	5 & Over	4.50%	1.96%
30		3.30%	1.62%
35		2.30%	1.11%
40		1.70%	0.77%
45		1.50%	0.60%
50		1.10%	0.51%
55		0.80%	0.51%
60		0.80%	0.51%

Sample	% of Active Members Becoming Disabled Within Next Year			
	Police		Fire	
Ages	Ordinary	Duty	Ordinary	Duty
25	0.06%	0.13%	0.07%	0.34%
30	0.07%	0.19%	0.08%	0.52%
35	0.08%	0.34%	0.09%	0.90%
40	0.11%	0.49%	0.12%	1.30%
45	0.16%	0.73%	0.18%	1.92%
50	0.47%	1.16%	0.53%	3.06%
55	0.73%	1.96%	0.82%	5.18%
60	0.83%	2.82%	0.94%	7.47%

Miscellaneous and Technical Assumptions
June 30, 2020

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. This assumption accounts for potential dependent children/dependent parent death benefits. No other assumption is made for surviving children/dependent parents. Male spouses are assumed to be three years older than female spouses.
Pay Increase Timing:	End of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year starting on the valuation date.
Decrement Timing:	Decrements are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date of decrement.
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.
Longevity in AFC:	None
Unused Sick Leave Payout:	None
Disability Change Age:	The duty disability benefit is assumed to change at the earlier of age 65 or the time the member would have had 25 years of credited service (including prior service). The benefit at change age was assumed to be 2.0% times final compensation times projected benefit service.
Mandatory Retirement Age:	Currently most members of the DPFRS are subject to a mandatory retirement age of 60. However, we understand that the mandatory retirement age is currently not enforced for Police members. Recent membership data indicates that very few Police members stay in employment past age 65. We have, therefore, assumed employment would end at age 65 for Police members and age 60 for Fire members regardless of the length of their DROP participation at that age.
DROP Assumption:	Members are assumed to retire or DROP based on assumed rates. For Police members, 65% of eligible members are assumed to enter the DROP and remain in the DROP for seven years. For Fire members, 60% of eligible members are assumed to enter the DROP and remain in the DROP for five years. Employer contributions are assumed not to be made on DROP payroll. Expected benefits paid into DROP contributions are discounted at the assumed rate of return for valuation purposes. Balances for current DROP participants are held outside of system assets and are excluded from the valuation.

Miscellaneous and Technical Assumptions
June 30, 2020
(Concluded)

Service Credit Accruals:	Service accruals for calculating benefits begin as of June 30, 2014 for Component I liabilities. However, service in Component II may be used to satisfy benefit eligibility requirements in Component I.
Workers Compensation Offset:	No Workers Compensation offsets are assumed for duty disability benefits.
DROP Account:	Members in the Component II DROP as of June 30, 2014 were excluded from this valuation.
Class Codes/Bargaining Unit:	For valuation purposes, members are categorized as DPOA, DFFA or LSA based on class codes and bargaining units provided by the Retirement System and are primarily used in the valuation to determine deferred retirement commencement.
Form of Payment:	No adjustment has been made for alternate forms of payment elections.
Disability Load:	Duty Disability benefits were increased by 2.0% to account for the Death While Disabled provision based on an analysis of the estimated impact for a sample set of individuals.
IRC Section 415 Limit:	We assumed that no benefits will be limited by IRC Section 415. The limit is assumed to grow with wage inflation.
IRC Section 401(a)(17) Limit:	All of the member salary provided falls below the current 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.
COLA (VPIF):	Unless stated otherwise, liabilities in this report are based on an assumed average 0.5% future VPIF. The rationale is that COLAs are not guaranteed. This assumption was set based on scenario analysis at Plan inception and will be revised as experience emerges and the Plan evolves.
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.
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 1%.

SECTION G

PLAN PROVISION SUMMARY (AS APPROVED BY STAFF)

Summary of Benefit Provisions
(July 1, 2020)

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.

Plan Membership

Employee means an employee of the City's Police Department who has taken an oath of office or a Firefighter providing services to the City, excluding individuals who are compensated on a contractual or fee basis, any person who is classified as a non-common law employee or an independent contractor for federal income tax and withholding, and also excluding the medical Director of the Retirement System.

The membership of the Retirement System shall consist of all employees of the Fire Department of the City of Detroit and of the Police Department of the City of Detroit who are employed as Firefighters or Police Officers according to the rules and regulations of the respective departments.

Appointed Officials of the Police Department or the Fire Department who are appointed from the membership are permitted to remain members. A Police Officer or Firefighter who is **killed or totally disabled prior to being confirmed**, shall be deemed to have been a member as of the date of his or her death. Any member who is **transferred to a civilian position** in his or her department shall continue as a member.

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 a member. Credited Service is recorded from the later of July 1, 2014, or the date of employment with the City as a Police Officer or Firefighter. A member also receives 1 month of Credited Service for each month the member is eligible to receive duty disability benefits, until such time as the member has 25 years of credited service.

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.

Summary of Benefit Provisions
(Continued)

Average Final Compensation

Compensation: Compensation is base salary, excluding bonuses, overtime, sick leave, longevity pay, unused vacation time, etc. 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 5 consecutive years of Credited Service (including Prior Service) immediately preceding the date of the members last termination of City employment as a Police Officer or Firefighter. If the member has less than 5 years of Credited Service (including Prior Service), the Average Final Compensation is the average of the compensation received during all years of Credited Service.

Final Compensation means the annual compensation of a member at the time of last termination of employment.

Normal Retirement

Normal Retirement Age: The Normal Retirement Age is 50 with 25 or more years of Credited Service (including prior service), with the following transition period.

Fiscal Year	Age and Elgibility Service
2015	43 and 20
2016	43 and 20
2017	44 and 21
2018	45 and 22
2019	46 and 23
2020	47 and 24
2021 and later	50 and 25

Normal Retirement Amount: The retirement allowance payable to a member who retires on or after the normal retirement age is 2.0% times Average Final Compensation times Credited Service (after June 30, 2014) measured to the nearest month.

Deferred Retirement (Vested Benefit)

Eligibility: 10 years of Vesting Service.

Benefit Commencement: Age 55.

Annual Amount: Same as Normal Retirement but based on Average Final Compensation and Credited Service at the time of termination. An actuarial reduction from age 62 is applicable if benefits are taken prior to age 62 (*waived for DPLSA and DPCOA members*).

Summary of Benefit Provisions
(Continued)

Duty Disability Retirement

Eligibility: The individual must be totally disabled for duty by reason of illness, injury, or disease resulting from performance of duty.

Amount: For the first 24 months, the member shall receive a basic benefit equal to 50% of his or her final compensation plus a supplemental benefit equal to 16-2/3% of final compensation. After 24 months, if the Board finds that the member is disabled from any occupation the member shall continue to receive both the 50% and the 16-2/3% benefit until the member would have achieved 25 years of service. The 16-2/3% benefit ceases at the time the member would have had 25 years of service, or if the member is found not to be disabled from any occupation after the 24-month review. Duty disability benefits continue to be paid until age 65, unless the member is found not to be disabled prior to that date. Upon termination of disability, or the attainment of age 65, the member's benefit is reduced to the 50% basic benefit. Earned Income in any year acts to reduce the disability benefit in the following year, to the extent that earned income combined with the disability benefit exceeds the compensation at the time of disability (after adjustment for the Variable Improvement factor). Amounts payable from Worker's Comp or similar programs are offset against the amount otherwise payable.

Non-Duty Disability Retirement

Eligibility: Total and permanent disability that is not duty related but that occurred while in the employ of the City.

Amount: If the member has less than 5 years of Credited service, accumulated contributions are refunded or, at the members option, may be payable in the form of a cash refund annuity. No other benefits are payable. Members with 5 or more years of credited service at the time of disability may receive a benefit computed as a Normal Retirement benefit, but not less than 20% of Average Final Compensation. Earned Income in any year acts to reduce the disability benefit in the following year, to the extent that earned income combined with the disability benefit (after adjustment for the Variable Improvement factor) exceeds the compensation at the time of disability. Amounts payable from Worker's Comp or similar programs are offset against the amount otherwise payable.

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: Accumulated Mandatory Employee Contributions are refunded. If there is a surviving spouse, the surviving spouse receives a lifetime pension of 5/11ths of the member's final compensation. Each surviving child under age 18 receives a pension of $1/10^{th}$ of final compensation payable until age 18. If there are more than two surviving children, each receives an equal share of 7/33rds of final compensation, payable to age 18 and redistributed to the remaining children upon attainment of age 18.

Summary of Benefit Provisions
(Continued)

The sum of all benefits payable shall not exceed 2/3rds of the member's Final Compensation. If there is no surviving spouse, each surviving child under age 18 receives a pension of $1/4^{th}$ of the member's final compensation, subject to a maximum total of ½ of final compensation. If there is neither surviving spouse nor surviving children under the age of 18, each dependent parent, if any, shall receive a pension of $1/6^{th}$ of the member's Final Compensation.

Ordinary (Other than Line of Duty) Death Before Retirement

Eligibility: 10 or more years of Vesting Service. 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.

Refund of Mandatory Contributions

A member who ceases to be an employee for reasons other than retirement, 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: In receipt of a retirement allowance for at least 12 months as of the first day of the plan year.

Amount: Beginning July 1, 2015 and effective the first date of each Plan year thereafter, the Board may determine that the Component I Retirement Allowance shall be increased by 1% of the then current (i.e., compounded to include prior VPIF's) 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 90%.

Deferred Retirement Option Program "DROP"

Eligibility: Eligible for immediate retirement under Component I and either a non-union executive or covered by a collective bargaining agreement permitting participation in the DROP.

Amount: Upon entry into the DROP, the member ceases to accrue additional retirement benefits and must elect the optional form under which the retirement allowance will ultimately be paid. 75% of that amount, including VPIF, is paid into the DROP account.

Summary of Benefit Provisions
(Continued)

Investment: ING is currently responsible for the administration and investment of the DROP accounts. As soon as possible after July 1, 2014, the Board shall determine whether or not it is feasible for the Board to administer and invest the DROP accounts, in which case DROP assets would be commingled with Retirement System assets for investment purposes.

Earnings Credits: If the Board administers and invests the accounts, earnings credits shall be 75% of actual net Retirement System earnings rates, but neither less than 0% nor more than 7.75%.

Fees: Fees associated with maintenance of the DROP accounts outside the Retirement System shall be charged directly to DROP participants by means of deductions from their accounts.

Distribution: Upon termination of employment for any reason (including disability), the member's DROP account may be distributed in the form of a lump sum or an annuity. Any such annuity shall be subject to market rates of interest and other market related assumptions. At the same time, the member's monthly retirement allowance shall commence in the amount that would have been paid at the time the member entered the DROP, together with any applicable VPIF increases.

Death While in DROP: In the case of a member who dies during DROP participation, the DROP account balance is paid either to the named beneficiary or to the estate. Further, the DROP election is then rescinded and 100% of the retirement allowance that would have been paid but for participation in the DROP is restored. Survivor benefits are then payable in accordance with the payment option elected by the deceased member at the time the member elected to participate in the DROP.

Termination of DROP: The DROP can be terminated if it is determined that it is not cost neutral and cannot be amended to make it so.

Contributions

Members: Members who were active as of June 30, 2014 contribute 6% of Compensation. Members who are hired or rehired after that date contribute 8% of compensation. DROP participants do not make employee contributions. Member contributions are "picked up" in accordance with IRC 414(h).

Employers: 11.2% of compensation for members of the DPOA until October 3, 2014; 11.2% of Compensation of active employees who are members of the DFFA until November 6, 2014; 12.25% of Compensation of Active employees who are members of the DPCOA, DPLSA, and DPOA from and after October 3, 2014 until June 30, 2023; 12.25% of Compensation of DFFA members from and after November 6, 2014 until June 30, 2023, to be split between the Pension Accumulation Fund and the Rate Stabilization reserve. For Plan years 2024 and later, contributions shall be determined by an Actuary using reasonable and appropriate assumptions approved by the Board and the Investment Committee.

Summary of Benefit Provisions
(Continued)

Voluntary Employee Contributions

Eligibility: Coverage by a collective bargaining agreement that permits the Member to make Voluntary Employee Contributions to Component I. Cannot be a current participant in the DROP.

Amount: Not less than 1% of Compensation nor more than 10% of Compensation. DPOA members can elect to have a whole % of the amount the City pays him or her for accumulated sick leave in excess of 400 hours paid to the voluntary employee account. 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 on Retirement System Assets for the second fiscal year immediately preceding the fiscal 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 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 in either 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.

Summary of Benefit Provisions
(Continued)

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.

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.

Summary of Benefit Provisions (Concluded)

Rehire Before or After Retirement

A former member who is vested and is not a DROP participant and who later becomes a Police Officer or Firefighter (but not a Police Assistant) shall have his or her 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.

Retirement benefits for a Retiree who returns to active full-time employment other than as a Police Assistant 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.

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, Actuarial Value of Assets, and related Actuarial Present Values for a plan.
Actuarial Value of Assets	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).

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.
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 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.
COLA	Cost-of-Living Adjustment.
DFFA	Detroit Fire Fighters Association.
DPCOA	Detroit Police Command Officers Association.
DPOA	Detroit Police Officers Association.
DROP	Deferred Retirement Option Program.
Duration	An approximate measure of sensitivity to changes in interest rates.
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.
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.

Glossary

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 Actuarial Value of Assets to the Actuarial Accrued Liability.
FPA	Funding Policy Assets
FY	Fiscal Year
GASB	Governmental Accounting Standards Board.
GASB No. 67 and GASB 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. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
LSA	Lieutenants and Sergeants Association.
MVA	Market Value Assets
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
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 8th Amended Plan for the Adjustment of the Debt of the City of Detroit.

Glossary

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.
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	The difference between the Actuarial Accrued Liability and Actuarial 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 I – Funding Policy

Police and Fire Retirement System of the City of Detroit
Actuarial Funding Policy

Introduction

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

In 2014, the Plan for the System 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). In accordance with the POA, employer contributions and certain assumptions cannot be changed until fiscal year 2024. This Policy is intended to recognize those items as fixed until 2024 and 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 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.

Funding Objectives

1. Provide benefit security to members of the System:
    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. Fully funding the Legacy Plan liability no later than 2054;
    b. Keeping the Hybrid Plan fully funded; 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 risk.
    a. Perform annual valuations; and
    b. Include post-2024 contribution estimates (based on this Policy) in annual actuarial valuations.

- 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 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 all other 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 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 effective date, known as the Transition Cost. As of June 30, 2017, the AAL (including the Transition Cost) in the Hybrid Plan was fully funded. This Plan could become less than fully funded in the future if experience is less favorable than assumed or there are changes in assumptions or Plan provisions.

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 estimating contributions prior to June 30, 2023, the Funding Value of Assets (or actuarial value of assets) will be equal to the Market Value of Assets, as mandated by the Plan of Adjustment. 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 recognized 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 actuarial valuation will calculate results on both the smoothed value of assets and the (non-smoothed) Market Value of Assets beginning with the June 30, 2019 valuation (the Funding Value of Assets will initially be set to the Market Value of Assets as of June 30, 2018 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 after 2023.

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

c) Layered amortizations will be considered by the Board post-2024.

b. Legacy Plan

a) The Level Dollar amortization method shall be used to systematically eliminate (pay off) the Unfunded Actuarial Accrued Liability (UAAL) over a closed period of 20 years from July 1, 2023 for the UAAL as of July 30, 2022 (projected to July 1, 2023), and

b) Layered amortizations that use 20-year closed periods for gains and losses occurring after June 30, 2022 (each 20-year period starts with the first payment after the applicable gain or loss occurs).

4. Funding Target and Cash Flow Projections

a. The targeted funded ratio shall be 100%.

b. The Legacy Plan 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 90% (Hybrid Plan, only).

5. Risk Management

a. Assumption Changes

a) The actuarial assumptions 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. However, the assumed rate of return and the actuarial value of assets are mandated by the City's POA and cannot be changed prior to June 30, 2023.

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.

c) The next experience study will be performed after the 2020 actuarial valuation and will include both economic (investment return, inflation, etc.) and demographic (mortality, retirement, disability, etc.) assumptions. 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 currently determined

- 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- and 10-year geometric average portfolio rate of return on both the market value and funding value of assets (developed prospectively beginning with the 2019 valuation).
- 5- and 10-year standard deviation of return on both the market value and funding value of assets (developed prospectively beginning with the 2019 valuation).

(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 System 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

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

(iv) Other

Glossary

1. **Actuarial Accrued Liability (AAL):** 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."
2. **Actuarial Assumptions:** Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
3. **Actuarial Cost Method:** A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
4. **Actuarial Gain (Loss):** A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used. 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.
5. **Actuary:** 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.
6. **Amortization:** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
7. **Unit Credit Normal Actuarial Cost Method:** A funding method that calculates the Normal Cost as the present value of the change in accrued benefits for active members.
8. **Experience Study:** 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.
9. **Funding Value of Assets**: 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.
10. **Market Value of Assets:** The fair value of plan assets as reported in the plan's audited financial statements.
11. **Normal Cost (NC):** 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.
12. **Unfunded Actuarial Accrued Liability (UAAL):** The positive difference, if any, between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."

Actuarial Value of Assets

	2019	2020	2021	2022
A. Funding Value Beginning of Year	$ 127,971,386	$ 163,103,424		
B. Market Value End of Year	158,967,545	184,053,538		
C. Market Value Beginning of Year	127,971,386	158,967,545		
D. Contributions During Year:				
D1. City Contributions	17,832,015	18,028,236		
D2. Member Contributions	9,768,283	10,366,173		
D3. Other	4,042,476	1,628,499		
D4. Total	31,642,774	30,022,908		
E. Disbursements:				
E1. Benefits Paid During Year	3,617,625	4,361,603		
E2. Refunds	395,733	345,445		
E3. Total	4,013,358	4,707,048		
F. Investment Income:				
F1. Average Funding Value: A + (D4 - E3) / 2	141,786,094	175,761,354		
F2. Assumed Rate	6.75%	6.75%		
F3. Amount for Immediate Recognition: F1 X F2	9,570,561	11,863,891		
F4. Market Total: B - C - D4 + E3	3,366,743	(229,867)		
F5. Amount for Phased-In Recognition: F4-F3	(6,203,818)	(12,093,758)		
G. Phased-In Recognition of Investment Income:				
G1. Current Year: F5/3	(2,067,939)	(4,031,253)		
G2. 1st Prior Year	0	(2,067,939)	$ (4,031,253)	
G3. 2nd Prior Year	0	0	(2,067,940)	$ (4,031,252)
G3. Total Recognized Investment Gain	(2,067,939)	(6,099,192)	(6,099,193)	(4,031,252)
H. Total Interest Distributed - Current Year: F3 + G3	7,502,622	5,764,699		
I. Funding Value End of Year:				
I1. Preliminary Funding Value End of Year: A + D - E + H	163,103,424	194,183,983		
I2. Upper Corridor Limit 115% x B	182,812,677	211,661,569		
I3. Lower Corridor Limit 85% x B	135,122,413	156,445,507		
I4. **Funding Value End of Year**	**163,103,424**	**194,183,983**		
J. Difference Between Market & Funding Value: B - I4	(4,135,879)	(10,130,445)		
K. Recognized Rate of Return: H / F1	5.29%	3.28%		
L. Market Rate of Return: F4 / (F1 + C - A)	2.37%	(0.13)%		
M. Ratio of Funding Value to Market Value: I4 / B	102.60%	105.50%		

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 unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value. If assumed rates are exactly realized for two consecutive years, the Funding Value will become equal to Market Value.

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May 18, 2021

Mr. David Cetlinski, Executive Director
The Police and Fire Retirement System of the
City of Detroit
One Detroit Center
500 Woodward Avenue, Suite 3000
Detroit, Michigan 48226

Re: June 30, 2020 Police and Fire Component I Actuarial Valuation

Dear David:

Enclosed are 30 copies of the report of the June 30, 2020 annual actuarial valuation of the Police and Fire Component I (Hybrid) Valuation.

Sincerely,

Kenneth G. Alberts

KGA:bd
Enclosures

cc: Kelly Tapper, City of Detroit Retirement Systems
Gail Oxendine, City of Detroit Retirement Systems
David T. Kausch, GRS
Judith A. Kermans, GRS

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